2015-2016 CATALOG

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GILSON TEST SIEVES
ASTM E11; ISO 565, 3310-1

Throughout this catalog and especially here in the Sieving and Screening section, you will find many references to ASTM and ISO test methods and specifications. ASTM International (the American Society for Testing and Materials) and ISO (International Organization for Standardization) are two different groups with similar goals of establishing standardized methods and criteria for testing material. ASTM was originally focused in the United States and North America, and is still the predominant specifying organization. In recent years, they have sought opportunities around the world to expand their effectiveness. ISO has had global influence nearly from the start, and has standards already in place in many countries. In recent years, the two organizations have responded to requests from both members and users of the specifications to insure that documents governing similar procedures are more compatible. This "Harmonization" is ongoing and actively promoted by both societies in many subject areas.

The most commonly used test sieves in North America meet the requirements of ASTM E11, Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves. The ISO equivalent is ISO 565, Test sieves -- Metal Wire Cloth, Perforated Metal Plate and Electroformed Sheet -- Nominal Sizes of Openings, in conjunction with ISO-3310-1, Test Sieves -- Technical Requirements and Testing -- Part 1: Test Sieves of Metal Wire Cloth. ISO sieves are available in a greater number of opening sizes within the total range, and may be a good choice if a specific or custom size is needed for a QC/QA application. ASTM and ISO sieves are constructed to specifications and tolerances that are very similar, in some cases identical. There are some differences in available screen cloth opening sizes, but many openings and wire sizes are exactly the same, with the same tolerances. For example, an ASTM #30 test sieve uses exactly the same cloth as an ISO 600µm sieve; same with ASTM 3/8in and ISO 9.5mm, and many others. Frames for most ASTM test sieves are still constructed in 3in (76mm), 8in (203mm), or 12in (305mm) diameters. There are sometimes other diameters, but the frames are generally referenced in inch units. Most ISO sieves are constructed with either 200mm or 300mm frames, so ASTM and ISO sieves will not nest together in a stack. Gilson 8in or 12in Sieve Shakers will accept stacks of 200mm or 300mm test sieves with no difference in performance. Gilson also stocks all popular sizes of both ASTM and ISO test sieves, so you can be confident that your order will be shipped right away.

Gilson stocks the widest range and largest quantity of sieves of any major supplier. Immediate shipment is available for all popular sizes.

ASTM Sieves meet the requirements of ASTM E11 and AASHTO M 92. ISO Sieves meet ISO 565 specifications with tolerances to ISO 3310-1. All are serial numbered and supplied with a certificate of compliance.

Gilson Test Sieves

ASTM and ISO Test Sieves are categorized in three different classes.

- **Compliance Test Sieves** are supplied with a certificate of manufacturing conformance. All Gilson Test Sieves meet Compliance grade requirements.
- **Inspection Test Sieves** have a specified number of openings measured and detailed documentation is reported for each sieve.
- **Calibration Test Sieves** have two to three times more openings measured than Inspection Test Sieves. Each sieve is supplied with detailed documentation.

Mesh Opening
Opening Sizes are listed using standard millimeter (mm) or micrometer (µm) descriptions, as well as traditional inch and number designations where appropriate. Gilson offers all mesh sizes, but not all sizes are available in every frame diameter. Common coarse sizes are also listed. Normally, every second or fourth size is used, although precision testing may require consecutive sizes. Additional sieves are often inserted into the sequence to avoid overloading of individual sieves or to better define a particular size range.

ISO Sieve Cloth can be mounted in 8in (203mm) frames when special-ordered. These items are nonreturnable when supplied as ordered.

Frame Diameter
Frames should accommodate the entire sample volume with enough surface area to avoid overloading individual sieves. The diameter selected must also fit the sieve shaker being used. Gilson stocks most common sizes diameter sieves.

Frame Height
Sieve frames are designated as Full-Height or Half-Height. Intermediate-Height sieves are also available for 12in diameters. Half or Intermediate-Height frames allow a greater number of sieves to be used when stack height is limited. Full-Height frames allow free movement of larger particles during agitation for more efficient separation. ISO Test Sieves are fitted with black rubber O-Rings.

Frame and Cloth Material
- Stainless Steel Frame with Stainless Steel Cloth assures a sieve with the longest possible service

SIEVE FRAME HEIGHTS & PARTICLE TOPSIZE LIMITS

Sieve		Frame Height Measurements		
Diameter	Frame Designation	Stacked, in (mm)	Overall, in (mm)	Above Cloth, in (mm)
3in (76mm)	FH HH	1-1/8 (28.6) 5/8 (15.9)	1-3/4 (44.5) 1-1/4 (31.8)	1-1/4 (31.8) 5/8 (15.9)
6in (152mm)	FH HH	1-7/8 (47.6) 1-1/8 (28.6)	2-5/8 (66.7) 1-7/8 (47.6)	1-3/4 (44.5) 1 (25.4)
8in (203mm)	FH HH	2-1/8 (54) 1-1/8 (28.6)	2-5/8 (66.7) 1-5/8 (41.3)	2 (50.8) 1 (25.4)
200mm	FH HH	2-1/8 (54) 1-1/8 (28.6)	2-5/8 (66.7) 1-5/8 (41.3)	1.96 (50) .98 (25)
10in (254mm)	FH	3-1/8 (79.4)	4 (101.6)	3 (76.2)
12in (305mm)	FH IH HH	3-3/8 (85.7) 2-1/8 (54) 1-3/4 (44.5)	4-1/4 (108) 3 (76.2) 2-5/8 (66.7)	3-1/4 (82.6) 2 (50.8) 1-5/8 (41.3)
300mm	FH HH	2-1/2 (63.5) 1-1/2 (38.1)	3 (76.2) 2 (50.8)	1.96 (50) .98 (25)
18in (457mm)	FH	4-1/4 (108)	5-1/2 (139.7)	4.5 (114.3)

Combination Sieve

Stainless Steel Sieves

life. This is the best choice where contamination, sanitation or extreme wear is an issue.

- Combination Brass Frame with Stainless Steel Cloth is a popular choice that offers extended service life. The frames of these sieves feature a stainless steel skirt for added durability.

- Brass Frame with Brass Cloth is acceptable for light-duty applications. Coarse-series sieves are not available with brass cloth.

Backing Cloth
Backing Cloth prevents sagging and tearing and improves service life of finer sieves. The #35 stainless steel mesh is located below the primary sieve cloth, increasing the strength of the sieve and reducing distortion of the openings during use. Backing Cloth is available at extra cost for sieves with stainless steel mesh finer than ASTM E11 #70 or ISO565/3310-1 212µm and finer of any frame diameter. To order, add the suffix "BU" to the model number of the sieve. These sieves are made-to-order, have longer delivery time, and are non-returnable.

Pans and Covers
- Pans collect fines at the bottom of the sieve stack. Extended-Rim pans are also available to insert into the middle of a stack, allowing two samples to be tested at once.

- Covers are not necessary with most Gilson sieve shakers, but may be needed if using a different shaker or shaking by hand. The Cover-with-Ring has a wire finger loop in the center to facilitate removal.

Gilson Sieve Verification Services
Gilson Verification can be performed on any test sieve or Gilson screen tray, used or new. These services are ordered by specifying the appropriate model number given in our listing for Test Sieve and Screen Tray Verification and Services. An optical comparator with NIST traceable calibration measures opening sizes and wire diameters on each sieve, and a statistical analysis assures the standard deviations are within ASTM or ISO requirements for Inspection or Calibration grades. Sieves, trays, or wire cloth units are not included in the purchase price of the verification services. Because wire cloth stretches, sags, or tears, and abrasive materials can reduce wire diameters, a verification process should also be set up to regularly verify that working sieves still meet the specifications. To verify used sieves, contact a Gilson customer service representative for re-verification services. Sieves with backing cloth installed cannot be verified to Inspection or Calibration grade.

Standard Reference Materials (SRM's)
Sieve Reference Materials are precision glass beads or powders for performance testing of sieves. They are traceable to the National Institute of Standards and Technology (NIST), or European Community Bureau of Reference (BCR). SRM's fit easily into internal quality programs following guidelines in ASTM E2427, *Sieve Acceptance by Performance Testing.* User-Prepared Reference Materials can also be utilized under E2427 in the same manner as SRM's. Because user materials are non-standard, they are not traceable and require more handling. In addition, the user must determine acceptable tolerances for statistical analysis.

Sieve Shakers
The proper sieve shaker saves considerable time and effort, and yields superior accuracy, consistency, and repeatability compared to manual shaking or hand sieving methods for particle sizing. Effective agitation lifts all particles off the sieve cloth, reorients them, and allows them to be repeatedly "tried" to different openings at different angles. Careful review of shaker specifications allows optimal choices for different materials and applications. Greater sample volumes and large particle topsize may indicate selection of Gilson Test-Master®, Testing Screen or Porta-Screen® models for efficient processing.

helpfulhint

This chart compares standard opening sizes between ASTM E11 and ISO 565/3310-1 Test Sieves.

ASTM/ISO COMPARISON

ASTM/ISO COMPARISON

ASTM E11		ISO 565/3310-1 Size	ASTM E11		ISO 565/3310-1 Size
Alt.	Std.		Alt.	Std.	
5in	125mm	125mm	-	-	1.60mm
4.24in	106mm	106mm	No.14	1.40mm	1.40mm
4in	100mm	100mm	-	-	1.25mm
3 1/2in	90.0mm	90.0mm	No.16	1.18mm	1.18mm
3in	75.0mm	75.0mm	-	-	1.12mm
2 1/2in	63.0mm	63.0mm	No.18	1.00mm	1.00mm
-	-	56.0mm	-	-	900µm
2.12in	53.0mm	53.0mm	No.20	850µm	850µm
2in	50.0mm	50.0mm	-	-	800µm
1 3/4in	45.0mm	45.0mm	No.25	710µm	710µm
-	-	40.0mm	-	-	630µm
1 1/2in	37.5mm	37.5mm	No.30	600µm	600µm
-	-	35.5mm	-	-	560µm
1 1/4in	31.5mm	31.5mm	No.35	500µm	500µm
-	-	28.0mm	-	-	450µm
1.06in	26.5mm	26.5mm	No.40	425µm	425µm
1in	25.0mm	25.0mm	-	-	400µm
7/8in	22.4mm	22.4mm	No.45	355µm	355µm
-	-	20.0mm	-	-	315µm
3/4in	19.0mm	19.0mm	No.50	300µm	300µm
-	18.0mm	18.0mm	-	-	280µm
5/8in	16.0mm	16.0mm	No.60	250µm	250µm
-	-	14.0mm	-	-	224µm
0.530in	13.2mm	13.2mm	No.70	212µm	212µm
1/2in	12.5mm	12.5mm	-	-	200µm
7/16in	11.2mm	11.2mm	No.80	180µm	180µm
-	-	10.0mm	-	-	160µm
3/8in	9.5mm	9.5mm	No.100	150µm	150µm
-	-	9.0mm	-	-	140µm
5/16in	8.0mm	8.0mm	No.120	125µm	125µm
-	-	7.1mm	-	-	112µm
0.265in	6.7mm	6.7mm	No.140	106µm	106µm
1/4in	6.3mm	6.3mm	-	-	100µm
No. 3 1/2	5.6mm	5.6mm	No.170	90µm	90µm
-	-	5.0mm	-	-	80µm
No.4	4.75mm	4.75mm	No.200	75µm	75µm
-	-	4.50mm	-	-	71µm
No.5	4.00mm	4.00mm	No.230	63µm	63µm
-	3.55mm	3.55mm	-	-	56µm
No.6	3.35mm	3.35mm	No.270	53µm	53µm
1/8in[1]	-	-	-	-	50µm
-	3.15mm	3.15mm	No.325	45µm	45µm
No.7	2.80mm	2.80mm	-	-	40µm
-	-	2.50mm	No.400	38µm	38µm
No.8	2.36mm	2.36mm	-	-	36µm
No.10	2.00mm	2.00mm	No.450	32µm	32µm
-	-	1.80mm	No.500	25µm	25µm
No.12	1.70mm	1.70mm	No.635	20µm	20µm

[1]Not a standard ASTM size.

helpfulhint

Sieve Shakers designated as 8in (203mm) or 12in (305mm), refer to the maximum allowable ASTM test sieve diameters. Although ASTM and ISO diameters will not nest together in a stack, ISO 200mm and 300mm diameter test sieves perform equally well in these shakers.

GV-65 Calibration Verification shown with Sieve

GV-66 Calibration Verification shown with Screen Tray


GILSON COMPANY, INC.
COMPLIANCE TEST SIEVE CERTIFICATION
ASTM E 11
ISO 565
ISO 3310-1
BS 410
Serial Number: 00000000
GILSON

Certificate of E11 Compliance for all Sieves

TEST SIEVE & SCREEN TRAY VERIFICATION SERVICES
ASTM E11, E2427; ISO 565, 3310-1

There have been extensive revisions to the newest version of ASTM standard E11, *Specification for Wire Cloth and Sieves for Testing Purposes*. Gilson is leading the way in educating our customers about the new specification and making these new products available. The new specification affects all test sieves, screen trays, and wire cloth, and changes the way the mesh openings are evaluated by looking at the statistical distribution of aperture sizes, rather than just the average opening sizes. In addition to a more accurate and reliable system of evaluation, the new system also allows compatibility with ISO 565 and 3310-1 requirements. There are now three grades, or classes of ASTM or ISO test sieves available; Compliance, Inspection and Calibration.

- **Compliance Test Sieves** are manufactured with wire cloth that has been inspected and measured in roll or sheet quantities prior to being cut and mounted in the individual sieve frames. Opening sizes are not measured in individual sieves. Each Compliance sieve is supplied with a certificate of manufacturing compliance, but no statistical documentation is given. Compliance sieves are designed for applications where a basic, reliable degree of accuracy and repeatability are sufficient.

- **Inspection Test Sieves** have a specified number of openings measured in each sieve after the cloth is mounted in the frame. There is a 99% confidence level that the standard deviation of these openings is within the maximum allowed by ASTM. Inspection Sieves are a good choice in applications where accuracy and repeatability are critical. Each Inspection Sieve consists of a Compliance Sieve with added Inspection Sieve Verification service.

- **Calibration Test Sieves** have about twice as many openings measured as Inspection Sieves. The higher number of openings measured on each sieve increases the confidence level to 99.73% that the standard deviation of these openings is within the maximum allowed by ASTM. Calibration Sieves should be used in applications where a very high degree of accuracy is required. Each Calibration Sieve consists of a compliance sieve with added Calibration Sieve Verification service.

New Gilson Test Sieves are guaranteed to meet the requirements of ASTM or ISO for Compliance, Inspection or Calibration grades as ordered, but for continued assurance of performance, procedures should be in place to regularly check working sieves as they age. Wire cloth stretches, sags, or even tears, and abrasive materials reduce wire diameter, causing increased opening sizes and loss of accuracy over time.

These same verification services are also available for screen trays used in Gilson Testing Screens, Test-Master®, Porta-Screen® and Gilso-Matic® machines.

Gilson Reverification Services can be performed on used ASTM or ISO Test Sieves or Screen Trays. Simply add "R" suffix to the model number of the desired verification grade. An optical comparator with NIST traceable calibration measures opening and wire diameter sizes on each sieve. Certification reports are produced for the appropriate grade. These services are available for all ASTM and ISO sieve sizes and types, and are ordered by specifying model numbers for Inspection Sieve Verification, or Calibration Sieve Verification. Sieves are not included in the purchase price. When verifying used sieves, contact a Gilson customer service representative for shipping instructions.

Master-Matched Sieves are ASTM E11 8in diameter stainless steel or combination sieves from No.8 (2.36mm) to No.325 (45µm) with openings closely matched to a master set of sieves in Gilson's reference laboratory. Master-Matched Sieves are verified to meet ASTM E11, then performance-selected using NIST traceable Standard Reference Materials to correlate with the master set. Each sieve is performance tested to insure it yields ±2.5% by weight of the value of the master sieve.

All Gilson test sieves meet ASTM or ISO requirements for Compliance Test Sieves. Ordering additional verification services for each individual sieve upgrades them to meet Inspection or Calibration specifications.

TEST SIEVE & SCREEN TRAY VERIFICATION & SERVICES

Inspection Test Sieve Verification, ASTM E11	GV-60[1]
Calibration Test Sieve Verification, ASTM E11	GV-65[1]
Inspection Test Sieve Verification, ISO 565 and 3310-1	GV-62[1]
Calibration Test Sieve Verification, ISO 565 and 3310-1	GV-63[1]
Inspection Screen Tray Verification, ASTM E11	GV-61[1]
Calibration Screen Tray Verification, ASTM E11	GV-66[1]
Inspection Screen Tray Verification, ISO 565 and 3310-1	GV-64[1]
Calibration Screen Tray Verification, ISO 565 and 3310-1	GV-67[1]
Master-Matched Sieves	MM-70

[1]To specify Reverified Sieves, add "R" suffix to model number of desired Verification grade.

Combination Sieve

8in Stainless Steel Test Sieves

SS-8R Gilson Tapping Sieve Shaker shown with Sieves

8IN DIAMETER ASTM TEST SIEVES

8IN DIAMETER ASTM TEST SIEVES

	ASTM E11		Stainless Cloth Stainless Frame		Stainless Cloth Brass Frame		Brass Cloth Brass Frame	
	Alt.	Std.	Full Ht.	Half Ht.	Full Ht.	Half Ht.	Full Ht.	Half Ht.
COARSE SERIES	4in	100.0mm	V8SF 4"	—	V8CF 4"	V8CH 4"	—	—
	3-1/2in	90.0mm	V8SF 3-1/2"	—	V8CF 3-1/2"	V8CH 3-1/2"	—	—
	3in	75.0mm	V8SF 3"	—	V8CF 3"	V8CH 3"	—	—
	2-1/2in	63.0mm	V8SF 2-1/2"	—	V8CF 2-1/2"	V8CH 2-1/2"	—	—
	2.12in	53.0mm	V8SF 2.12"	—	V8CF 2.12"	V8CH 2.12"	—	—
	2in	50.0mm	V8SF 2"	—	V8CF 2"	V8CH 2"	—	—
	1-3/4in	45.0mm	V8SF 1-3/4"	—	V8CF 1-3/4"	V8CH 1-3/4"	—	—
	1-1/2in	37.5mm	V8SF 1-1/2"	—	V8CF 1-1/2"	V8CH 1-1/2"	—	—
	1-1/4in	31.5mm	V8SF 1-1/4"	—	V8CF 1-1/4"	V8CH 1-1/4"	—	—
	1.06in	26.5mm	V8SF 1.06"	—	V8CF 1.06"	V8CH 1.06"	—	—
	1in	25.0mm	V8SF 1"	V8SH 1"	V8CF 1"	V8CH 1"	—	—
	7/8in	22.4mm	V8SF 7/8"	V8SH 7/8"	V8CF 7/8"	V8CH 7/8"	—	—
	3/4in	19.0mm	V8SF 3/4"	V8SH 3/4"	V8CF 3/4"	V8CH 3/4"	—	—
	5/8in	16.0mm	V8SF 5/8"	V8SH 5/8"	V8CF 5/8"	V8CH 5/8"	—	—
	0.530in	13.2mm	V8SF .530"	V8SH .530"	V8CF .530"	V8CH .530"	—	—
	1/2in	12.5mm	V8SF 1/2"	V8SH 1/2"	V8CF 1/2"	V8CH 1/2"	—	—
	7/16in	11.2mm	V8SF 7/16"	V8SH 7/16"	V8CF 7/16"	V8CH 7/16"	—	—
	3/8in	9.5mm	V8SF 3/8"	V8SH 3/8"	V8CF 3/8"	V8CH 3/8"	—	—
	5/16in	8.0mm	V8SF 5/16"	V8SH 5/16"	V8CF 5/16"	V8CH 5/16"	—	—
	0.265in	6.7mm	V8SF .265"	V8SH .265"	V8CF .265"	V8CH .265"	—	—
	1/4in	6.3mm	V8SF 1/4"	V8SH 1/4"	V8CF 1/4"	V8CH 1/4"	—	—
	No.3-1/2	5.6mm	V8SF #3-1/2	V8SH #3-1/2	V8CF #3-1/2	V8CH #3-1/2	—	—
	No.4	4.75mm	V8SF #4	V8SH #4	V8CF #4	V8CH #4	—	—
FINE SERIES	No.5	4.0mm	V8SF #5	V8SH #5	V8CF #5	V8CH #5	—	—
	No.6	3.35mm	V8SF #6	V8SH #6	V8CF #6	V8CH #6	—	—
	1/8in[1]	3.18mm	V8SF 1/8"	V8SH 1/8"	V8CF 1/8"	V8CH 1/8"	—	—
	No.7	2.8mm	V8SF #7	V8SH #7	V8CF #7	V8CH #7	—	—
	No.8	2.36mm	V8SF #8	V8SH #8	V8CF #8	V8CH #8	V8BF #8	V8BH #8
	No.10	2.0mm	V8SF #10	V8SH #10	V8CF #10	V8CH #10	V8BF #10	V8BH #10
	No.12	1.7mm	V8SF #12	V8SH #12	V8CF #12	V8CH #12	V8BF #12	V8BH #12
	No.14	1.4mm	V8SF #14	V8SH #14	V8CF #14	V8CH #14	V8BF #14	V8BH #14
	No.16	1.18mm	V8SF #16	V8SH #16	V8CF #16	V8CH #16	V8BF #16	V8BH #16
	No.18	1.0mm	V8SF #18	V8SH #18	V8CF #18	V8CH #18	V8BF #18	V8BH #18
	No.20	850µm	V8SF #20	V8SH #20	V8CF #20	V8CH #20	V8BF #20	V8BH #20
	No.25	710µm	V8SF #25	V8SH #25	V8CF #25	V8CH #25	V8BF #25	V8BH #25
	No.30	600µm	V8SF #30	V8SH #30	V8CF #30	V8CH #30	V8BF #30	V8BH #30
	No.35	500µm	V8SF #35	V8SH #35	V8CF #35	V8CH #35	V8BF #35	V8BH #35
	No.40	425µm	V8SF #40	V8SH #40	V8CF #40	V8CH #40	V8BF #40	V8BH #40
	No.45	355µm	V8SF #45	V8SH #45	V8CF #45	V8CH #45	V8BF #45	V8BH #45
	No.50	300µm	V8SF #50	V8SH #50	V8CF #50	V8CH #50	V8BF #50	V8BH #50
	No.60	250µm	V8SF #60	V8SH #60	V8CF #60	V8CH #60	V8BF #60	V8BH #60
	No.70	212µm	V8SF #70	V8SH #70	V8CF #70	V8CH #70	V8BF #70	V8BH #70
	No.80	180µm	V8SF #80	V8SH #80	V8CF #80	V8CH #80	V8BF #80	V8BH #80
	No.100	150µm	V8SF #100	V8SH #100	V8CF #100	V8CH #100	V8BF #100	V8BH #100
	No.120	125µm	V8SF #120	V8SH #120	V8CF #120	V8CH #120	V8BF #120	V8BH #120
	No.140	106µm	V8SF #140	V8SH #140	V8CF #140	V8CH #140	V8BF #140	V8BH #140
	No.170	90µm	V8SF #170	V8SH #170	V8CF #170	V8CH #170	V8BF #170	V8BH #170
	No.200	75µm	V8SF #200	V8SH #200	V8CF #200	V8CH #200	V8BF #200	V8BH #200
	No.230	63µm	V8SF #230	V8SH #230	V8CF #230	V8CH #230	V8BF #230	V8BH #230
	No.270	53µm	V8SF #270	V8SH #270	V8CF #270	V8CH #270	V8BF #270	V8BH #270
	No.325	45µm	V8SF #325	V8SH #325	V8CF #325	V8CH #325	V8BF #325	V8BH #325
	No.400	38µm	V8SF #400	V8SH #400	V8CF #400	V8CH #400	—	—
	No.450	32µm	V8SF #450	V8SH #450	V8CF #450	V8CH #450	—	—
	No.500	25µm	V8SF #500	V8SH #500	V8CF #500	V8CH #500	—	—
	No.635	20µm	V8SF #635	V8SH #635	V8CF #635	V8CH #635	—	—
	Regular Pan		V8SFXPN	V8SHXPN	V8BFXPN	V8BHXPN	V8BFXPN	V8BHXPN
	Extended Rim Pan		V8SFXPE	V8SHXPE	V8BFXPE	V8BHXPE	V8BFXPE	V8BHXPE
	Regular Cover		V8SFXCV		V8BFXCV		V8BFXCV	
	Cover with Ring		V8SFXCR		V8BFXCR		V8BFXCR	

[1] Not a standard ASTM E11 size.

12IN DIAMETER ASTM TEST SIEVES

12IN DIAMETER ASTM TEST SIEVES

	ASTM		Stainless Cloth Stainless Frame			Stainless Cloth Brass Frame			Brass Cloth Brass Frame		
	Alt.	Std.	Full Ht.	Inter. Ht.	Half Ht.	Full Ht.	Inter. Ht.	Half Ht.	Full Ht.	Inter. Ht.	Half Ht.
COARSE SERIES	4in	100.0mm	V12SF 4"	V12SI 4"	V12SH 4"	V12CF 4"	V12CI 4"	V12CH 4"	—	—	—
	3-1/2in	90.0mm	V12SF 3-1/2"	V12SI 3-1/2"	V12SH 3-1/2"	V12CF 3-1/2"	V12CI 3-1/2"	V12CH 3-1/2"	—	—	—
	3in	75.0mm	V12SF 3"	V12SI 3"	V12SH 3"	V12CF 3"	V12CI 3"	V12CH 3"	—	—	—
	2-1/2in	63.0mm	V12SF 2-1/2"	V12SI 2-1/2"	V12SH 2-1/2"	V12CF 2-1/2"	V12CI 2-1/2"	V12CH 2-1/2"	—	—	—
	2.12in	53.0mm	V12SF 2.12"	V12SI 2.12"	V12SH 2.12"	V12CF 2.12"	V12CI 2.12"	V12CH 2.12"	—	—	—
	2in	50.0mm	V12SF 2"	V12SI 2"	V12SH 2"	V12CF 2"	V12CI 2"	V12CH 2"	—	—	—
	1-3/4in	45.0mm	V12SF 1-3/4"	V12SI 1-3/4"	V12SH 1-3/4"	V12CF 1-3/4"	V12CI 1-3/4"	V12CH 1-3/4"	—	—	—
	1-1/2in	37.5mm	V12SF 1-1/2"	V12SI 1-1/2"	V12SH 1-1/2"	V12CF 1-1/2"	V12CI 1-1/2"	V12CH 1-1/2"	—	—	—
	1-1/4in	31.5mm	V12SF 1-1/4"	V12SI 1-1/4"	V12SH 1-1/4"	V12CF 1-1/4"	V12CI 1-1/4"	V12CH 1-1/4"	—	—	—
	1.06in	26.5mm	V12SF 1.06"	V12SI 1.06"	V12SH 1.06"	V12CF 1.06"	V12CI 1.06"	V12CH 1.06"	—	—	—
	1in	25.0mm	V12SF 1"	V12SI 1"	V12SH 1"	V12CF 1"	V12CI 1"	V12CH 1"	—	—	—
	7/8in	22.4mm	V12SF 7/8"	V12SI 7/8"	V12SH 7/8"	V12CF 7/8"	V12CI 7/8"	V12CH 7/8"	—	—	—
	3/4in	19.0mm	V12SF 3/4"	V12SI 3/4"	V12SH 3/4"	V12CF 3/4"	V12CI 3/4"	V12CH 3/4"	—	—	—
	5/8in	16.0mm	V12SF 5/8"	V12SI 5/8"	V12SH 5/8"	V12CF 5/8"	V12CI 5/8"	V12CH 5/8"	—	—	—
	0.530in	13.2mm	V12SF .530"	V12SI .530"	V12SH .530"	V12CF .530"	V12CI .530"	V12CH .530"	—	—	—
	1/2in	12.5mm	V12SF 1/2"	V12SI 1/2"	V12SH 1/2"	V12CF 1/2"	V12CI 1/2"	V12CH 1/2"	—	—	—
	7/16in	11.2mm	V12SF 7/16"	V12SI 7/16"	V12SH 7/16"	V12CF 7/16"	V12CI 7/16"	V12CH 7/16"	—	—	—
	3/8in	9.5mm	V12SF 3/8"	V12SI 3/8"	V12SH 3/8"	V12CF 3/8"	V12CI 3/8"	V12CH 3/8"	—	—	—
	5/16in	8.0mm	V12SF 5/16"	V12SI 5/16"	V12SH 5/16"	V12CF 5/16"	V12CI 5/16"	V12CH 5/16"	—	—	—
	0.265in	6.7mm	V12SF .265"	V12SI .265"	V12SH .265"	V12CF .265"	V12CI .265"	V12CH .265"	—	—	—
	1/4in	6.3mm	V12SF 1/4"	V12SI 1/4"	V12SH 1/4"	V12CF 1/4"	V12CI 1/4"	V12CH 1/4"	—	—	—
	No.3-1/2	5.6mm	V12SF #3-1/2	V12SI #3-1/2	V12SH #3-1/2	V12CF #3-1/2	V12CI #3-1/2	V12CH #3-1/2	—	—	—
	No.4	4.75mm	V12SF #4	V12SI #4	V12SH #4	V12CF #4	V12CI #4	V12CH #4	—	—	—
FINE SERIES	No.5	4.0mm	V12SF #5	V12SI #5	V12SH #5	V12CF #5	V12CI #5	V12CH #5	—	—	—
	No.6	3.35mm	V12SF #6	V12SI #6	V12SH #6	V12CF #6	V12CI #6	V12CH #6	—	—	—
	1/8in[1]	3.18mm	V12SF 1/8"	V12SI 1/8"	V12SH 1/8"	V12CF 1/8"	V12CI 1/8"	V12CH 1/8"	—	—	—
	No.7	2.8mm	V12SF #7	V12SI #7	V12SH #7	V12CF #7	V12CI #7	V12CH #7	—	—	—
	No.8	2.36mm	V12SF #8	V12SI #8	V12SH #8	V12CF #8	V12CI #8	V12CH #8	V12BF #8	V12BI #8	V12BH #8
	No.10	2.0mm	V12SF #10	V12SI #10	V12SH #10	V12CF #10	V12CI #10	V12CH #10	V12BF #10	V12BI #10	V12BH #10
	No.12	1.7mm	V12SF #12	V12SI #12	V12SH #12	V12CF #12	V12CI #12	V12CH #12	V12BF #12	V12BI #12	V12BH #12
	No.14	1.4mm	V12SF #14	V12SI #14	V12SH #14	V12CF #14	V12CI #14	V12CH #14	V12BF #14	V12BI #14	V12BH #14
	No.16	1.18mm	V12SF #16	V12SI #16	V12SH #16	V12CF #16	V12CI #16	V12CH #16	V12BF #16	V12BI #16	V12BH #16
	No.18	1.0mm	V12SF #18	V12SI #18	V12SH #18	V12CF #18	V12CI #18	V12CH #18	V12BF #18	V12BI #18	V12BH #18
	No.20	850µm	V12SF #20	V12SI #20	V12SH #20	V12CF #20	V12CI #20	V12CH #20	V12BF #20	V12BI #20	V12BH #20
	No.25	710µm	V12SF #25	V12SI #25	V12SH #25	V12CF #25	V12CI #25	V12CH #25	V12BF #25	V12BI #25	V12BH #25
	No.30	600µm	V12SF #30	V12SI #30	V12SH #30	V12CF #30	V12CI #30	V12CH #30	V12BF #30	V12BI #30	V12BH #30
	No.35	500µm	V12SF #35	V12SI #35	V12SH #35	V12CF #35	V12CI #35	V12CH #35	V12BF #35	V12BI #35	V12BH #35
	No.40	425µm	V12SF #40	V12SI #40	V12SH #40	V12CF #40	V12CI #40	V12CH #40	V12BF #40	V12BI #40	V12BH #40
	No.45	355µm	V12SF #45	V12SI #45	V12SH #45	V12CF #45	V12CI #45	V12CH #45	V12BF #45	V12BI #45	V12BH #45
	No.50	300µm	V12SF #50	V12SI #50	V12SH #50	V12CF #50	V12CI #50	V12CH #50	V12BF #50	V12BI #50	V12BH #50
	No.60	250µm	V12SF #60	V12SI #60	V12SH #60	V12CF #60	V12CI #60	V12CH #60	V12BF #60	V12BI #60	V12BH #60
	No.70	212µm	V12SF #70	V12SI #70	V12SH #70	V12CF #70	V12CI #70	V12CH #70	V12BF #70	V12BI #70	V12BH #70
	No.80	180µm	V12SF #80	V12SI #80	V12SH #80	V12CF #80	V12CI #80	V12CH #80	V12BF #80	V12BI #80	V12BH #80
	No.100	150µm	V12SF #100	V12SI #100	V12SH #100	V12CF #100	V12CI #100	V12CH #100	V12BF #100	V12BI #100	V12BH #100
	No.120	125µm	V12SF #120	V12SI #120	V12SH #120	V12CF #120	V12CI #120	V12CH #120	V12BF #120	V12BI #120	V12BH #120
	No.140	106µm	V12SF #140	V12SI #140	V12SH #140	V12CF #140	V12CI #140	V12CH #140	V12BF #140	V12BI #140	V12BH #140
	No.170	90µm	V12SF #170	V12SI #170	V12SH #170	V12CF #170	V12CI #170	V12CH #170	V12BF #170	V12BI #170	V12BH #170
	No.200	75µm	V12SF #200	V12SI #200	V12SH #200	V12CF #200	V12CI #200	V12CH #200	V12BF #200	V12BI #200	V12BH #200
	No.230	63µm	V12SF #230	V12SI #230	V12SH #230	V12CF #230	V12CI #230	V12CH #230	V12BF #230	V12BI #230	V12BH #230
	No.270	53µm	V12SF #270	V12SI #270	V12SH #270	V12CF #270	V12CI #270	V12CH #270	V12BF #270	V12BI #270	V12BH #270
	No.325	45µm	V12SF #325	V12SI #325	V12SH #325	V12CF #325	V12CI #325	V12CH #325	V12BF #325	V12BI #325	V12BH #325
	No.400	38µm	V12SF #400	V12SI #400	V12SH #400	V12CF #400	V12CI #400	V12CH #400	—	—	—
	No.450	32µm	V12SF #450	V12SI #450	V12SH #450	V12CF #450	V12CI #450	V12CH #450	—	—	—
	No.500	25µm	V12SF #500	V12SI #500	V12SH #500	V12CF #500	V12CI #500	V12CH #500	—	—	—
	No.635	20µm	V12SF #635	V12SI #635	V12SH #635	V12CF #635	V12CI #635	V12CH #635	—	—	—
	Regular Pan		V12SFXPN	—	V12SHXPN	V12BFXPN	V12BIXPN	V12BHXPN	V12BFXPN	V12BIXPN	V12BHXPN
	Extended Rim Pan		V12SFXPE	V12SIXPE	V12SHXPE	V12BFXPE	V12BIXPE	V12BHXPE	V12BFXPE	V12BIXPE	V12BHXPE
	Regular Cover			V12SFXCV			V12BFXCV			V12BFXCV	
	Cover with Ring			V12SFXCR			V12BFXCR			V12BFXCR	

[1] Not a standard ASTM E11 size.

ISO 200/300MM TEST SIEVES

200mm ISO Test Sieves

also available

200mm Air Jet Sieves are listed separately in this section.

helpful hint

- ISO Test Sieves are available with opening sizes up to 125mm (5in). Please inquire for openings larger than 63mm.
- ISO Test Sieves are supplied with sieve seal gasket.
- ISO Sieves with 200mm or 300mm frames do not stack with ASTM 8in (203mm) or 12in (305mm) sieves.
- ISO Sieve Cloth can be custom mounted in 8in (203mm) frames. These items are non-returnable when supplied as ordered.
- Sieve Verification Services for ISO Sieves can be found in a separate listing within this section.

ISO 200/300MM TEST SIEVES

	ISO 565, 3310-1	200mm				300mm	
		Stainless Cloth Stainless Frame		Stainless Cloth Brass Frame		Stainless Cloth Stainless Frame	
		Full Ht.	Half Ht.	Full Ht.	Half Ht.	Full Ht.	Half Ht.
COARSE SERIES	63.0mm	V200SF 63M	V200SH 63M	V200CF 63M	V200CH 63M	V300SF 63M	V300SH 63M
	56.0mm	V200SF 56M	V200SH 56M	V200CF 56M	V200CH 56M	V300SF 56M	V300SH 56M
	53.0mm	V200SF 53M	V200SH 53M	V200CF 53M	V200CH 53M	V300SF 53M	V300SH 53M
	50.0mm	V200SF 50M	V200SH 50M	V200CF 50M	V200CH 50M	V300SF 50M	V300SH 50M
	45.0mm	V200SF 45M	V200SH 45M	V200CF 45M	V200CH 45M	V300SF 45M	V300SH 45M
	40.0mm	V200SF 40M	V200SH 40M	V200CF 40M	V200CH 40M	V300SF 40M	V300SH 40M
	37.5mm	V200SF 37.5M	V200SH 37.5M	V200CF 37.5M	V200CH 37.5M	V300SF 37.5M	V300SH 37.5M
	35.5mm	V200SF 35.5M	V200SH 35.5M	V200CF 35.5M	V200CH 35.5M	V300SF 35.5M	V300SH 35.5M
	31.5mm	V200SF 31.5M	V200SH 31.5M	V200CF 31.5M	V200CH 31.5M	V300SF 31.5M	V300SH 31.5M
	28.0mm	V200SF 28M	V200SH 28M	V200CF 28M	V200CH 28M	V300SF 28M	V300SH 28M
	26.5mm	V200SF 26.5M	V200SH 26.5M	V200CF 26.5M	V200CH 26.5M	V300SF 26.5M	V300SH 26.5M
	25.0mm	V200SF 25M	V200SH 25M	V200CF 25M	V200CH 25M	V300SF 25M	V300SH 25M
	22.4mm	V200SF 22.4M	V200SH 22.4M	V200CF 22.4M	V200CH 22.4M	V300SF 22.4M	V300SH 22.4M
	20.0mm	V200SF 20M	V200SH 20M	V200CF 20M	V200CH 20M	V300SF 20M	V300SH 20M
	19.0mm	V200SF 19M	V200SH 19M	V200CF 19M	V200CH 19M	V300SF 19M	V300SH 19M
	18.0mm	V200SF 18M	V200SH 18M	V200CF 18M	V200CH 18M	V300SF 18M	V300SH 18M
	16.0mm	V200SF 16M	V200SH 16M	V200CF 16M	V200CH 16M	V300SF 16M	V300SH 16M
	14.0mm	V200SF 14M	V200SH 14M	V200CF 14M	V200CH 14M	V300SF 14M	V300SH 14M
	13.2mm	V200SF 13.2M	V200SH 13.2M	V200CF 13.2M	V200CH 13.2M	V300SF 13.2M	V300SH 13.2M
	12.5mm	V200SF 12.5M	V200SH 12.5M	V200CF 12.5M	V200CH 12.5M	V300SF 12.5M	V300SH 12.5M
	11.2mm	V200SF 11.2M	V200SH 11.2M	V200CF 11.2M	V200CH 11.2M	V300SF 11.2M	V300SH 11.2M
	10.0mm	V200SF 10M	V200SH 10M	V200CF 10M	V200CH 10M	V300SF 10M	V300SH 10M
	9.5mm	V200SF 9.5M	V200SH 9.5M	V200CF 9.5M	V200CH 9.5M	V300SF 9.5M	V300SH 9.5M
	9.0mm	V200SF 9M	V200SH 9M	V200CF 9M	V200CH 9M	V300SF 9M	V300SH 9M
	8.0mm	V200SF 8M	V200SH 8M	V200CF 8M	V200CH 8M	V300SF 8M	V300SH 8M
	7.1mm	V200SF 7.1M	V200SH 7.1M	V200CF 7.1M	V200CH 7.1M	V300SF 7.1M	V300SH 7.1M
	6.7mm	V200SF 6.7M	V200SH 6.7M	V200CF 6.7M	V200CH 6.7M	V300SF 6.7M	V300SH 6.7M
	6.3mm	V200SF 6.3M	V200SH 6.3M	V200CF 6.3M	V200CH 6.3M	V300SF 6.3M	V300SH 6.3M
	5.6mm	V200SF 5.6M	V200SH 5.6M	V200CF 5.6M	V200CH 5.6M	V300SF 5.6M	V300SH 5.6M
	5.0mm	V200SF 5M	V200SH 5M	V200CF 5M	V200CH 5M	V300SF 5M	V300SH 5M
	4.75mm	V200SF 4.75M	V200SH 4.75M	V200CF 4.75M	V200CH 4.75M	V300SF 4.75M	V300SH 4.75M
	4.50mm	V200SF 4.5M	V200SH 4.5M	V200CF 4.5M	V200CH 4.5M	V300SF 4.5M	V300SH 4.5M
FINE SERIES	4.00mm	V200SF 4M	V200SH 4M	V200CF 4M	V200CH 4M	V300SF 4M	V300SH 4M
	3.55mm	V200SF 3.55M	V200SH 3.55M	V200CF 3.55M	V200CH 3.55M	V300SF 3.55M	V300SH 3.55M
	3.35mm	V200SF 3.35M	V200SH 3.35M	V200CF 3.35M	V200CH 3.35M	V300SF 3.35M	V300SH 3.35M
	3.15mm	V200SF 3.15M	V200SH 3.15M	V200CF 3.15M	V200CH 3.15M	V300SF 3.15M	V300SH 3.15M
	2.80mm	V200SF 2.8M	V200SH 2.8M	V200CF 2.8M	V200CH 2.8M	V300SF 2.8M	V300SH 2.8M
	2.50mm	V200SF 2.5M	V200SH 2.5M	V200CF 2.5M	V200CH 2.5M	V300SF 2.5M	V300SH 2.5M
	2.36mm	V200SF 2.36M	V200SH 2.36M	V200CF 2.36M	V200CH 2.36M	V300SF 2.36M	V300SH 2.36M
	2.24mm	V200SF 2.24M	V200SH 2.24M	V200CF 2.24M	V200CH 2.24M	V300SF 2.24M	V300SH 2.24M
	2.00mm	V200SF 2M	V200SH 2M	V200CF 2M	V200CH 2M	V300SF 2M	V300SH 2M
	1.80mm	V200SF 1.8M	V200SH 1.8M	V200CF 1.8M	V200CH 1.8M	V300SF 1.8M	V300SH 1.8M
	1.70mm	V200SF 1.7M	V200SH 1.7M	V200CF 1.7M	V200CH 1.7M	V300SF 1.7M	V300SH 1.7M
	1.60mm	V200SF 1.6M	V200SH 1.6M	V200CF 1.6M	V200CH 1.6M	V300SF 1.6M	V300SH 1.6M
	1.40mm	V200SF 1.4M	V200SH 1.4M	V200CF 1.4M	V200CH 1.4M	V300SF 1.4M	V300SH 1.4M
	1.25mm	V200SF 1.25M	V200SH 1.25M	V200CF 1.25M	V200CH 1.25M	V300SF 1.25M	V300SH 1.25M
	1.18mm	V200SF 1.18M	V200SH 1.18M	V200CF 1.18M	V200CH 1.18M	V300SF 1.18M	V300SH 1.18M
	1.12mm	V200SF 1.12M	V200SH 1.12M	V200CF 1.12M	V200CH 1.12M	V300SF 1.12M	V300SH 1.12M
	1.00mm	V200SF 1M	V200SH 1M	V200CF 1M	V200CH 1M	V300SF 1M	V300SH 1M
	900µm	V200SF 900U	V200SH 900U	V200CF 900U	V200CH 900U	V300SF 900U	V300SH 900U
	850µm	V200SF 850U	V200SH 850U	V200CF 850U	V200CH 850U	V300SF 850U	V300SH 850U
	800µm	V200SF 800U	V200SH 800U	V200CF 800U	V200CH 800U	V300SF 800U	V300SH 800U
	710µm	V200SF 710U	V200SH 710U	V200CF 710U	V200CH 710U	V300SF 710U	V300SH 710U
	630µm	V200SF 630U	V200SH 630U	V200CF 630U	V200CH 630U	V300SF 630U	V300SH 630U
	600µm	V200SF 600U	V200SH 600U	V200CF 600U	V200CH 600U	V300SF 600U	V300SH 600U
	560µm	V200SF 560U	V200SH 560U	V200CF 560U	V200CH 560U	V300SF 560U	V300SH 560U
	500µm	V200SF 500U	V200SH 500U	V200CF 500U	V200CH 500U	V300SF 500U	V300SH 500U
	450µm	V200SF 450U	V200SH 450U	V200CF 450U	V200CH 450U	V300SF 450U	V300SH 450U
	425µm	V200SF 425U	V200SH 425U	V200CF 425U	V200CH 425U	V300SF 425U	V300SH 425U
	400µm	V200SF 400U	V200SH 400U	V200CF 400U	V200CH 400U	V300SF 400U	V300SH 400U
	355µm	V200SF 355U	V200SH 355U	V200CF 355U	V200CH 355U	V300SF 355U	V300SH 355U
	315µm	V200SF 315U	V200SH 315U	V200CF 315U	V200CH 315U	V300SF 315U	V300SH 315U
	300µm	V200SF 300U	V200SH 300U	V200CF 300U	V200CH 300U	V300SF 300U	V300SH 300U
	280µm	V200SF 280U	V200SH 280U	V200CF 280U	V200CH 280U	V300SF 280U	V300SH 280U
	250µm	V200SF 250U	V200SH 250U	V200CF 250U	V200CH 250U	V300SF 250U	V300SH 250U
	224µm	V200SF 224U	V200SH 224U	V200CF 224U	V200CH 224U	V300SF 224U	V300SH 224U
	212µm	V200SF 212U	V200SH 212U	V200CF 212U	V200CH 212U	V300SF 212U	V300SH 212U
	200µm	V200SF 200U	V200SH 200U	V200CF 200U	V200CH 200U	V300SF 200U	V300SH 200U
	180µm	V200SF 180U	V200SH 180U	V200CF 180U	V200CH 180U	V300SF 180U	V300SH 180U
	160µm	V200SF 160U	V200SH 160U	V200CF 160U	V200CH 160U	V300SF 160U	V300SH 160U
	150µm	V200SF 150U	V200SH 150U	V200CF 150U	V200CH 150U	V300SF 150U	V300SH 150U
	140µm	V200SF 140U	V200SH 140U	V200CF 140U	V200CH 140U	V300SF 140U	V300SH 140U
	125µm	V200SF 125U	V200SH 125U	V200CF 125U	V200CH 125U	V300SF 125U	V300SH 125U
	112µm	V200SF 112U	V200SH 112U	V200CF 112U	V200CH 112U	V300SF 112U	V300SH 112U
	106µm	V200SF 106U	V200SH 106U	V200CF 106U	V200CH 106U	V300SF 106U	V300SH 106U
	100µm	V200SF 100U	V200SH 100U	V200CF 100U	V200CH 100U	V300SF 100U	V300SH 100U
	90µm	V200SF 90U	V200SH 90U	V200CF 90U	V200CH 90U	V300SF 90U	V300SH 90U
	80µm	V200SF 80U	V200SH 80U	V200CF 80U	V200CH 80U	V300SF 80U	V300SH 80U
	75µm	V200SF 75U	V200SH 75U	V200CF 75U	V200CH 75U	V300SF 75U	V300SH 75U
	71µm	V200SF 71U	V200SH 71U	V200CF 71U	V200CH 71U	V300SF 71U	V300SH 71U
	63µm	V200SF 63U	V200SH 63U	V200CF 63U	V200CH 63U	V300SF 63U	V300SH 63U
	56µm	V200SF 56U	V200SH 56U	V200CF 56U	V200CH 56U	V300SF 56U	V300SH 56U
	53µm	V200SF 53U	V200SH 53U	V200CF 53U	V200CH 53U	V300SF 53U	V300SH 53U
	50µm	V200SF 50U	V200SH 50U	V200CF 50U	V200CH 50U	V300SF 50U	V300SH 50U
	45µm	V200SF 45U	V200SH 45U	V200CF 45U	V200CH 45U	V300SF 45U	V300SH 45U
	40µm	V200SF 40U	V200SH 40U	V200CF 40U	V200CH 40U	V300SF 40U	V300SH 40U
	38µm	V200SF 38U	V200SH 38U	V200CF 38U	V200CH 38U	V300SF 38U	V300SH 38U
	36µm	V200SF 36U	V200SH 36U	V200CF 36U	V200CH 36U	V300SF 36U	V300SH 36U
	32µm	V200SF 32U	V200SH 32U	V200CF 32U	V200CH 32U	V300SF 32U	V300SH 32U
	25µm	V200SF 25U	V200SH 25U	V200CF 25U	V200CH 25U	V300SF 25U	V300SH 25U
	20µm	V200SF 20U	V200SH 20U	V200CF 20U	V200CH 20U	V300SF 20U	V300SH 20U
	Pan	V200SF XPN	V200SH XPN	V200BF XPN	V200BH XPN	V300SF XPN	V300SH XPN
	Cover	V200S XCV	V200S XCV	V200B XCV	V200B XCV	V300S XCV	V300S XCV

3in Round Test Sieves

SS-3 shown with 3in Stainless Steel Sieves

3IN DIAMETER ASTM TEST SIEVES

	3IN DIAMETER ASTM TEST SIEVES					
	ASTM		Stainless Cloth Stainless Frame		Stainless Cloth Brass Frame	
	Alt.	Std.	Full Ht.	Half Ht.	Full Ht.	Half Ht.
COARSE	3/8in	9.5mm	V3SF 3/8"	—	—	—
	5/16in	8.0mm	V3SF 5/16"	—	—	—
	0.265in	6.7mm	V3SF .265"	—	—	—
	1/4in	6.3mm	V3SF 1/4"	—	—	—
	No.3-1/2	5.6mm	V3SF #3-1/2	V3SH #3-1/2	V3CF #3-1/2	V3CH #3-1/2
	No.4	4.75mm	V3SF #4	V3SH #4	V3CF #4	V3CH #4
FINE SERIES	No.5	4.0mm	V3SF #5	V3SH #5	V3CF #5	V3CH #5
	No.6	3.35mm	V3CF #6	V3SH #6	V3CF #6	V3CH #6
	No.7	2.8mm	V3SF #7	V3SH #7	V3CF #7	V3CH #7
	No.8	2.36mm	V3SF #8	V3SH #8	V3CF #8	V3CH #8
	No.10	2.0mm	V3SF #10	V3SH #10	V3CF #10	V3CH #10
	No.12	1.7mm	V3SF #12	V3SH #12	V3CF #12	V3CH #12
	No.14	1.4mm	V3SF #14	V3SH #14	V3CF #14	V3CH #14
	No.16	1.18mm	V3SF #16	V3SH #16	V3CF #16	V3CH #16
	No.18	1.0mm	V3SF #18	V3SH #18	V3CF #18	V3CH #18
	No.20	850µm	V3SF #20	V3SH #20	V3CF #20	V3CH #20
	No.25	710µm	V3SF #25	V3SH #25	V3CF #25	V3CH #25
	No.30	600µm	V3SF #30	V3SH #30	V3CF #30	V3CH #30
	No.35	500µm	V3SF #35	V3SH #35	V3CF #35	V3CH #35
	No.40	425µm	V3SF #40	V3SH #40	V3CF #40	V3CH #40
	No.45	355µm	V3SF #45	V3SH #45	V3CF #45	V3CH #45
	No.50	300µm	V3SF #50	V3SH #50	V3CF #50	V3CH #50
	No.60	250µm	V3SF #60	V3SH #60	V3CF #60	V3CH #60
	No.70	212µm	V3SF #70	V3SH #70	V3CF #70	V3CH #70
	No.80	180µm	V3SF #80	V3SH #80	V3CF #80	V3CH #80
	No.100	150µm	V3SF #100	V3SH #100	V3CF #100	V3CH #100
	No.120	125µm	V3SF #120	V3SH #120	V3CF #120	V3CH #120
	No.140	106µm	V3SF #140	V3SH #140	V3CF #140	V3CH #140
	No.170	90µm	V3SF #170	V3SH #170	V3CF #170	V3CH #170
	No.200	75µm	V3SF #200	V3SH #200	V3CF #200	V3CH #200
	No.230	63µm	V3SF #230	V3SH #230	V3CF #230	V3CH #230
	No.270	53µm	V3SF #270	V3SH #270	V3CF #270	V3CH #270
	No.325	45µm	V3SF #325	V3SH #325	V3CF #325	V3CH #325
	No.400	38µm	V3SF #400	V3SH #400	V3CF #400	V3CH #400
	No.450	32µm	V3SF #450	V3SH #450	V3CF #450	V3CH #450
	No.500	25µm	V3SF #500	V3SH #500	V3CF #500	V3CH #500
	No.635	20µm	V3SF #635	V3SH #635	V3CF #635	V3CH #635
	Regular Pan		V3SFXPN	V3SHXPN	V3BFXPN	V3BHXPN
	Extended Rim Pan		V3SFXPE	V3SHXPE	V3BFXPE	V3BHXPE
	Regular Cover		V3SFXCV		V3BFXCV	
	Cover with Ring		V3SFXCR		V3BFXCR	

NEW! Ship Weight Index

The Estimated Ship Weight for every product is easy to find in the NEW Ship Weight Index!

also available

3in Stainless Steel Sieves can be verified to Inspection or Calibration grades under ASTM E11 or ISO 565 and 3310-1 specifications. See our separate listings for Test Sieve and Screen Tray Verification and Services.

Acrylic Frame Sieves with Stainless Steel Mesh

Acrylic Frame Precision Sieves with Electroformed Mesh

3IN ACRYLIC FRAME TEST SIEVES
ASTM E11, E161; ISO 565, 3310-1, 3310-3

3in (76mm) diameter sieves have clear acrylic frames for enhanced sample visibility during testing, and are precision machined for improved fit and reduced sample loss. Frames are available fitted with conventional ASTM E11 stainless steel Woven-Wire cloth or ASTM E161 Precision Electroformed nickel mesh. Each sieve is supplied with a Certificate of Compliance to the appropriate ASTM Standard. Clear Acrylic Spacers are available if fewer sieves are used in the stack.

Woven-wire sieves are available in sizes from 5.60mm (No. 3 ½) to 20µm (No. 635) in ASTM E11 Compliance Grade, and can be Verified or Reverified to Inspection or Calibration grades using Gilson Verification Services. Stack height relative to metal frame sieves allows up to twice as many sieves in a stack. Acrylic frame woven wire sieves are approximately 0.8in (20.3mm).

Precision Electroformed Sieves with their greater accuracy and opening size selection makes them a better solution for precision particle sizing operations. Opening sizes are available to 5µm and include sizes meeting ASTM E161 and ISO 565 requirements. E161 Precision Electroformed Sieves have tolerances to ±2µm, two to ten times lower than ASTM E11 woven-wire sieves, and some openings are equivalent to E11 sizes. When calibrated with glass beads or other means, electroformed sieves can serve as a reliable reference standard. Their increased height limits the number that can be used in a stack. Acrylic frame electroformed sieves are approximately 1.4in (36.8mm).

3in Acrylic Frame Sieves are required for the Gilsonic Autosiever, and a recommended alternative to metal-frame sieves for the Gilson Performer III Sieve Shaker, where the reduced height of the woven wire frames allows up to fourteen sieves in a stack.

3IN ACRYLIC FRAME TEST SIEVES[1]

ASTM E11		Stainless Steel Mesh	ASTM E161 Precision Electroformed
Alt.	Std.		
No.3-1/2	5.60mm	GAA-20	—
No.4	4.75mm	GAA-21	—
No.5	4.00mm	GAA-22	—
No.6	3.35mm	GAA-23	—
No.7	2.80mm	GAA-24	—
No.8	2.36mm	GAA-25	—
No.10	2.00mm	GAA-26	—
No.12	1.70mm	GAA-27	—
No.14	1.40mm	GAA-28	—
No.16	1.18mm	GAA-29	—
No.18	1.00mm	GAA-30	—
No.20	850µm	GAA-31	—
No.25	710µm	GAA-32	—
No.30	600µm	GAA-33	—
No.35	500µm	GAA-34	—
No.40	425µm	GAA-35	—
No.45	355µm	GAA-36	—
No.50	300µm	GAA-37	—
No.60	250µm	GAA-38	—
No.70	212µm	GAA-39	—
No.80	180µm	GAA-40	—
No.100	150µm	GAA-41	GAA-62
No.120	125µm	GAA-42	GAA-63
No.140	106µm	GAA-43	GAA-63A
—	105µm	—	GAA-64
—	100µm	—	GAA-65
—	95µm	—	GAA-66
No.170	90µm	GAA-44	GAA-67
—	85µm	—	GAA-68
—	80µm	—	GAA-69
No.200	75µm	GAA-45	GAA-70
—	70µm	—	GAA-71
—	65µm	—	GAA-72
No.230	63µm	GAA-46	GAA-72A
—	60µm	—	GAA-73
—	55µm	—	GAA-74
No.270	53µm	GAA-47	GAA-74A
—	50µm	—	GAA-75
No.325	45µm	GAA-48	GAA-76
—	40µm	—	GAA-77
No.400	38µm	GAA-49	GAA-77A
—	35µm	—	GAA-78
No.450	32µm	GAA-50	GAA-78A
—	30µm	—	GAA-79
No.500	25µm	GAA-51	GAA-80
No.635	20µm	GAA-52	GAA-81
—	15µm	—	GAA-82
—	10µm	—	GAA-83
—	5µm	—	GAA-84

[1]Inquire for sizes not listed.

alsoavailable

3in Acrylic Frame Test Sieves can be verified to Inspection or Calibration grades under ASTM E11 or ISO 565 and 3310-1 specifications. See our separate listing for Test Sieve and Screen Tray Verification and Services.

6in Stainless Steel Sieves

10in Stainless Steel Sieves

Brass Frame with Stainless Steel mesh

6IN, 10IN, & 18IN DIAMETER ASTM TEST SIEVES

6IN, 10IN & 18IN DIAMETER ASTM TEST SIEVES

	ASTM		6in Diameter		10in Diameter	18in Diameter
			Stainless Cloth Stainless Frame		Stainless Cloth Stainless Frame	Stainless Cloth Brass Frame
	Alt.	Std.	Full Ht.	Half Ht.	Full Ht.	Full Ht.
COARSE SERIES	4in	100.0mm	—	—	V10SF 4"	V18CF 4"
	3-1/2in	90.0mm	—	—	V10SF 3-1/2"	V18CF 3-1/2"
	3in	75.0mm	—	—	V10SF 3"	V18CF 3"
	2-1/2in	63.0mm	—	—	V10SF 2-1/2"	V18CF 2-1/2"
	2.12in	53.0mm	—	—	V10SF 2.12"	V18CF 2.12"
	2in	50.0mm	—	—	V10SF 2"	V18CF 2"
	1-3/4in	45.0mm	—	—	V10SF 1-3/4"	V18CF 1-3/4"
	1-1/2in	37.5mm	—	—	V10SF 1-1/2"	V18CF 1-1/2"
	1-1/4in	31.5mm	—	—	V10SF 1-1/4"	V18CF 1-1/4"
	1.06in	26.5mm	—	—	V10SF 1.06"	V18CF 1.06"
	1in	25.0mm	V6SF 1"	—	V10SF 1"	V18CF 1"
	7/8in	22.4mm	V6SF 7/8"	—	V10SF 7/8"	V18CF 7/8"
	3/4in	19.0mm	V6SF 3/4"	—	V10SF 3/4"	V18CF 3/4"
	5/8in	16.0mm	V6SF 5/8"	—	V10SF 5/8"	V18CF 5/8"
	0.530in	13.2mm	V6SF .530"	—	V10SF .530"	V18CF .530"
	1/2in	12.5mm	V6SF 1/2"	—	V10SF 1/2"	V18CF 1/2"
	7/16in	11.2mm	V6SF 7/16"	—	V10SF 7/16"	V18CF 7/16"
	3/8in	9.5mm	V6SF 3/8"	—	V10SF 3/8"	V18CF 3/8"
	5/16in	8.0mm	V6SF 5/16"	—	V10SF 5/16"	V18CF 5/16"
	0.265in	6.7mm	V6SF .265"	—	V10SF .265"	V18CF .265"
	1/4in	6.3mm	V6SF 1/4"	—	V10SF 1/4"	V18CF 1/4"
	No.3-1/2	5.6mm	V6SF #3-1/2	V6SH #3-1/2	V10SF #3-1/2	V18CF #3-1/2
	No.4	4.75mm	V6SF #4	V6SH #4	V10SF #4	V18CF #4
FINE SERIES	No.5	4.0mm	V6SF #5	V6SH #5	V10SF #5	V18CF #5
	No.6	3.35mm	V6SF #6	V6SH #6	V10SF #6	V18CF #6
	No.7	2.8mm	V6SF #7	V6SH #7	V10SF #7	V18CF #7
	No.8	2.36mm	V6SF #8	V6SH #8	V10SF #8	V18CF #8
	No.10	2.0mm	V6SF #10	V6SH #10	V10SF #10	V18CF #10
	No.12	1.7mm	V6SF #12	V6SH #12	V10SF #12	V18CF #12
	No.14	1.4mm	V6SF #14	V6SH #14	V10SF #14	V18CF #14
	No.16	1.18mm	V6SF #16	V6SH #16	V10SF #16	V18CF #16
	No.18	1.0mm	V6SF #18	V6SH #18	V10SF #18	V18CF #18
	No.20	850µm	V6SF #20	V6SH #20	V10SF #20	V18CF #20
	No.25	710µm	V6SF #25	V6SH #25	V10SF #25	V18CF #25
	No.30	600µm	V6SF #30	V6SH #30	V10SF #30	V18CF #30
	No.35	500µm	V6SF #35	V6SH #35	V10SF #35	V18CF #35
	No.40	425µm	V6SF #40	V6SH #40	V10SF #40	V18CF #40
	No.45	355µm	V6SF #45	V6SH #45	V10SF #45	V18CF #45
	No.50	300µm	V6SF #50	V6SH #50	V10SF #50	V18CF #50
	No.60	250µm	V6SF #60	V6SH #60	V10SF #60	V18CF #60
	No.70	212µm	V6SF #70	V6SH #70	V10SF #70	V18CF #70
	No.80	180µm	V6SF #80	V6SH #80	V10SF #80	V18CF #80
	No.100	150µm	V6SF #100	V6SH #100	V10SF #100	V18CF #100
	No.120	125µm	V6SF #120	V6SH #120	V10SF #120	V18CF #120
	No.140	106µm	V6SF #140	V6SH #140	V10SF #140	V18CF #140
	No.170	90µm	V6SF #170	V6SH #170	V10SF #170	V18CF #170
	No.200	75µm	V6SF #200	V6SH #200	V10SF #200	V18CF #200
	No.230	63µm	V6SF #230	V6SH #230	V10SF #230	V18CF #230
	No.270	53µm	V6SF #270	V6SH #270	V10SF #270	—
	No.325	45µm	V6SF #325	V6SH #325	V10SF #325	—
	No.400	38µm	V6SF #400	V6SH #400	V10SF #400	—
	No.450	32µm	V6SF #450	V6SH #450	V10SF #450	—
	No.500	25µm	V6SF #500	V6SH #500	V10SF #500	—
	No.635	20µm	V6SF #635	V6SH #635	V10SF #635	—
	Regular Pan		V6SFXPN	V6SHXPN	V10SFXPN	V18BFXPN
	Extended Rim Pan		V6SFXPE	V6SHXPE	V10SFXPE	—
	Regular Cover		V6SFXCV	V6SFXCV	V10SFXCV	V18BFXCV
	Cover with Ring		V6SFXCR	V6SFXCR	V10SFXCR	—

AJA-212

Precision Electroformed Sieves

SIEVES FOR MICRON AIR JET SIEVE®

These 200mm diameter sieves are made exclusively for the old-style Micron Air Jet Sieve® instrument. They are supplied in ASTM E11 Compliance Grade, but may be upgraded to Inspection or Calibration Grade. See separate Gilson Test Sieve Verification Service listing for details. Sieves are constructed with stainless steel frame and mesh, and fitted with special sealing gaskets.

SIEVES FOR MICRON AIR JET SIEVE®

ASTM		
Alt.	Std.	Model
No.4	4.75mm	AJA-245
No.5	4.00mm	AJA-244
No.6	3.35mm	AJA-243
No.7	2.80mm	AJA-242
No.8	2.36mm	AJA-241
No.10	2.00mm	AJA-240
No.12	1.70mm	AJA-239
No.14	1.40mm	AJA-238
No.16	1.18mm	AJA-237
No.18	1.00mm	AJA-236
No.20	850µm	AJA-235
No.25	710µm	AJA-234
No.30	600µm	AJA-233
No.35	500µm	AJA-232
No.40	425µm	AJA-231
No.45	355µm	AJA-230
No.50	300µm	AJA-229
No.60	250µm	AJA-228
No.70	212µm	AJA-227
No.80	180µm	AJA-226
No.100	150µm	AJA-224
No.120	125µm	AJA-223
No.140	106µm	AJA-222
No.170	90µm	AJA-220
No.200	75µm	AJA-218
No.230	63µm	AJA-217
No.270	53µm	AJA-216
No.325	45µm	AJA-214
No.400	38µm	AJA-213
No.450	32µm	AJA-212
No.500	25µm	AJA-211
No.635	20µm	AJA-210

technote

Test Sieves used for the new-style AJ-103 and AJ-105 Mikro Air Jet sieves do not require use of the sealing gasket. This can simpley be removed and the SSA-9 Low-Profile O-Ring subsituted.

ASTM PRECISION ELECTROFORMED SIEVES
ASTM E161; ISO 565, 3310-3

At ±2µm, opening tolerances of Precision Electroformed Sieves are consistently more accurate than woven-wire sieves, and sizes are available to 5µm. Electroformed sieve cloth is formed using electrodeposition of nickel, producing a planar mesh with very consistent square openings. Each sieve is measured at over 100 random openings and supplied with a Certificate of Compliance to meet listed standards. The accuracy, efficiency and size range of Electroformed Sieves make them a better solution for precision particle sizing operations. When used with precision vibratory or sonic shakers, Electroformed Sieves are often more productive than woven wire sieves with standard mechanical shakers.They perform well for dry or wet sieving conditions, and can be used with dispersing or wetting agents. When calibrated with glass beads or other reference materials, electroformed sieves can serve as a reliable reference standard.

Electroformed sieves have stainless steel 8in (203.2mm) or 3in (76.2mm) diameter full or half-height frames. Stacking heights for eight inch diameter frames are 2in (50.8mm) and 1in (25.4mm). For three inch frames, stacking heights are 3in (76.2mm) and 1in (25.4mm). The Lines Per Inch (LPI) value indicates the number of openings of the specified size occurring in one linear inch (25.4mm). Higher LPIs are more fragile while low LPIs have thicker metal, but fewer openings. Standard electroformed cloth has a support grid that increases strength and durability, but blocks some openings and reduces sieving efficiency. To order sieves without this support grid, add a "U" to model numbers (price is same). Cloth is bonded to the frame with an epoxy ring. Frames stack with ASTM E11 woven-wire sieves.

Electroformed sieves are precision instruments and ultrasonic cleaning is recommended for normal maintenance. Gilson assumes no responsibility for damage in use, and electroformed sieves are nonreturnable when supplied as ordered. Delivery time is 4 to 6 weeks. Sieves with larger openings or other LPIs can be quoted on request. Special frames in 200mm or 12in (305mm) diameter (20µm mesh and larger only) can also be quoted.

ASTM PRECISION ELECTROFORMED SIEVES[1]

ASTM		8in Frame		3in Frame	
Opening Size	LPI	Full Ht.	Half Ht.	Full Ht.	Half Ht.
75µm	150	V8EF-075	V8EH-075	V3EF-075	V3EH-075
70µm	181	V8EF-070	V8EH-070	V3EF-070	V3EH-070
63µm	181	V8EF-063	V8EH-063	V3EF-063	V3EH-063
60µm	181	V8EF-060	V8EH-060	V3EF-060	V3EH-060
53µm	250	V8EF-053	V8EH-053	V3EF-053	V3EH-053
50µm	250	V8EF-050	V8EH-050	V3EF-050	V3EH-050
45µm	250	V8EF-045	V8EH-045	V3EF-045	V3EH-045
40µm	300	V8EF-040	V8EH-040	V3EF-040	V3EH-040
38µm	300	V8EF-038	V8EH-038	V3EF-038	V3EH-038
32µm	300	V8EF-032	V8EH-032	V3EF-032	V3EH-032
30µm	300	V8EF-030	V8EH-030	V3EF-030	V3EH-030
25µm	400	V8EF-025	V8EH-025	V3EF-025	V3EH-025
20µm	400	V8EF-020	V8EH-020	V3EF-020	V3EH-020
15µm	400	V8EF-015	V8EH-015	V3EF-015	V3EH-015
10µm	500	V8EF-010	V8EH-010	V3EF-010	V3EH-010
5µm	500	V8EF-005	V8EH-005	V3EF-005	V3EH-005
Pan		V8SFXPN	V8SHXPN	V3SFXPN	V3SHXPN
Cover		V8SFXCV	V8SFXCV	V3SFXCV	V3SFXCV
Extended Rim Pan		V8SFXPE	V8SHXPE	V3SFXPE	V3SHXPE

[1]The chart shows our most popular Precision Electroformed Sieve sizes. Please contact us if your size is not listed.

Stainless Steel Wet-Wash Sieves

WT-33C #325

WT-84C #200

DEEP FRAME WET-WASH SIEVES
ASTM E11

Wet-wash sieves are used for fines content determinations or to wash away excessive fines when preparing specimens for particle size testing. All have extra-deep frames above the wire cloth to contain wash water, but will also nest with standard pans and covers. Popular models listed are normally in stock, and feature stainless steel cloth in ASTM No.100, No.200, and No.325 sizes, with stainless steel or brass frames in 12in (305mm), 8in (203mm), or 3in (76mm) diameters. New all-stainless steel Wet-Wash Sieves offer great value, better durability, and much longer service life than brass models.

Inquire for additional mesh sizes. Reinforcing Backing Cloth is recommended for extended service life when using the finer mesh sizes frequently. This can be specified at an additional charge by adding the suffix, "BU" to the model number when ordering. Sieves ordered with Backing Cloth are non-returnable when supplied as ordered. Deep Frame Wet Wash Sieves have holes in the lower flange for water drainage.

Sieves ship with ASTM E11 Compliance Grade certification. Gilson Sieve Verification Services are available for certification to Inspection or Calibration Grade requirements. Overall height of sieves is approximately 0.75—1in (19—25mm) greater than height above cloth.

DEEP FRAME WET-WASH SIEVES

Frame Diameter x Depth in (mm)	ASTM E11 Sieve Opening Alt. (Std.)	Stainless Steel Cloth Stainless Steel Frame	Stainless Steel Cloth Brass Frame
12x8 (305x203)	No. 100 (150um) No. 200 (75µm) No. 325 (45µm)	WT-128S #100 WT-128S #200 WT-128S #325	WT-128C #100 WT-128C #200 WT-128C #325
8x8 (203x203)	No. 100 (150µm) No. 200 (75µm) No. 325 (45µm)	WT-88S #100 WT-88S #200 WT-88S #325	WT-88C #100 WT-88C #200 WT-88C #325
8x6 (203x152)	No. 100 (150µm) No. 200 (75µm) No. 325 (45µm)	WT-86S #100 WT-86S #200 WT-86S #325	- - -
8x4 (203x102)	No. 100 (150µm) No. 200 (75µm) No. 325 (45µm)	WT-84S #100 WT-84S #200 WT-84S #325	WT-84C #100 WT-84C #200 WT-84C #325
3x4 (76x102)	No. 100 (150µm) No. 200 (75µm) No. 325 (45µm)	WT-34S #100 WT-34S #200 WT-34S #325	WT-34C #100 WT-34C #200 WT-34C #325

WT-206

WTA-54

SV-125 shown with Polyester Cloth

SV8-2C and SV8-2F

REPLACEABLE MESH WET-WASH SIEVES
ASTM E11

Replaceable Mesh Sieves for wash-sieving procedures save significant expense. Interchangeable screens change out quickly when worn beyond acceptable limits. Unique cartridge assemblies combine ASTM E11 testing-grade stainless steel wire cloth with sturdy back-up cloth for long life and replacement convenience. Replacement screens are held securely in place using a rubber gasket and stainless steel fasteners. The 8in (203mm) diameter brass frames nest with conventional sieves and pans. Available in 4in (102mm) or 6in (152mm) heights. Replaceable Screens include back-up cloth and are available in No.200 or No.325 mesh.

REPLACEABLE MESH WET-WASH SIEVES	
No.200, 4in height	WT-204
No.200, 6in height	WT-206
No.325, 4in height	WT-324
No.325, 6in height	WT-326
Accessories	
No.200 Replacement Screen	WTA-53
No.325 Replacement Screen	WTA-54

helpfulhint

Wet-wash sieves with back-up cloth or special mesh sizes are made to order and are nonreturnable.

TWO-PART REPLACEABLE MESH SIEVES

Non-Metallic Two-Part 8in (203mm) Transparent Polycarbonate Frames are designed for use with disposable Polyester or Nylon monofilament fabric squares. Two-part frames have 1/4in (6.4mm) wall and press together to tension mesh between them. Inexpensive mesh may be replaced when contaminated or blinded. Assembled sieves nest with each other but not with standard metallic sieves. Sieves have approximately a 2in (51mm) stacking height, 2-3/4in (70mm) overall height, and 2in (51mm) depth to cloth. Frames are not autoclavable.

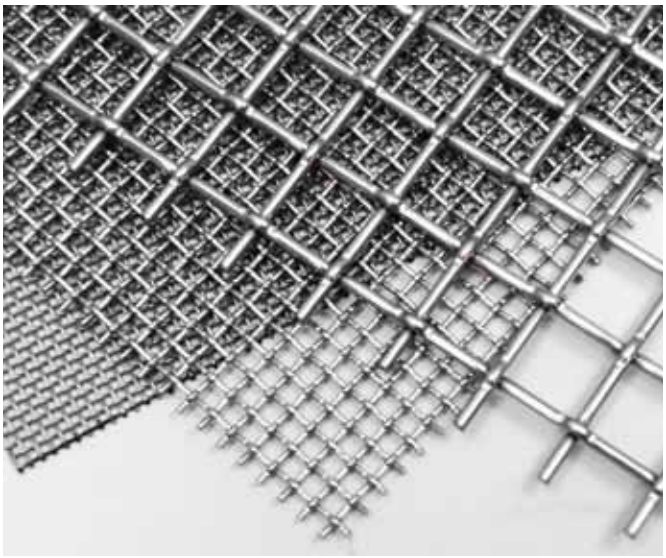
Brass Two-Part 8in Frames can be fitted with 10in (255mm) polyester or nylon monofilament mesh squares. Cloth is placed between the sieve frame and skirt and the two parts are pressed together. Using a fresh cloth eliminates sample contamination from previous tests. Frames are available for fine or coarse cloth. Frames nest with each other or with conventional 8in (203mm) diameter standard sieves.

Polyester or Nylon Cloth Squares are specially designed to fit in either a non-metallic or brass two part frame. Cloth of either Nylon or Polyester is cut into 10in squares. Polyester is recommended for most applications. Each square has a resilient material embedded in the mesh in a circular shape. This material helps cloth to seal with the accompanying two part frame. PM-2 and NM-2 size monofilament cloth choices do not require the resilient material.

TWO-PART REPLACEABLE MESH SIEVES	
Nonmetallic Sieve for No.100 & Finer Mesh	SV-125
Nonmetallic Sieve for No.20—No.80 Mesh	SV-126
Brass Sieve for No.100 & Finer Mesh	SV8-2F
Brass Sieve for No.20—No.80 Mesh	SV8-2C

Accessories

Description	Polyester	Nylon
No.20—No.80 (850—180µm)	PM-1	NM-1
No.100—No.230 (150—63µm)	PM-2	NM-2
No.270, No.325, No.400 (53µm, 45µm, 38µm)	PM-3	NM-3
No.450, No.500, No.635 (32µm, 25µm, 20µm)	PM-4	NM-4
Nominal 15, 10, 7µm	PM-5	NM-5
Polyethylene Film Square for Pan	PM-10	—



ASTM Testing Grade Wire Cloth

Polyester Screen Cloth

ASTM TESTING GRADE WIRE CLOTH
ASTM E11; AASHTO M 92

Quality ASTM E11 testing grade wire cloth also meets AASHTO M 92 and is the same used in test sieves and screen trays. Stainless steel cloth is available in all E11 sizes, and brass cloth has openings from 2.36mm to 45µm (No.8 to No. 325). Inquire for wire cloth meeting ISO 565 and 3310 requirements. Some plain steel cloth is available on request, but cost of higher quality stainless steel is close to the same.

Gilson supplies cut wire cloth within the limitations of roll size. Most sizes are in stock up to 34x40in (864x1,016mm); inquire for larger dimensions. Each piece of wire cloth cut is priced by full square feet, so one 10x10in cut piece will be priced as a full square foot. Inquire for pricing if multiple small pieces or special shapes are required. It can be beneficial to purchase by the square foot to avoid unnecessary cutting charges. Cloth cut to order is nonreturnable.

ASTM TESTING GRADE WIRE CLOTH

Mesh Size	Stainless Steel	Brass
4in—1/4in (100—6.3mm)	WC-3S	—
No.8—No.170 (2.36mm—90µm)	WC-5S	WC-5
No.200 (75µm)	WC-200S	WC-200
No.230 (63µm)	WC-230S	WC-230
No.270 (53µm)	WC-270S	WC-270
No.325 (45µm)	WC-325S	WC-325
No.400 (38µm)	WC-400S	WC-400
No.450 (32µm)	WC-450S	—
No.500 (25µm)	WC-500S	—
No.635 (20µm)	WC-635S	—

POLYESTER OR NYLON SCREEN CLOTH

For special applications where metallic wire cloth cannot be used, choose Polyester or Nylon cloth with openings equivalent to US Standard sizes from No.6 to No.635. Both materials have very consistent opening sizes, but average openings and thread diameter may vary substantially from ASTM E11 tolerances for metallic woven wire cloth.

Polyester has good abrasion resistance, and is very resistant to most acids and alkalis up to pH of 9-10. It has very good wet stability. Nylon has excellent abrasion resistance, high tensile strength, and is resistant at high pH conditions, but tends to stretch in water.

Screen Cloth is supplied cut within the limitations of standard 46in (1,068mm) roll width. Each piece of cloth cut is priced by full square feet, so one 10x10in cut piece will be priced as a full square foot. Inquire for pricing if multiple small pieces, special shapes or wider pieces are required. It can be beneficial to purchase by the square foot to avoid unnecessary cutting charges. Cloth cut to order is nonreturnable.

POLYESTER OR NYLON SCREEN CLOTH

Mesh Size	Polyester	Nylon
No.6—No.18 (3.35—1.00mm)	PM-A	NM-A
No.20—No.80 (850—180µm)	PM-B	NM-B
No.100—No.230 (150—63µm)	PM-C	NM-C
No.270—No.400 (53—38µm)	PM-D	NM-D
No.450—No.635 (32—20µm)	PM-E	NM-E
Nominal 15, 10, or 7µm	PM-F	NM-F

SV-155, SV-165 & SV-205 shown with SV-216

SSA-820 shown with Sieves

SSA-803 shown with 8in full-height Sieves

3IN NON-METALLIC SIEVES

Clear, durable polycarbonate-frame sieves are 3in (76mm) in diameter and hand-made by Gilson for special applications. Polyester mesh has opening sizes matching US Standard series from No.50 (300µm) to No.635 (20µm), as well as 7, 10 and 15µm. Mesh and frame assembly is secured with heat-cured acrylic cement and silicone sealant. An elastic polylefin band covers the frame joint and provides an effective seal when nesting. Sieves are autoclavable and microwaveable for drying.

Transparent frames make it easy to visually monitor specimen performance during separation or liquid levels during wet-sieving operations. Sieves are approximately 1-3/4in (45mm) overall height, 1-1/4in (32mm) stacked, and 2-7/8in (73mm) inside diameter. These sieves do not nest with standard metallic sieves. Special SV-217 Wet-Test Pan is 2-1/2in (64mm) deep and has drain for 3/8in (9.5mm) tube connection. SV-218 Extended-Rim Pan can be inserted in the middle of a sieve stack, allowing more than one specimen to be tested at a time. Specify opening size when ordering.

3IN NON-METALLIC SIEVES

No.35—No.45 (500—355µm)	SV-135
No.50—No.80 (300—180µm)	SV-155
No.100—No.200 (150—75µm)	SV-165
No.230—No.400 (63—38µm)	SV-185
No.450—No.635 (32—20µm)	SV-205
Nominal 15, 10, 7µm	SV-206

Accessories

Sieve Cover	SV-215
Regular Pan	SV-216
Wet-Test Pan	SV-217
Extended-Rim Pan	SV-218
3/8in (9.5mm) Vinyl Tubing, per foot	WT-4

SIEVE STORAGE RACKS

SSA-820 Wall-Mount Sieve Rack creates wall-mounted storage for 8in (203mm) diameter sieves. Sieves are held on edge in eleven individual 3in (76mm) wide compartments, each holding one full-height or two half-height sieves. Compartment bottoms are neoprene lined and inclined to keep sieves in place. Construction is all stainless steel. Holes are provided for mounting on 16in (406mm) centers and for bolting racks together vertically and/or horizontally. Rack construction is all stainless steel with rubber feet for desk or counter top use. The bottom front flange has a 1-1/4in (32mm) high area to label slots for sieve sizes. **Product Dimensions:** 34-1/4x9x11in (870x229x279mm), WxDxH.

SSA-822 Adjustable Wall-Mount Sieve Rack for 12in (305mm) diameter sieves is similar in design to SSA-820, but has slots every 1/2in (13mm) for variable placement of the eight supplied dividers. Capacity is eight full-height or fourteen half-height sieves. Additional dividers are available in sets of five as SSA-823. Sieve Rack Units are shipped with instructions for simple user assembly. **Product Dimensions:** 36-1/4x13x15-3/4in (921x330x400mm), WxDxH.

SSA-803 Adjustable Bench Sieve Rack holds all diameters of sieves up to 12in (305mm). This rack eliminates clutter and inconvenience of nested storage and facilitates easy retrieval of sieves for speed and efficiency in the lab. Stainless steel rack has non-skid rubber feet, and is supplied with two permanent and two adjustable rubber-coated sieve support rods. Unit accommodates twenty full-height (forty half-height) 8in sieves, twelve full-height (twenty four half-height) 12in sieves, or forty full-height 3in sieves. Sizes may also be mixed, and be as small as 3in diameter. SSA-804 Support Rod Set contains two rubber-covered rods, and may be used to increase the capacity for 3in full-height sieves to eighty. **Product Dimensions:** 26x13x13in (660x330x330mm), WxDxH.

SIEVE STORAGE RACKS

Wall-Mount Sieve Rack	SSA-820
Adjustable Wall-Mount Sieve Rack	SSA-822
Adjustable Bench Sieve Rack	SSA-803

Accessories

Dividers for SSA-822	SSA-823
Support Rod Set for SSA-803	SSA-804

Whitehouse Sieve Standards

NIST Glass Beads

WHITEHOUSE SIEVE STANDARDS

Whitehouse Sieve Standards provide a unique method of calibrating No.6 (3.35mm) and finer sieves with traceability to NIST. Calibrations can be performed in minutes, with no need to ship the sieves back or have them out of service. Periodic checks serve as an indicator of when to replace sieves. Each Whitehouse Standard comes as five single-use vials of glass beads for use with a single sieve size. A single vial is used for 8in or 200mm sieves, while two to five vials are used for sieves up to 18in or 450mm in diameter. After processing, the average aperture is quickly read from the calibration graph provided.

Whitehouse has been selected by the Community Bureau of Reference (BCR) to produce standards for the European Community. Whitehouse Sieve Standards are traceable to NIST and NPL as well as to BCR. The highly spherical beads are made from 2.45 specific gravity soda-lime glass and certified for size using electroformed sieves with checks using microscopy and image analysis.

WHITEHOUSE SIEVE STANDARDS

Sieve Size	Nominal Wt. per Vial, g	Number of Vials	Model
No.635 (20µm)	0.8	5	BS-391
No.500 (25µm)	0.8	5	BS-392
No.450 (32µm)	1.0	5	BS-393
No.400 (38µm)	1.0	5	BS-394
No.325 (45µm)	1.0	5	BS-395
No.270 (53µm)	1.0	5	BS-396
No.230 (63µm)	1.0	5	BS-397
No.200 (75µm)	1.0	5	BS-398
No.170 (90µm)	1.0	5	BS-399
No.140 (106µm)	1.0	5	BS-400
No.120 (125µm)	1.0	5	BS-401
No.100 (150µm)	1.5	5	BS-402
No.80 (180µm)	1.5	5	BS-403
No.70 (212µm)	1.5	5	BS-404
No.60 (250µm)	2.5	5	BS-405
No.50 (300µm)	2.5	5	BS-406
No.45 (355µm)	2.5	5	BS-407
No.40 (425µm)	2.5	5	BS-408
No.35 (500µm)	2.5	5	BS-409
No.30 (600µm)	2.5	5	BS-410
No.25 (710µm)	2.5	5	BS-411
No.20 (850µm)	3.0	5	BS-412
No.18 (1.00mm)	7.0	5	BS-413
No.16 (1.18mm)	10.0	5	BS-414
No.14 (1.40mm)	15.0	5	BS-415
No.12 (1.70mm)	15.0	5	BS-416
No.10 (2.00mm)	20.0	5	BS-417
No.8 (2.36mm)	20.0	5	BS-418
No.7 (2.80mm)	25.0	5	BS-419
No.6 (3.35mm)	25.0	5	BS-420

NIST REFERENCE MATERIALS

Gilson stocks a number of Standard Reference Materials, (SRM's) issued by the US National Institute of Standards and Technology (NIST) for calibration of sieves, sedimentation instruments, particle counters, and other instruments.

BS-5, BS-10, BS-20, BS-30A and BS-40B are calibrated glass beads for determining effective sieve opening. (NOT for determining conformity to specifications.) They are also useful for calibration of electroformed sieves. The entire sample is placed on clean sieves and shaken in the manner that tests will be made on test samples. Percent of glass beads retained on each sieve is calculated, and effective opening of each of the sieves is determined from calibration data on the NIST Certificate supplied with the bead set.

BS-42 is a set of three 150g bottles of different sands for use in sieving. Material A is the coarsest for testing sieves from No.30—No.100. Material C is for No.70—No.200 sieves and Material D is for finer sieves, No.100—No.325.

BS-50 Portland Cement No.114 is twenty units, each in a sealed pouch. This is used for Wagner Turbidimeter (ASTM C115; AASHTO T 98), Blaine fineness apparatus (ASTM C204; AASHTO T 153), the 2in diameter No.325 sieve used in fineness tests (ASTM C430; AASHTO T 192), and others.

NIST REFERENCE MATERIALS

Material	Model	Range	Quantity
NIST Glass Beads	BS-5	No.10—No.20 (2450—750µm)	200g
	BS-10	No.25—No.60 (750—220µm)	87g
	BS-20	No.45—No.140 (400—100µm)	70g
	BS-30A	No.120—No.270 (125—53µm)	43g
	BS-40B	No.400—No.635 (38—20µm)	28g
NIST Sand	BS-42	No.30—No.325 (600—45µm)	3 bottles
NIST No.114 Portland Cement	BS-50	—	20 units

helpfulhint

Gilson Sieve Verification and Re-Verification Services ensure your sieves meet ASTM E11 or ISO 565 Inspection and Calibration Grade requirements. Now available for Testing Screen Trays as well.

TSA-168 TSA-170 TSA-173

TSA-172

TSA-171

TSA-174

TSA-176

WT-6

TSA-177 & TSA-178

TSA-182 & TSA-183

TSA-184, TSA-186 & TSA-188

TSA-198 thru 208

BRUSHES

BRUSHES	
Small Fine Sieve Cleaning Brush has soft, 100% China bristles in round 3/4in (19mm) ferrule that are tapered for use with fine mesh sieves. Especially handy for 3in diameter or Precision Electroformed sieves and others of small diameter. Overall length is 5in (127mm) with wood handle.	TSA-168
Fine Sieve Cleaning Brush is ideal for cleaning No.16 and finer sieves. Soft bristle, nickeled steel ferrule, lacquered wood handle, 1-1/4in diameter and 5-3/4in long.	TSA-170
Wire Loop Brush is a 1-1/4in wide fan type brush with 1-5/8in long metal bristles and a wire loop handle. The 4-3/4in long brush is designed for use on coarse wire cloth.	TSA-173
Coarse Sieve Cleaning Brush has an 8-1/2in curved plastic handle with 1-1/2in x 1-3/4in of slanted brass wire bristles—perfect for No.30 and coarser wire cloth in round sieves.	TSA-172
Coarse Screen Tray Brush is recommended for No.30 and coarser wire cloth in screen trays. The 13in curved wooden handle has 5-1/2in x 3/4in of fine (0.005) brass wire bristles, which slant toward the tip for cleaning corners of screen trays. Also useful for cleaning molds.	TSA-171
Table Brush has 9x3in of horsehair bristles. This 14in long brush comes with a plastic or wood handle, depending on availability. A general purpose brush suitable for clean up of lab equipment.	TSA-174
Wire Scratch Brush has flat wire bristles that are grouped in 5x10 rows. Sturdy wood block handle is 7-3/4in long x 2-5/8in wide. The TSA-176, with 2in bristles, may be used on soil-cement specimens to meet ASTM D 559, D 560, AASHTO T 135, and T 136. The TSA-176A is the same brush with 1-1/4in bristles. Wire Scratch Brush, 2in Bristles Wire Scratch Brush, 1-1/4in Bristles	 TSA-176 TSA-176A
Scrub Brushes are available in 20in (508mm) long-handled, or 8in (203mm) short-handled versions, and stand up to heavy everyday use in the field. Both feature durable, solid plastic handles and sturdy, acid-resistant synthetic fibers. Short Scrub Brush, 8in (203mm) Long Scrub Brush, 20in (508mm)	 TSA-232 TSA-233
Camel Hair Brush Set for delicate mesh includes two flat-tip and two round-tip brushes.	WT-6

TSA-232

TSA-233

SCOOPS

SCOOPS					
Type	**Model**	**Capacity oz (L)**	**Bottom Type**	**Bowl LxW, in**	**Overall Length in**
Plastic	TSA-177	32 (0.95)	Flat	6.5 x 5.0	11.5
	TSA-178	82 (2.4)	Flat	9.0 x 6.0	14.5
Aluminum	TSA-182	38 (1.12)	Flat	8.8 x 5.3	14.0
	TSA-183	3.5 (0.10)	Flat	4.8 x 2.8	8.5
	TSA-193	2 (0.05)	Round	4.5 x 2.0	7.8
	TSA-184	5 (0.15)	Round	4.8 x 2.5	7.3
	TSA-185	12 (0.36)	Round	5.8 x 3.3	8.8
	TSA-186	24 (0.71)	Round	7.0 x 3.8	10.5
	TSA-187	85 (2.37)	Round	11.8 x 6.3	16.0
	TSA-188	38 (1.12)	Round	8.8 x 4.6	12.3
	TSA-189	58 (1.71)	Round	10.0 x 5.3	14.3
Stainless Steel	TSA-198	4 (0.11)	Round	3.0 x 5.0	9.0
	TSA-205	12 (0.36)	Flat	5.5 x 3.0	9.0
	TSA-206	24 (0.71)	Flat	7.0 x 4.5	12.0
	TSA-207	45 (1.33)	Flat	8.0 x 5.5	13.5
	TSA-208	63 (1.86)	Flat	10 x 7.0	15.0

ULTRASONIC SIEVE CLEANERS

Gilson Ultrasonic Sieve Cleaners are ideal for safe and efficient cleaning of fine-mesh sieves from 3 to12in (75 to 305mm) diameters, including fragile electroformed cloth sieves. Ultrasonic energy waves create rapid cavitation, agitating and freeing lodged particles. Most meshes are completely cleaned in one to five minutes.

UB-1 shown with 8in Sieves

UB-15

UB-18 shown with 8in Sieves

ULTRASONIC SIEVE CLEANERS				
Description	**Model**	**Tank Capacity, qt (L)**	**Tank Dimensions, LxWxH, in (mm)**	**External Dimensions, LxWxH, in (mm)**
Ultrasonic 8in Sieve Cleaner is sized for full immersion cleaning of up to four 8in (203mm) full-height sieves. Generating unit is housed separately from the stainless steel liquid tank for safe and convenient use. Threaded inlet and outlet drain connections are provided. Generator has On/Off push button. Ultrasonic frequency is 80kHz. A UBA-1 Sieve Holder Rack is included. Extra Racks can be ordered separately to increase productivity.		16 (15.1)	12x10x9 (305x254x229)	15x13x13 (381x330x330)
Ultrasonic 8in Sieve Cleaner 115V, 50/60Hz	UB-1			
Ultrasonic 8in Sieve Cleaner 220V, 50/60Hz	UB-1A			
Sieve Holder Rack for 8in Sieves	UBA-1			
Ultrasonic 12in Sieve Cleaner has identical performance features to UB-1, but the tank is sized for full-immersion of up to four 12in (305mm) diameter full-height sieves.		55 (52)	20x12x16 (508x305x406)	22x14x20.5 (559x356x521)
Ultrasonic 12in Sieve Cleaner 115V, 50/60Hz	UB-5			
Ultrasonic 12in Sieve Cleaner 220V, 50/60Hz	UB-5A			
Ultrasonic 3in Sieve Cleaner is ideal for full-immersion cleaning of 3in (76mm) diameter sieves, including electroformed meshes as fine as 5µm. It is recommended for Gilson 3in Acrylic Frame Sieves. The 320 Watt output generator features microprocessor circuitry, and 0 to 30min timer. Stainless steel tank is equipped with drain valve. 115V, 50/60Hz, 1 amp. UBA-100 stainless steel Sieve Holder is purchased separately.		3.4 (3.2)	9.4x5.4x4 (239x137x102)	12.5x8.1x9 (318x206x229)
Ultrasonic 3in Sieve Cleaner 120V, 50/60Hz	UB-15			
Sieve Holder rack for 3in Sieves	UBA-100			
Ultrasonic Multi-Sieve Cleaner can perform full immersion cleaning of four full-height, or six half-height 8in (203mm) sieves, or partial-immersion cleaning of two full or intermediate height 12in (305mm) sieves. 1,500 Watt output. microprocessor circuitry, 0 to 30min timer and cooling fan. Vinyl clad stainless steel tank is equipped with drain valve. Sieve Rack is included.		40 (37.9)	14x16x10 (356x406x254)	19x17x20 (381x330x406)
Ultrasonic Multi-Sieve Cleaner 120V, 50/60Hz	UB-18			
Ultrasonic Multi-Sieve Cleaner 220V, 50/60Hz	UB-18A			
Ultrasonic Multi-Sieve Cleaner 240V, 50/60Hz	UB-18B			
Special Detergent Concentrate liquid expedites cleaning for all sizes of sieves. A small amount in each tank cleans quickly and effectively, and is safe for all meshes. Available in one gallon (3.8L) bottles.	UBA-4	-	-	-

TSA-271

SSA-58

TSA-175

TSA-265

SP-90

WT-7

WT-5

WT-3

WT-4

SIEVING ACCESSORIES

SIEVING ACCESSORIES	
Digital Caliper accurately measures inside, outside, and depth in inches or mm over a range of 0-6in or 0-150mm. Readability is 0.0005in or 0.01mm on LCD display. Stainless steel caliper has smooth-moving head with locking knob, zero calibration and On/Off switch. Battery is easily replaceable. Supplied with protective carrying case.	TSA-271
Sieving Aid is a very fine (5—7µm), high purity silicon dioxide powder. When mixed with fine samples (2% by weight is typical), Sieving Aid keeps material free-flowing and prevents agglomeration from static attraction or high humidity. It also acts as a dehydrating agent for samples. Addition does not affect sieving results because of its extremely low bulk density of 7lb/ft^3 (112kg/m^3). 1L is sufficient for over 100 sieving tests. Typical dry purity is 99.6% SiO_2. Available as individual 1 liter bottles or convenient and economical 5-packs.	
Sieving Aid, 1L Bottle	SSA-58
Sieving Aid, 5-Pack of 1L Bottles	SSA-58C
Pocket Magnifier is ten-power (10x), and useful for examination of wire cloth for damage or for appropriate mesh size. Not for acceptance testing or verification. Viewing area is 1/2x1/2in (12.7x12.7mm). Size is 1-1/4x1-3/8x7/8in (32x35x22mm) open; folds flat to 3/8in (9.5mm) thickness.	TSA-175
Screen Opening Gauge is a useful tool when examining test sieves and screen trays as a quick check for wire cloth opening sizes. Marked from 1/8 to 1 1/8in on one side and 3 to 28mm on the other, the gauge is simply placed in an opening and read where the mesh contacts the side. Durable 22ga stainless steel body has laser-engraved graduations. Not for acceptance or verification.	TSA-265
Automagnet Separator simple spring plunger has hold-and-release action, and permits extraction of magnetic material dry or partially immersed in liquids. Powerful Sealed Alnico V-six Pole Permanent magnet in lightweight aluminum case. Product Dimensions: 2-1/2inx6-1/2in (64x165mm), Dia.xH.	SP-90
Spray Fitting attaches to standard lab faucet with threaded fitting. Adapter for small, unthreaded faucets is included. Superfine conical spray pattern brass fitting is rated at 2gal (7.6L) per minute.	WT-7
Spray Bottle has a 32oz (946ml) capacity and an adjustable nozzle.	WT-5
Sieve Pan with drain is 8in (203mm) diameter by 2-5/8in (67mm) in height, with 3/8in barbed fitting for vinyl tubing.	
Brass	WT-3
Stainless Steel	WT-3S
Sieve Pan with drain is 3in (76mm) diameter by 3/4in (44mm) in height, with 1/4in barbed fitting for tubing.	
Brass	WT-13
Stainless Steel	WT-13S
Sieve Seal Gaskets seal between stacked Test Sieves or pan to prevent loss of fines.	
3in (76mm)	SSA-14
8in (203mm)	SSA-10
12in (305mm)	SSA-11
Vinyl Tubing fits 8in diameter sieve pan with drain.	
3/8in ID, priced per foot	WT-4
100ft pack	WT-4R
Vinyl Tubing fits 3in diameter sieve pan with drain.	
1/4in ID, priced per foot	WT-8
100ft pack	WT-8R

SIEVE SHAKER SELECTION

Matching a sieve shaker to material characteristics saves time and effort, and ensures superior accuracy and repeatability.

Circular Sieve Shakers use a very simple motion on a flat, oscillating plane. Particles are evenly distributed around most of the sieve surfaces, and randomly fall through openings. These units are adequate for coarser free-flowing materials between No.4 (4.75mm) and No.100 (150µm).

Orbital Sieve Shakers mimic the motion of hand sieving, and are an economical choice for free-flowing materials. The particles are essentially rolled around on the mesh surface until they fall through an opening. A bumping action is sometimes introduced as the sieve stack oscillates. Orbital shakers work well for most materials between No.4 (4.75mm) and No.200 (75µm).

Tapping is a performance enhancing feature included on premium sieve shakers with vibratory, circular, orbital, or other primary actions. Repetitive tapping of the sieve stack by mechanical means reorients particles, aids passage, and prevents blinding. Tapping sieve shakers improve the passage of fines for nearly any material.

Vibratory Sieve Shakers use electromagnetic energy to agitate particles. An ideal setting creates a fluid bed of material on the mesh. This optimizes the number of openings tried by the sample material. Adjustments for vibration amplitude and frequency on some shakers allow optimization for a wider range of materials. Vibratory Shakers perform well on most materials between No.10 (2mm) to No.635 (20µm).

Pause is a function on better quality Vibratory Shakers with an effect similar to Tapping. Programming a pause into the test cycle causes particles to briefly stop, and then reorient themselves when agitation resumes.

Sonic Sieve Shakers use up to 3,600 sonic energy pulses per minute to oscillate an air column enclosed within the sieve stack. This continuous agitation excites the particles and continuously reorients particles to the mesh surface. Programmable horizontal and vertical tapping clears the sieves and allows accurate separations down to 5µm.

SS-8R shown with Sieves

SS-20

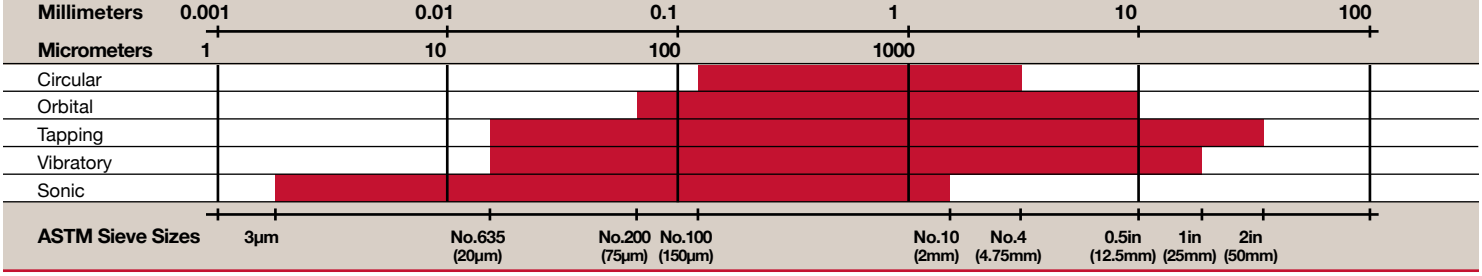
SS-15 shown with Sieves

SS-3 shown with Sieves

SS-30 shown with Sieves

SS-12R shown with Sieves

SIEVE SHAKER SELECTION



SS-15 shown with Sieves

Close-up of Digital Timer; works for both shakers

SS-14D shown with Sieves

GILSON 8IN SIEVE SHAKERS

The SS-15 and SS-15D Sieve Shakers are portable 8in (203mm) sieve shakers designed to outperform comparably priced equipment. The 1/4hp units are widely accepted by state transportation departments for highway materials testing. Back and forth lateral motion is combined with up and down and tilting motions causing test material to travel in an orbit on the sieve surfaces. This assures full use of sieve mesh area without precise leveling of the shaker.

The 8in Sieve Shakers are recommended primarily for No.4 to No.200 size range, but may be used with larger material sizes when specifications for sieve loading and sample quantities permit. The Shakers hold six full-height sieves with pan or twelve half-height sieves with pan. Clamp bar with attached cover secures sieves. Free-standing operation is normal, but they may be mounted via holes provided in bottom end flanges. The SS-15 model uses a 15 minute mechanical-electrical timer with an adjustable knob-stop for improved repeatability and a "hold" feature for continuous running. The New SS-15D model features our digital countdown timer with large LED display to precisely time operation up to 99 minutes at ±1 second. A pause function and user-selectable modes offer greater versatility. Settings are saved between cycles for precise repeatability and easy, one-button operation.

Motor and all mechanical parts are enclosed in a sturdy metal case. **Product Dimensions:** 17x11x30in (432x279x762mm), WxDxH.

GILSON 8IN/12IN SIEVE SHAKERS

Gilson's newest Sieve Shakers accept ASTM or ISO sieves in multiple diameters of 8in, 12in, 200mm or 300mm for maximum versatility. Extended stack height allows more sieves in a single stack for efficient processing. Simple orbital and tilting action distributes material evenly across sieve mesh for accurate separations from #4 to # 200 (4.75mm to 75µm) particle sizes. Extended size ranges are possible for some free-flowing materials.

Sieve Capacity ranges from six 12in full-height to twenty one 8in half-height sieves. Sieves are locked in for testing quickly and securely with Gilson's exclusive EZ-Clamp system. The easy to operate clamping system with integral sieve cover slides freely up and down the clamp rods with the push of a button. Once in position, a quick twist secures the stack. When the test is complete, raise just enough to remove the stack, and the clamps stay in place, ready for the next test without readjustment.

Test times are controlled on the SS-14 with a reliable mechanical-electrical timer with adjustable stop for repeatable times and a "hold" feature for continuous operation. The SS-14D features Gilson's digital countdown timer with large LED display for precision control to 99 minutes at ±1 second. A pause function and user-selectable modes offer greater versatility. Settings are saved between cycles for precise repeatability and easy, one-button operation.

The powerful 1/4hp motor and all mechanical and electrical parts are enclosed in the rugged painted steel case with rubber feet. **Product Dimensions:** 26x20x40in (660x508x1016mm) WxDxH.

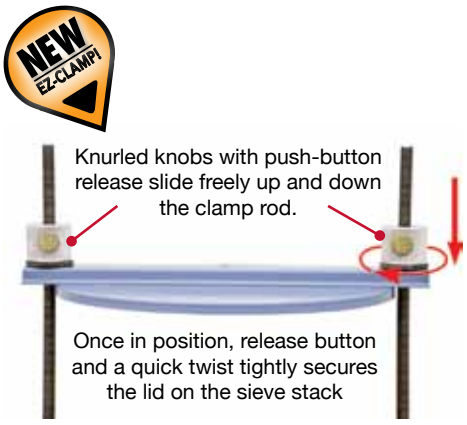
GILSON 8IN SIEVE SHAKERS

Gilson 8in Sieve Shaker, Mechanical Timer, 115V/60Hz	SS-15
230V/50Hz	SS-15F
Gilson 8in Sieve Shaker, Digital Timer, 115V/60Hz	SS-15D
230V/50Hz	SS-15DF

GILSON 8IN/12IN SIEVE SHAKERS

Gilson 8in/12in Sieve Shaker, Mechanical Timer, 115V/60Hz	SS-14
230V/50Hz	SS-14F
Gilson 8in/12in Sieve Shaker, Digital Timer, 115V/60Hz	SS-14D
230V/50Hz	SS-14DF

SS-8R shown with Sieves



SS-12R shown with Sieves

GILSON TAPPING SIEVE SHAKERS

- **Two-way tapping.**
- **Innovative new EZ-Clamp system.**
- **No permanent mounting required.**
- **Precision electronic controller.**
- **Capacities of up to twenty sieves.**

The sieving action of Gilson SS-8R and SS-12R Tapping Sieve Shakers is based on research to obtain sharp, repeatable separations quickly over a broad range of particle sizes and material types. The exclusive Gilson action results from perfect circular rotation of the sieve stack and vertical two-way tapping at 48 taps per minute. Circular rotation is superior to inefficient back-and-forth actions that create "dead spots" and prevent complete separation. Particles roll in all directions relative to the pattern of woven sieve mesh. "Up" taps mix, reorient, and redistribute particles to present new orientations to sieve surfaces. "Down" taps assist in passing near-size particles to clear the mesh. These high-capacity shakers can hold as many as twenty sieves, depending on model and sieve frame dimensions.

The built-in precision digital controller features push-button start, and resets desired test time automatically for exact repeatability up to 99 minutes, 59 seconds. A pause function allows the cycle to be suspended and resumed with no loss of test time, and a five-second audible alarm sounds at completion of the interval. The controller is simple to program and the large, bright 0.5in (12.6mm) LED display is easy to read.

Easy to operate new EZ-Clamp system with integral sieve cover slides freely up and down the clamp rods with the push of a button. Once in position, simply release, then a quick twist secures the cover on the sieve stack. Once the test is complete, raise just enough to remove the stack. The clamps stay in place, ready for the next test without readjustment. The EZ-Clamp system is also available as an accessory to retrofit older SS-8R and SS-12R shakers.

: PRODUCT SPOTLIGHT :

SIEVE CAPACITY SPECIFICATIONS (IN ADDITION TO PAN)

Sieve Type	SS-8R	SS-12R
8in Full-Height	10	10
8in Half-Height	20	20
12in Full-Height	—	6
12in Intermediate Height	—	10
12in Half-Height	—	13

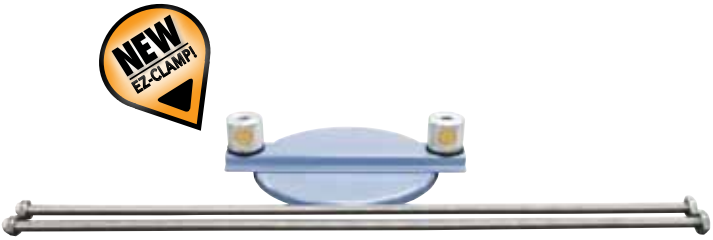
Gilson's internal counterbalance system promotes stability during operation without the need for permanent mounting. The unit can easily be relocated, using the adjustable footpads for leveling. Gilson Sieve Shakers are housed in sturdy painted steel cases and powered by 1/3hp electric motors. Sieves and accessories are ordered separately.

SS-8R Gilson Tapping Sieve Shaker can hold up to twenty 8in (203mm) half-height test sieves with pan or ten full-height sieves with pan. The recommended particle size range is 1in (25mm) to No.635 (20µm). Characteristics of individual materials may affect the useful particle size range. **Product Dimensions:** 22.5x12.5x39.5in (572x312x1,003mm), WxDxH.

SS-12R Gilson Tapping Sieve Shaker holds up to thirteen half-height, ten intermediate height or six full-height 12in (305mm) sieves with pan. 12in sieves have over twice the effective sieving area as 8in sieves. Recommended sieve size range is 2in (50mm) to No.635 (20µm). Characteristics of individual materials may affect the useful particle size range. An adapter is included, allowing use of 8in sieves in the SS-12R. **Product Dimensions:** 22.5x12.5x39.5in (572x312x1,003mm), WxDxH.

GILSON TAPPING SIEVE SHAKERS

Gilson Tapping Sieve Shaker 8in, 115V/60Hz	SS-8R
230V/50Hz	SS-8RF
Gilson Tapping Sieve Shaker 12in, 115V/60Hz	SS-12R
230V/50Hz	SS-12RF



SSA-807

SSA-809 shown on SS-12R with Sieves

SSA-805R shown with SS-12R & Sieves

GILSON TAPPING SIEVE SHAKER ACCESSORIES

GILSON TAPPING SIEVE SHAKER ACCESSORIES	
EZ-Clamp Upgrade Kit replaces the original clamping assemblies on older Gilson Tapping Sieve Shakers. Knurled knobs with push-button release, and slide freely up and down the clamp rods for smooth, easy clamping. Once in position, a quick twist tightly secures the sieve stack. When the test is complete, push the EZ-Clamp button and raise just enough to remove the stack. Upon release of the button, the clamps stay in place, ready for the next test. EZ-Clamp kits include free-sliding push-button knobs, an integral sieve cover and new clamp rods.	
EZ-Clamp Upgrade Kit for SS-8R	SSA-807
EZ-Clamp Upgrade Kit for SS-12R	SSA-809
Gilson Sound Enclosure controls noise and dust associated with SS-8R and SS-12R Sieve Shakers and other lab equipment. Sturdy painted steel case with full-width hinged doors is lined with 1in (25.4mm) of sound-attenuating foam. Product Dimensions: 31x19x46in (800x500x1,200mm), WxDxH.	SSA-805R
Clean-N-Stor accessories are time-saving devices for collection, cleaning, and weighing functions associated with sieving operations. Inverting an 8in or 200mm sieve on the stainless steel funnel allows quick emptying and cleaning of contents into a receiving scoop or pan. A sieve stack can also be stored on top of the funnel. A scoop and soft-bristle cleaning brush are included with all models. The SSA-801 attaches to the top of the SS-8R case. SSA-802 is a stand-alone model that can be positioned directly over an electronic balance, so sieve fractions can be weighed as the sieve is being cleaned. OBA-15R is an adjustable-height Clean-N-Stor version designed to fit over taller balances. OBA-15R Dimensions: 8.4x11x6.8in (213x279x173mm).	
Clean-N-Stor Attachment for SS-8R	SSA-801
Stand-Alone Clean-N-Stor	SSA-802
Adjustable-Height Clean-N-Stor	OBA-15R

SSA-801 shown with Sieves on SS-8R

SSA-802 shown with Sieve

GILSON ROTARY SIFTERS

- **Built by Gilson, backed by Gilson.**
- **Accurate results.**
- **Simple and efficient.**
- **Newest Silent Sifter® II: "The quietest in the industry."**

Gilson has revamped the classic rotary sifter design and added our own innovations to introduce three new models. This proven sieving method preferred by many DOT's is now available with Gilson-guaranteed quality and reliability.

Gilson's progressive designs carry forward the best features of traditional rotary sifters and add upgrades drawn from our expertise in particle separation technology. Faster conversion from 8 to12in or 200 to 300mm diameter sieves, easier set up, and much quieter operation all reflect the time devoted to improved design and materials. Sieve stack capacity ranges from six 12in diameter full-height sieves with pan, or up to twenty 8in diameter half-height sieves with pan.

The totally enclosed cabinet allows safe, dust-free operation. Assembled sieve stacks are simply placed inside and the cabinet is rotated back against the stops, no clamping is required. An ergonomic knob allows easy rotation of the cabinet between the loading and testing positions. A drive roller system continuously rotates the sieve stack with particle separation assisted by tapping against the stack. The digital countdown timer with large LED display precisely times operation up to 99 minutes at ±1 second. A pause function and user-selectable modes offer greater versatility. Settings are saved between cycles for precise repeatability and easy, one-button operation.

Hammer assemblies are 6061 aluminum alloy with Ultra High Molecular Weight (UHMW) Polyethylene heads. Rugged painted case is CNC machined for precise, dust-proof fit using dense, impact-resistant MDF board, mounted on a sturdy, powder-coated ASTM A513 heavy steel tubing stand. Full-width door swings completely out of the way on heavy-duty commercial grade hinges. The system is driven by a dependable 1/4hp continuous-duty motor. **Product Dimensions:** 19x24x58in (483x610x1,473mm), WxDxH.

SS-20 Rotary Sifter offers classic design and efficient operation in an economic package. Design advances, upgraded materials and efficient operation put the SS-20 a step above other sifters, while maintaining compliance with specification requirements. For ease of mobility, SSA-77 4in hard rubber Locking Swivel Casters may be purchased separately for installation on the SS-20 Floor Stand.

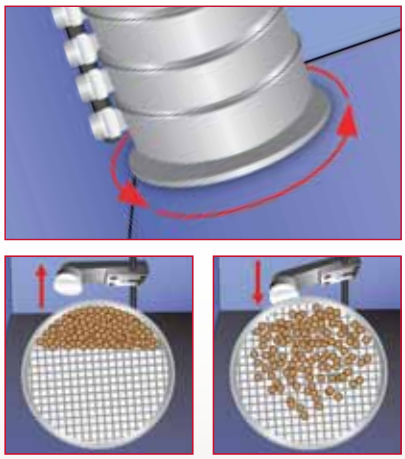
SS-21 Silent Sifter® matches the performance of the SS-20 Rotary Sifter

SS-20 Inside View shown with Sieves

Close-up of hammers

Close-up of handle

GILSON ROTARY SIFTERS



As the sieve stack rotates, hammers tap the sieves to re-orient and redistribute particles across the sieve surface.

NEW! Ship Weight Index

The Estimated Ship Weight for every product is easy to find in the NEW Ship Weight Index!

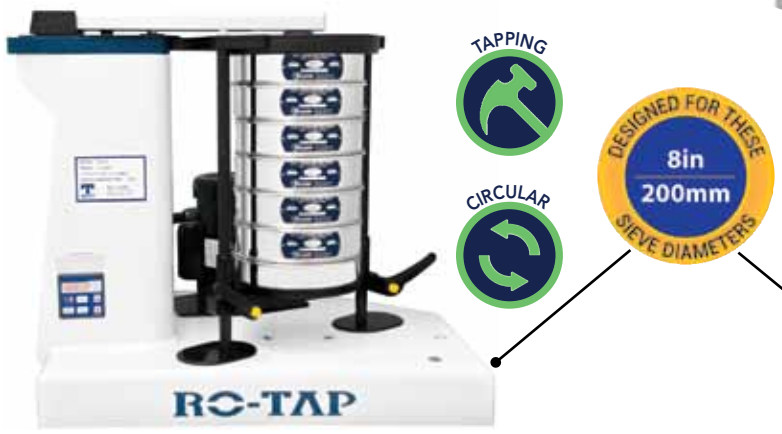
while significantly reducing operational noise levels. Design modifications made using Gilson's proprietary silencing technology have resulted in a unit with noise levels 7—10dB lower than any other rotary sifter. The floor stand of the SS-21 includes SSA-77 4in diameter hard rubber Locking Swivel Casters for easy mobility in the lab. The Silent Sifter makes a significant contribution to the reduction of noise levels in your lab.

SS-22 Silent Sifter® II is the newest and most unobtrusive member of the Gilson Rotary Sifter family. Specially engineered with advanced soundproofing materials and techniques, this sifter is 16—18dB quieter than standard rotary sifters, and 8—10dB quieter than even our SS-21 Silent Sifter®. A heavy-duty, over-center lever latch pulls the door tightly against the case gasket, insuring a tight, dust-proof seal that enhances noise control. This is your first choice for enhanced worker protection and reduction of nuisance noise levels. The floor stand of the Silent Sifter® II includes 4in hard rubber locking casters. Performance and features match those of our other two sifter models.

Users of traditional Rotary Sifters can still take advantage of Gilson's advances in design, along with better pricing and availability, by upgrading commonly replaced parts with Gilson components. Gilson Hammer Assemblies, Hammer Heads, and Timers fit all current rotary sifter brands and are designed for efficient operation and long service life. Inquire for other quality replacement components.

GILSON ROTARY SIFTERS	
Gilson Rotary Sifter, 115V/60Hz	SS-20
230V/50Hz	SS-20F
Gilson Silent Sifter®, 115V/60Hz	SS-21
230V/50Hz	SS-21F
Gilson Silent Sifter® II, 115V/60Hz	SS-22
230V/50Hz	SS-22F
Accessories	
Rotary Sifter Hammer Assembly	SSA-72
Rotary Sifter Hammer Head	SSA-74
Rotary Sifter Timer/Controller	SSA-76
Rotary Sifter 4in Locking Swivel Casters	SSA-77

SS-31 shown with SSA-320A, SSA-325 & Sieves



SS-30 shown with Sieves

SS-33 shown with Sieves

W.S. TYLER® RO-TAP® SIEVE SHAKERS

W.S. Tyler® Ro-Tap® Sieve Shakers have 278 oscillations and 150 taps per minute as specified in some ASTM and other sieving applications. Horizontal, circular action combined with vertical tapping assures accurate and consistent results.

These shakers are designed for heavy-duty use and bolt easily to a solid table or sturdy bench top. All models feature an adjustable-plate sieve support and built-in 99 minute x 0.1 second digital timer. Powerful 1/4hp motors provide plenty of action for efficient separations. For models operating on 230V/60Hz power, add "S" to the model number. Sieves are ordered separately and a sieve cover is required.

SS-30 8in W.S. Tyler® Ro-Tap® Sieve Shaker holds up to six full-height 8in (203mm) sieves with a full-height pan, or thirteen half-height sieves with a half-height pan. Recommended particle size range is No.4 (4.75mm) to No.635 (20µm). Add "K" to model number to specify our Lab Kit, which includes the Sieve Shaker, SSA-320A Sound Enclosure, and SSA-325 Test Stand. **Product Dimensions:** 28x21x25in (711x533x635mm), WxDxH.

SS-31 12in W.S. Tyler® Ro-Tap® Sieve Shaker holds up to four 12in (305mm) full-height sieves and pan, six intermediate height and pan, or eight half-height sieves and pan. Recommended particle size range is 1/2in (12.5mm) to No.500 (25µm). Add "K" to model number to specify our Lab Kit, which includes the Sieve Shaker, SSA-320A Sound Enclosure, and SSA-325 Test Stand. **Product Dimensions:** 28x21x25in (711x533x635mm), WxDxH.

SS-33 8in W.S. Tyler® Ro-Tap® II Sieve Shaker performs two 8in (203mm) sieve tests simultaneously with exactly the same action as the single-stack models. Recommended particle size range is from No.4 to No.635. **Product Dimensions:** 31x27x26in (787x686x660mm), WxDxH.

SSA-320A Sound Enclosure for SS-30 or SS-31 W.S. Tyler® Ro-Tap® Sieve Shakers has a steel cabinet lined with 1in (25.4mm) thick acoustic foam. Two front doors and a top-opening panel allow easy access. A small access port is built-in to the rear of each unit. **Product Dimensions:** 35x24x29in (889x610x737mm), WxDxH.

SSA-321 Sound Enclosure has all of the same features as the SSA-320A, but it is dimensioned to fit the larger SS-33 W.S. Tyler® Ro-Tap® II Sieve Shaker. **Product Dimensions:** 34x33x31in (864x838x787mm), WxDxH.

SSA-325 Test Stand for SS-30 and SS-31 can be used with or without the SSA-320A. The sturdy aluminum frame includes hardware for assembly and floor anchoring. **Product Dimensions:** 20x32x28in (508x813x711mm), WxDxH.

W.S. TYLER® RO-TAP® SIEVE SHAKERS	
W.S. Tyler® Ro-Tap® 8in Sieve Shaker, 115V/60Hz	SS-30
230V/50Hz	SS-30F
W.S. Tyler® Ro-Tap® 12in Sieve Shaker, 115V/60Hz	SS-31
230V/50Hz	SS-31F
W.S. Tyler® Ro-Tap® II 8in Sieve Shaker, 115V/60Hz	SS-33
230V/50Hz	SS-33F
Accessories	
Sound Enclosure for SS-30 & SS-31	SSA-320A
Test Stand for SS-30 & SS-31	SSA-325
Sound Enclosure for SS-33	SSA-321

SS-25 shown with Sieves

SS-82 shown with Sieves

"MARY ANN®" SIFTER

The original "Mary Ann®" Sifter is a popular tool for labs that have heavy testing schedules. Sieve stacks up to 26in (660mm) in height are quickly set into place, with no clamping required. Totally enclosed cabinet insures a safe, quiet operation and the door has the option where it can be mounted to open from either the right or left. The SS-25 allows fast and easy conversion to accommodate either 8in (203mm) or 12in (305mm) diameter testing sieves. Testing cycles are controlled to a ±1 second with a 99 minute digital timer. Sieve stack angled at 45 degrees and allows rotation of sieves. This rotation, aided by tapping from hardwood faced aluminum hammers, promotes many orientations of particle to mesh. The support stand also doubles as a sieve storage rack. Assembled Sifter requires 18x40in (457x1,016mm) of floor space. **Product Dimensions:** 18x26x58in (457x660x1,473mm), WxDxH.

"MARY ANN®" SIFTER	
"Mary Ann®" 8/12in Sifter, 115V/60Hz	SS-25

W.S. TYLER® COARSE SIEVE SHAKER

Designed for materials in the No.4 to No.100 size range, this rugged W.S. Tyler® sieve shaker is portable enough for field applications. An effective circular sifting motion is imparted to sieves via the 1/4hp motor. Built-in digital timer with 99 minute range is accurate to 0.1 second.

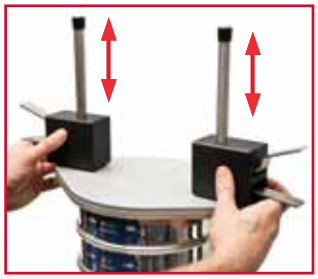
SS-82 accommodates both 8in (203mm) and 12in (305mm) sieves with included adapter. Shaker will accept from 6—13 eight inch sieves and from 4—8 twelve inch sieves, dependant upon use of full, intermediate or half-height sieve frames. Mounting holes are provided in the frame for securing the unit to a table or bench-top. **Product Dimensions:** 28x22x34in (711x559x864mm), WxDxH.

W.S. TYLER® COARSE SIEVE SHAKER	
W.S. Tyler® Coarse Sieve Shaker, 115V/60Hz	SS-82
220V/50Hz	SS-82F

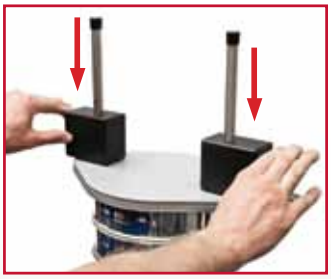
W.S. Tyler® is a trademark of Haver Tyler Corporation.

SS-10 shown with Sieves

SS-10 CLAMPING SYSTEM



Apply light upward pressure on both bottom levers to move sieve cover up or down.



Press downward on both top levers several times for a tight clamp on sieves.

SS-10 Touch Screen

technote

Gilson's 1-Touch Vibratory Sieve Shaker operates quietly and efficiently for fast, accurate separations over a wide range of materials. If noise levels are a concern in your testing environment, the SS-10 is your best choice. This compact, easy to operate unit also features custom repeatable programs and consistent performance to insure the highest level of repeatability for your critical materials.

1-TOUCH VIBRATORY SIEVE SHAKER

- **Quiet, efficient operation with a bench-top footprint.**
- **Three-dimensional agitation for maximum efficiency.**
- **Menu-guided touch-screen controls are easy to set up.**
- **Wide range of control settings for performance customized to materials.**
- **Fast, accurate separations for materials from No. 10 to No. 635 (2.00mm to 20µm).**

Gilson's new 1-Touch Vibratory Shaker for 8in and 200mm sieves combines the latest in electronic control with proven separation technology for fast, accurate separations of materials 2mm and finer. The touch-screen programmable controller allows selection of vibration level, time, and pauses. Once operating parameters are set, just tap "Start" on the display screen to begin each new test. Up to 99 testing profiles can be stored in non-volatile memory to insure exact repeatability. Quiet, compact bench-top unit offers complete control of multi-directional agitation for optimum performance based on material type.

The wide range of user-controlled performance options means the SS-10 is suitable for a variety of materials. Pharmaceuticals, powders and many other granular materials are efficiently sized on this programmable sieving system. The three-dimensional sieving action evenly distributes the specimen across sieve surfaces and continuously reorients particles to insure the maximum number of passing opportunities. Optimal size range is dependant on material type, but typically, particles between No.10 and No.635 sieve sizes are easily processed. GAA-19 Clear Acrylic Spacer for 8in sieves can be used in place of one sieve to visually observe specimen action when optimizing vibration settings. The 5.6in (142.2mm) diagonally measured screen offers a bright, clear view of controls and operating information. Fast acting stack clamps adjust quickly, hold their position, and tighten with little effort. Sieves are securely locked down, assuring efficient transfer of vibration energy during operation.

The shaker accepts eight full-height, or sixteen half-height 8in (203mm) diameter sieves plus pan. 200mm sieves can also be used. Times can be set up to 99 minutes, 99 seconds. Ten levels of vibration power are selectable for optimum separation efficiency with different materials. Intervals (pauses) of up to 99 minutes, 99 seconds can be programmed into the testing profile.

The sturdy housing is powder coated steel and has adjustable leveling feet with non-skid rubber pads. Electrical requirements are 115V/60Hz. **Product Dimensions:** 12x16.5x28in (305x419x711mm), WxDxH.

1-TOUCH VIBRATORY SIEVE SHAKER	
1-Touch Vibratory Sieve Shaker	SS-10
Accessories	
Clear Acrylic Sieve Spacer	GAA-19

SS-3 shown with Stainless Steel Sieves

SS-36 only

SS-34 shown with Sieves

PERFORMER III 3IN SIEVE SHAKER

- **Quiet, electromagnetic vibratory action.**
- **0—100% amplitude control.**
- **Switchable tapping action.**
- **Exclusive Gilson EZ-Clamp System quickly secures sieves.**
- **Precise digital timing.**

The Gilson Performer III's compact size, small footprint, and quiet operation make it a very efficient instrument for dry powder separations of small samples. 3in (76mm) Sieve Shaker is designed for chemicals, minerals, pharmaceuticals, powdered metals, cosmetics, abrasives, ores, foods, and other fine powders. Effective size range is No.4—No.635 (4.75mm—20µm) with woven wire sieves. Extended sizes are possible with some materials.

High frequency 3,600vpm electromagnetic vibratory action with 0—100% amplitude control is ideal for fine particle separations. In-line solenoid actuated tapping action (60 taps/min) works during dry sieving to redistribute the sample on the sieves, and breaks static blinding, helping to clear undersize particles rapidly. Tapping can also be used independently for tap-settling and tap-density functions.

The SS-3 can hold either seven full-height 3in (76mm) metal sieves plus pan or fourteen acrylic frame sieves and pan. The unique Gilson EZ-Clamp sieve clamping mechanism makes insertion and removal of the sieve stack simple and convenient, yet holds the sieves snugly during operation. The captive knobs on the clamping mechanism allow it to be released with a quick twist. The mechanism remains at this height until the knobs are twisted in the opposite direction, clamping the sieves in place.

SS-3 features include a rugged coated steel case, variable control for vibration and a manual/timed mode switch. The digital count-down controller controls operation to 99 min., 59 sec. and has pause feature. Stackable acrylic 3in (76mm) see-through cylinder is helpful for observing sample action while leveling platform or for setting vibration. Power requirements are 115V/50-60Hz. For 230V operation, order TR-502 Transformer. **Product Dimensions:** 8x11x22in (203x279x559mm), WxDxH.

W.S. TYLER® RO-TAP® E SIEVE SHAKERS

The new W.S. Tyler® Ro-Tap® E Sieve Shakers from W.S. Tyler® are available for 8in (203 mm) or 12in (305mm) test sieves. Both are for light to medium duty applications in the size range of No.10 (2mm) to No.635 (20µm). Electromagnetic vibration produces controlled, constant amplitude and three-dimensional sieving action to insure complete separations. Controls allow customized setting of vibration characteristics for analyses of fine or coarse materials. Digital controls, quick-release clamping, quiet operation and a see-through cover are featured on both models of this shaker. Heavy construction and cast iron parts assure a long service life.

SS-34 8in W.S. Tyler® Ro-Tap® E is compact and requires minimal counter space. The shaker will accept eight full-height or sixteen half-height sieves, plus pan. Units are available to operate on 110V/60Hz or 220V/50Hz power supplies. **Product Dimensions:** 18x18x30in (460x460x760mm), WxDxH.

SS-36 12in W.S. Tyler® Ro-Tap® E is a floor unit. The digital control panel can easily be remotely mounted for convenient operation. Sieve capacity is seven full-height, ten intermediate height or fourteen half-height sieves. Unit is available to operate on a 110V/60Hz power supply. **Product Dimensions:** 15x17x38in (380x430x960mm), WxDxH.

PERFORMER III 3IN SIEVE SHAKER

Performer III 3in Sieve Shaker	SS-3

Accessories

Acrylic Spacer for Metal Sieves	SSA-15
Acrylic Spacer for Acrylic Sieves	GAA-88

W.S. TYLER® RO-TAP® E SIEVE SHAKERS

8in W.S. Tyler® Ro-Tap® E Sieve Shaker, 110V/60Hz.	SS-34
8in W.S. Tyler® Ro-Tap® E Sieve Shaker, 220V/50Hz.	SS-34F
12in W.S. Tyler® Ro-Tap® E Sieve Shaker, 110V/60Hz.	SS-36

WET/DRY SIEVE VIBRATOR

The vibration energy of the SS-23 is transferred directly to the sieve frames, promoting passage of finer particles from wet or dry material. The powder-coated steel frame is designed for use with a notched plastic bucket to collect fines.

SS-23 shown with SSA-20 & Sieves

SS-23 shown with sieve

SS-45A shown with Sieves

WET/DRY SIEVE VIBRATOR

Inexpensive electric sieve vibrator is helpful for fast separations of wet or dry materials using one or two 8in diameter, full-height sieves.

For wet samples, WT-7 Spray Fitting, WT-5 Spray Mist Dispenser, or other wet sieving accessories can be used to assist processing. Use SSA-20 Notched Bucket or one sieve and an extended-rim sieve pan to catch undersize material.

Vibrating unit is mounted on a durable, powder-coated steel frame. Includes 3-wire cord and plug for 115V, 50/60Hz operation.

WET/DRY SIEVE VIBRATOR	
Wet/Dry Sieve Vibrator, 115V, 50/60Hz	SS-23
Accessories	
Notched Bucket	SSA-20

MANUAL SIEVE SHAKER

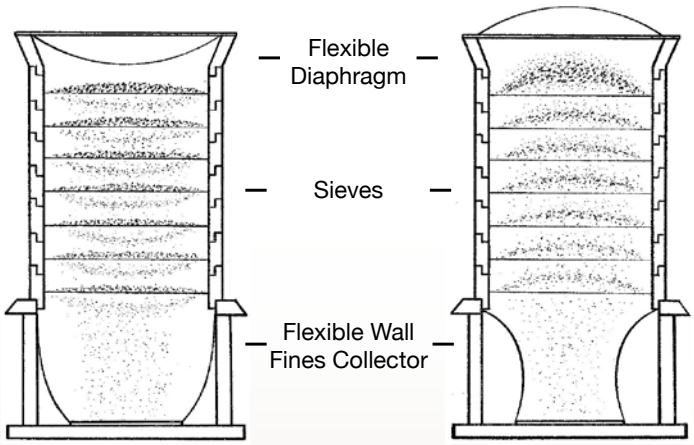
The Gilson Manual Sieve Shaker is specifically designed for portable use without electrical power supply. Manual shakers from other sources are merely adapted from motor driven units without regard for discomforts of hand cranking or other needs of the field operator.

Cranking effort is minimized through the use of quality flange bearings at both shaft ends, and counterbalanced mechanism. The special removable crank is provided. Approximately one turn per second gives desired sieving action. Lightweight, the unit also has recessed handles on sides for carrying. No special mounting hardware is required. Four oversized pliable rubber feet improve machine grip to work surface. The unit holds eight full-height or thirteen half-height 8in (203mm) sieves and pan. The unit includes sturdy painted steel case, and has same proven three-way sieving action, cover and clamping features as the Gilson SS-15 motorized shaker. **Product Dimensions:** 16x15.5x30.75in (406x394x813mm), WxDxH.

MANUAL SIEVE SHAKER	
Manual Sieve Shaker	SS-45A

GA-6 shown with Sieves

GA-6 SONIC SIEVING ACTION



The diagram represents one pulse. The GA-6 generates 3,600 sonic pulses per minute.

Tapping is controlled by the user and can be set for horizontal and vertical, vertical only, or turned off completely.

GILSONIC AUTOSIEVER

- **Fast, efficient, and proven dry separation of fine powders.**
- **Size range from 850µm (No.20) to 5µm.**
- **Programmable vertical and horizontal tapping clears sieves and reduces clumping.**
- **3in (76mm) acrylic-frame sieves are available in standard woven wire or precision electroformed mesh.**

The GilSonic AutoSiever is the most accurate and reliable sieve shaker available for particle sizing of dry powders and fine granular materials. Testing profiles are fully customizable, assuring consistent, repeatable values for even the most difficult materials. Only minimal training is required for proper operation.

3,600 sonic energy pulses per minute oscillate the air column enclosed within the sieve stack. This agitation continuously excites and reorients the particles to the mesh surface. Programmable tapping clears the sieves and prevents lumps from forming in the materials. Controls for intensity, ramp and dwell, and total test time assure fully customizable profiles for many different material types. Up to ten profiles can be saved in non-volatile memory, assuring repeatability for similar materials. The AutoSiever is designed and manufactured in the USA to meet CE requirements.

Test times vary depending on material type and particle size. Five minutes is typical, but some samples may be complete in as little as thirty seconds. Operating time can be set for up to 99.9 minutes. Sieving intensity (amplitude) is selected with a proportional power controller. Ramping function automatically increases power at a programmed rate for optimum separation of difficult materials. Programmable tapping is built into each unit and can be programmed for horizontal and vertical, vertical only, or turned off completely.

Sample capacity is a function of particle size and material type. Larger particle samples may range up to 20g or about 7cc. Samples with maximum particle sizes of 38µm (No.400) should be about 10g or 4cc. For precision sieving with electroformed sieves down to 5µm, some samples may be as small as 1g.

Sieves for the AutoSiever are purchased separately. The 3in (76mm) diameter clear acrylic-framed sieves are available with ASTM E11 woven-wire cloth or ASTM E161 precision electroformed mesh. The AutoSiever holds seven woven-wire or three precision electroformed sieves in the fixed-height stack assembly. Clear acrylic spacers are available if fewer sieves are desired.

Fines are retained in a flexible-walled latex fines collector. A latex diaphragm on top of the stack seals the air column and confines the sample during testing. The complete stack assembly is held together with a column lock, inserted into the backlit testing chamber and quickly secured in place for testing.

The cabinet is powder coated steel with a sliding acrylic door. The AutoSiever is supplied with one GAA-2 stack assembly, consisting of seven clear acrylic spacers, a fines collector with collector holder, top cone, diaphragm, and column lock. Sieves are purchased separately. Operates on 115/230V, 50 or 60Hz (selectable) power supplies, 40 Watts maximum. **Product Dimensions:** 10x10x20in (254x254x508mm), WxDxH.

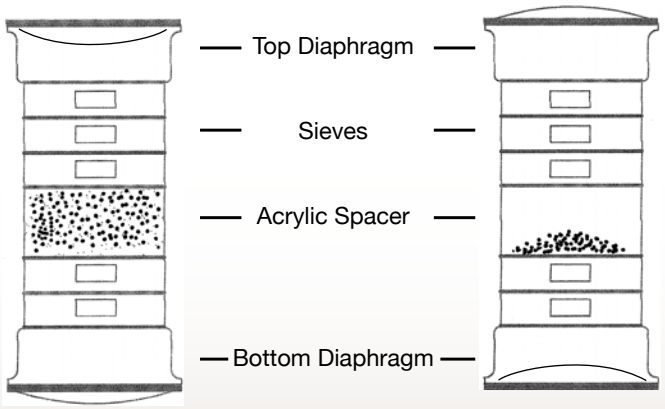
GILSONIC AUTOSIEVER	
GilSonic AutoSiever, with Stack Assembly	GA-6
Accessories	
Stack Assembly	GAA-2
Replacement Diaphragm	GAA-3
Replacement Fines Collector	GAA-4
Standard Acrylic Spacer	GAA-88

also available

See the separate listing for 3in Acrylic Frame Test Sieves.

GA-8 shown with Sieves

GA-8 SONIC SIEVING ACTION



The diagram represents one pulse. The GA-8 generates 3,600 sonic pulses per minute.

GAA-5 shown with Sieves

GAA-19

GAA-10

GILSONIC ULTRASIEVER®

- **Sonic sieving for samples up to 100g.**
- **Uses up to Seven Full-Height 8in or 200mm diameter sieves.**
- **Fully programmable time, amplitude and vertical or horizontal tapping sequences.**

The GilSonic UltraSiever® sample capacity is more than seven times that of our GA-6 AutoSiever, and it accepts up to seven 8in (203mm) diameter full-height test sieves. ASTM E11 woven wire sieves from 1/4in to No.635 (6.3mm to 20µm) or ASTM E161 sieves with unsupported precision electroformed mesh from 150 to 5µm with tolerances of ±2µm can be used. ISO 565-3310 200mm sieves can also be used when paired with the GAA-10 adapter set. Sample size for materials up to 1/4in (6.3mm) may be 100g or more. 10g or less is typical when using precision electroformed sieves below 20µm.

Sieving action is created by 3,600 sonic pulses per minute oscillating inside the sieve stack and agitating each particle. Sieving intensity (amplitude) is set through a proportional controller, based on observation of particles during agitation. A programmable Ramping function incrementally increases amplitude to the maximum rate and holds it, then steps it back down for optimum separation. There are additional controls for selectable horizontal and vertical tappers. The horizontal tappers can be positioned to tap on selected sieves. Four vertical tappers can be operated as one pair for most materials or two pairs for difficult samples. Up to ten programs with specific amplitude, ramping, tapping, and test duration settings for specific materials can be stored in the memory. Test times vary depending on material type and particle size. Typical sieving time is 1 to 5 minutes, but operating time can be set for up to 99.9 minutes.

The powder-coated steel case has vertically-hinged Lexan™ doors enclosing the sieve chamber. Sample material is contained by flexible top and bottom diaphragms. The stack is sealed when the upper enclosure is lowered. Upon test completion, fines are recovered from the bottom diaphragm. Acrylic spacers are required when using less than seven sieves or for viewing sieving action.

The GA-8 UltraSiever includes top and bottom sieve stack adapters, four diaphragms for top or bottom use, two acrylic spacers, one double-height acrylic sieve spacer, and twelve polyurethane sieve Seal Gaskets. The GAA-5 Extra Sieve Stack Assembly includes top and bottom sieve adapters, handle plate, bottom diaphragm, and sieve seal gaskets to assemble a second sieve stack for faster processing. Sieves are ordered separately. Operates on 115/230V, 50 or 60Hz (selectable) power supplies, 100 Watts maximum. **Product Dimensions:** 19x19x41in (483x483x1,041mm), WxDxH.

GILSONIC ULTRASIEVER®	
GilSonic UltraSiever®, 115/230V, 50/60Hz	GA-8
Accessories	
Replacement Top/Bottom Diaphragm	GAA-15
8in Sieve Seal Gasket	SSA-10
Diaphragm Seal Gasket	GAA-18
Spacer, 8in	GAA-19
Double-Height Spacer	GAA-16
Assembly for Sieve Stack	GAA-5
Adapter Set for 200mm Sieves	GAA-10
Spacer, 200mm	GAA-19M
Double-Height Spacer, 200mm	GAA-16M

AJ-103 shown with AJA-4 and AJA-8

AJA-8

200mm Air Jet Sieve

MIKRO AIR JET SIEVE™

The redesigned Mikro Air Jet Sieve™ is an accurate and reliable single-sieve system made in the USA for 10 to 100g samples of dry powders from 4.75mm to 20µm (No. 4 to No. 635). A rotating slotted nozzle supplies positive air pressure to gently fluidize the sample in a covered 200mm or 8in (203mm) diameter sieve. Exiting air is drawn downward with an external vacuum system, creating a negative pressure that carries undersize particles to a collection canister. Air Jet sieving action is gentle, effective, and especially useful for fragile or low specific gravity materials. Operation is clean, quiet, and takes up minimal space. Test times, vacuum/pressure settings and are controlled through the integrated computer with touch screen controls and display. The controller has memory for up to nine preset test times to insure easy operation and test-to-test repeatability.

The new Air Jet design now accommodates both 200mm test sieves and conventional 8in (203mm) ASTM Test Sieves with use of an O-ring for sealing. Sieves are constructed with stainless steel frames and mesh, and are ordered separately by mesh sizes required. Low-Profile O-rings adapt Gilson 8in ASTM E11 Test Sieves for use with the Mikro Air Jet, and are available separately as SSA-9. Multiple particle sizes can be determined by transferring retained sample on a fine sieve to the next larger sieve. Inquire for special 83mm diameter sieves and adaptor plate for small or fragile samples that allow three sieves to be used at once.

The AJ-103 Basic Mikro Air Jet Sieve® consists of the base unit with a clear acrylic sieve cover, slotted brass air nozzle, electronic controls with integrated computer and touch screen display. The 15 Watt bevel-gear motor has lifetime lubricated bearings. The cast aluminum Instrument housing features a built-in pressure differential gauge and has an attractive baked enamel finish. An integral electrical outlet provides a convenient connection for the vacuum system, purchased separately. Vacuum is monitored at the housing outlet and has a control valve for adjustment.

You can take advantage of the features of the Advanced Air Jet Sieve by ordering the AJ-105 model directly, or by purchasing a simple upgrade procedure to unlock all of the features on an existing Basic model. The Advanced version includes everything that the AJ-103 Basic model has, and uses Windows-compatible software to interface with an electronic balance for automatic collection of sieve and fraction weights, and to the user's computer for networking and printing functions. Test results can be reported in a variety of graphs and tabular formats, and can be saved directly to the computer. A serial interface cable is included. The AJ-105 model or upgrade requires an AJA-135 Electronic Balance, purchased separately. The Balance has a capacity of 4,200g with a readability of 0.01g, and is supplied with an interface cable.

A Vacuum system is required for operation, and is purchased separately. The AJA-134 Vacuum System is recommended for best performance over a wide range of materials, including very fine and conductive specimens. Three-stage filtration system includes a Dacron pre-filter bag, a disposable paper filter bag and a drop-in, pleated HEPA Filter Assembly with a minimum efficiency rating of 99.91% at 0.3µm. The powder-coated 5gal (19L) collection canister is equipped with casters and a carrying handle for easy portability. The 1hp air-cooled motor is available in 110 or 220V versions, and operates on 50-60Hz power supplies. Sound level is 85 to 88 dBa. The unit is equipped with a 10ft (3M) anti-static suction hose and 25ft (7.6M) power cord. AJA-133 Standard Vacuum System has a low-noise 1,000 Watt motor and low-profile epoxy-lined steel filter canister with 4gal (15L) capacity. Note that the Standard Vacuum System is not designed for conductive materials or materials with high fines content. The AJA-4 Cyclone Collector, used in conjunction with the vacuum systems, assures greatest recovery of sub-micron fines. Undersize sieve fractions are directed through an anti-static vacuum hose through the cyclone, and collected in a threaded glass receiving bottle. **AJA-134 Product Dimensions:** 18x18x35in (457x457x889mm) WxDxH.

MICRON AIR JET SIEVE®

Mikro Air Jet Sieve™ Basic, 90-240V/50-60Hz	AJ-103
Mikro Air Jet Sieve™ Advanced, 90-240V/50-60Hz	AJ-105
Advanced Upgrade from AJ-103 Basic Model	AJ-111

Accessories

Vacuum System w/HEPA Filter, 110V/50-60Hz	AJA-134
Standard Vacuum System, 110V/50-60Hz	AJA-133
High-Efficiency Cyclone Collector	AJA-4
Low Profile O-Rings for 8in Sieves	SSA-9
Electronic Balance with Serial Cable, 4,200 x 0.01g, 110 or 220V/50-60Hz	AJA-135
Replacement 200mm Clear Acrylic Cover	AJA-8
Non-Woven Bag for AJA-134	AJA-141
Dacron HEPA Pre-Filter Bag	AJA-142
HEPA Filter Assembly w/Gasket	AJA-143
Primary Bag Filter (Disposable)	AJA-144
Disposable Paper Bags for AJA-133 Vacuum, pkg. of 10	AJA-139
HEPA Replacement Cartridge for AJA-133 Vacuum	AJA-140

For WV-1 and WV-3

WV-1 shown with Sieves

WVA-100

WVA-110

WVA-165

WVA-161

GILSON WET-VAC®

The Gilson Wet-Vac® is a completely self-contained particle-sizing system for predominately wet sieving applications. Innovative wet-sieving designs include spray-distribution, water recycling and vibration control system assures maximum particle separation efficiency. Wet-Vac® filtration allows complete recovery of fines, while still offering the flexibility of dry, wet, or dry-to-wet sequencing of test cycles.

Wet sieving overcomes particle agglomeration, electrostatic attraction and other issues inhibiting separation of many fine materials, and offers an extension of normal sieving range into much finer sizes. Effective applications for this method include coal, mining/minerals, marine sediments, soils, pipeline slurries, and other non-soluble materials. Wet-Vac® tests closely simulate actual production conditions in wet-process industries. An initial period of dry screening to separate coarse particles before water is introduced can promote quicker saturation and more efficient screening of fines. Dry sieving using vibration only can also be performed.

A rotating spray bar in the sieve cover gently saturates the material, promoting gravity flow of fines through the sieve stack. An upward spray from below allows for constant water flow. Water is recycled through a 7gal (26.5L) holding tank and pressure is adjustable up to approximately 35psi (2.4bar). Valves and fittings provided also permit direct connections to water tap and drain for once-through operation. A vacuum of around 2in (50.8mm) of mercury is applied throughout the test cycle to further assist passage of fines. Powerful electromagnetic vibration with amplitude control disperses material for increased sieving speed and accuracy. A hand spray nozzle and hose are provided for cleaning and flushing.

WV-1 accepts 12in sieves and WV-2 uses 8in sieves. WV-3 includes cover assemblies and lifting rings to enable use of either 8in or 12in sieves. Half-Height sieve capacities for 12in models range up to eight and 8in models will take up to sixteen sieves. A clear acrylic cylinder is included and nests within the sieve stack to allow visual monitoring of water level and performance. Joints in the sieve stack assembly are sealed with O-Ring gaskets (purchased separately). Other contact parts are stainless steel. Filter paper is retained in a special holder and base that allows paper to be monitored and changed if necessary during a test cycle.

Stainless steel sieves in sizes from No.16 (1.18mm) to No. 635 (20µm) are recommended for use with the Wet-Vac and are ordered separately. O-Ring gaskets and filter papers are also ordered separately. All models require at least four O-Ring gaskets. An additional Filter Holder and Filter Base are helpful for efficient change-out of filter paper during testing. Controls, Gauges and indicators for water, vibration, and vacuum are positioned for easy access on the control panel. The built-in timer tracks total “on” time even when interruptions are necessary. The stainless steel cabinet housing the water tank, vacuum pump, vibrating assembly and other valving and electrical components is mounted on locking casters for convenient positioning near water or drain sources. Electrical requirement is 20 amps at 115V/60Hz. Inquire for other available voltages. **Product Dimensions:** 34x26x64in (864x660x1,626mm), WxDxH.

GILSON WET-VAC®

Gilson Wet-Vac® for 12in (305mm) Sieves, 115V/60Hz	WV-1
Gilson Wet-Vac® for 8in (203mm) Sieves, 115V/60Hz	WV-2
Gilson Wet-Vac® for 12in and 8in Sieves, 115V/60Hz	WV-3

Accessories

O-Ring Gasket, 12in	SSA-11
O-Ring Gasket, 8in	SSA-10
Filter Paper, 500mm, pkg. 100	WVA-161
Filter Holder	WVA-100
Filter Base	WVA-165
12in Clear Cylinder for WV-1 & WV-3	WVA-110
8in Clear Cylinder for WV-2 & WV-3	WVA-112

TS-2 shown with Screen Trays

TS-1 shown with Screen Trays

GILSON TESTING SCREENS

The Gilson Testing Screen is ideal for particle size determinations on large samples of aggregate, slag, ores, and many other coarse materials. Batch sizes up to one cubic foot (0.028m³) or more can be processed into six fractions in as little as three to five minutes, depending on material type. Vibration and amplitude characteristics are fixed at optimum for mineral aggregates in the 4in (101mm) to No.4 (4.75mm) size range, but options and accessories are available to optimize machine performance when testing finer samples or special materials. The standard Testing Screen can be used to process material all the way down to No.200 (75µm) if less efficient separations are acceptable.

Both Testing Screen models are similar in design and have exactly the same performance specifications. The only difference is in the clamping mechanism used to secure the screen trays during operation. The drive mechanism is completely enclosed for added safety. The powerful 1/2hp capacitor-type motor is operated through a starting switch with built in overload protection. Gilson Testing Screens are designed to be mounted to a solid, rigid floor system. Securing with anchor bolts to a concrete floor is recommended. Dimensions for anchor bolt placement are available upon request. **Product Dimensions:** 23x31x43in (584x787x1,092mm), WxDxH.

Screen Trays and Dustpans are purchased separately. Specify sizes when ordering. The Dustpan may be placed on the bottom shelf of the unit, freeing up a slot for an additional screen tray. Independently removable screen trays are shared by both the Testing Screen and Test-Master® models and are available in a wide range of opening sizes with ASTM E11, ISO 565 specification cloth or punched steel plate. Screen cloth is replaceable, insuring long life and inexpensive maintenance of trays. Each tray features a generous 14.75x22.75in (375x578mm), 2.33ft² (0.22m²) clear screen area. Dustpan configurations can be ordered for increased capacity, reduced dust output, or dispensing of fines directly into outside bag or container. Other accessories to facilitate sample handling, dust and noise control and separation performance are listed separately.

TS-1 Gilson Testing Screen uses a quick-acting hydraulic pump system to clamp the screen trays in place. Trays are quickly released using the same handle. This more efficient model is recommended for labs with a steady workload of particle size testing.

TS-2 Gilson Testing Screen secures the screen trays with manually operated screw-type clamping handles. This model is more economical, but slightly more labor-intensive for continuous use. TSA-155 or TSA-159 Hydraulic Clamping Conversion Kits are available to convert existing TS-2 models to hydraulic clamping TS-1 units.

GILSON TESTING SCREENS	
Hydraulic Clamping, 115V/60Hz	TS-1
230V/50Hz	TS-1F
Manual Clamping, 115V/60Hz	TS-2
230V/50Hz	TS-2F
Accessories	
Digital Timer/Controller	TSA-169R
Door Enclosure	TSA-157
Sound Enclosure	TSA-180
Clean-N-Weigh	TSA-167
Speed Variation Accessory	TSA-154R
Low-Amplitude Drive Shaft (Must be factory-installed)	TSA-200
Hydraulic Clamping Conversion; s/n 13824 and Lower	TSA-155
Hydraulic Clamping Conversion; s/n 13825 and Higher	TSA-159
Screen Tray Rack	TSA-156

TM-6 shown with doors closed

Foot-operated Tray Clamping

Feed Hopper

TM-5 shown with Screen Trays.
Doors open & Hopper elevated

GILSON TEST-MASTER® TESTING SCREENS

- **Counterbalanced drive for smooth, quiet operation.**
- **Integral hopper for easy sample handling.**
- **Fully enclosed to minimize dust.**
- **Built-in digital timer for maximum test repeatability.**

The redesigned Test-Master® Testing Screen now features an easily controlled, integrated hopper for easier introduction of sample material and vertically-hinged front panel doors for improved access and clearance. The 1.6ft³ (45.3L) hopper is hinged at the rear and allows the sample to be introduced incrementally as the machine is running. When the hopper is closed, a panel blocks dust from escaping through the opening. The narrower panel doors require less space to open and fold flat across the front of the unit. The doors also feature a safety interlock switch that disables the Test-Master® when open.

TM-5 with six-screen tray capacity, and seven-tray TM-6 units feature the same reliable counter-balanced drive assembly, fully enclosed operation and electronic digital controller as our previous models. Sample vibration characteristics are identical to our TS-1 and TS-2 models and the Screen Trays are interchangeable. Internal rotating counterweights of the Test-Master® drive system equalize the vertical screening action to assure smooth, quiet operation and prevent transfer of vibrations to other lab instruments.

The Test-Master® may be placed anywhere in the lab and does not require permanent installation. A built-in electronic digital controller has LED display of time remaining and produces an audible tone at the end of the test cycle. Test cycles lasting up to 99 minutes, 59 seconds may be programmed and cycles may be interrupted without loss of test time. An ergonomically operated foot-pedal easily operates the hydraulic clamping and pressure release system for the screen trays.

Screen Trays and Dustpans for Test-Master® units are ordered separately. Independently removable screen trays are shared by both the Testing Screen and Test-Master® models and are available in a wide range of opening sizes with ASTM E11, ISO 565 specification cloth or punched steel plate. Screen cloth is replaceable, insuring long life and inexpensive maintenance of trays. Each tray features a generous 14.75x22.75in (375x578mm), 2.33ft² (0.22m²) clear screen area. Available Screen Trays, Dustpans and Replacement Mesh sizes are listed in the accompanying selection guide. The Dustpan may be placed on the bottom shelf of the unit, freeing up a slot for an additional screen tray. Dustpan configurations can be ordered for increased capacity. For samples with larger particle sizes, the wider tray spacing of the TM-5 allows more efficient agitation. Both operate with powerful, capacitor-start 1/3hp motor. **Product Dimensions:** 28x35x50 in (711x889x1,270mm).

Test-Master® accessories and options allow greater versatility for processing a wider range of materials. Standard vibration characteristics are designed for coarse materials of mid-range density such as limestone or gravel. Separation of fine, sensitive or low density materials such as wood chips, coal or coke can be improved by adding the TSA-153 Speed Variation accessory and/or the factory-installed TSA-201 Low-Amplitude Drive Shaft. These options reduce break-down of material during screening and allow the user to match screening characteristics to the specific material. Customers with special materials should contact a Gilson technical service representative. Other accessories such as Clean-N-Weigh and Tray Racks interchange with Testing Screen models, making the Test-Master® a good choice for an efficient upgrade in the modern lab.

GILSON TEST-MASTER® TESTING SCREENS

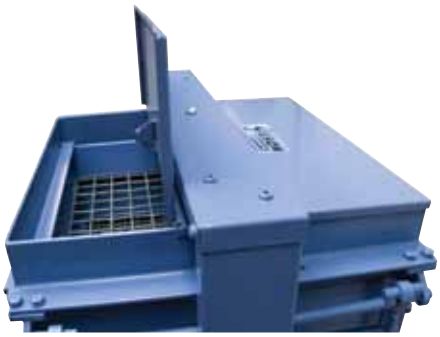
Test-Master®, 6-Tray Capacity, 115V/60Hz	TM-5
230V/50Hz	TM-5F
Test-Master®, 7-Tray Capacity, 115V/60Hz	TM-6
230V/50Hz	TM-6F

Accessories

Sound Enclosure	TSA-180
Clean-N-Weigh	TSA-167
Speed Variation Accessory	TSA-153
Low-Amplitude Drive Shaft (Must be factory-installed)	TSA-201
Screen Tray Rack	TSA-156

PS-4 shown with Screen Trays

PSA-367



PSA-312 on PS-3

PSA-114

Foot-Tab Leveling

GILSON PORTA-SCREEN®

- **Counterbalanced mechanism for smooth operation.**
- **Portable for mobile applications.**
- **Smaller screens are easier to handle.**

Gilson's Porta-Screen® has long been the accepted standard portable screen for quality control of construction aggregates at asphalt and ready-mix plants. Porta-Screen® models are designed for performance durability, yet are light enough to be portable. Designed for best separation in the 2in (50.8mm) to No.16 (1.18mm) range, it is often used to sieve materials to No.200 (75µm). Porta-Screens are also useful for separations of many other materials. Capacity depends on test material characteristics but may range up to 60lb (27.3kg) per test. PS-3 holds five screen trays and pan. PS-4 holds seven trays and pan to permit two added mesh sizes per test. Both the PS-3 and PS-4 fit inside the TSA-180 sound enclosure. Vibration of both models is mechanically counterbalanced for smooth, stable operation; no mounting is required. A built-in electronic digital timer has LED display of remaining test time and issues a 5 second audible alarm at zero. Timer resets to repeat times which can be programmed up to 99 minutes, 59 seconds. A feature allows interruptions without loss of test time.

Screen Trays and Dustpans for the Porta-Screen® units are ordered seperately. Trays have 14x14in (356x356mm) screen area and are quickly secured for operation by dual hand clamp levers. When levers are released, trays are individually-removable for convenient emptying, cleaning, and weighing operations. Mesh sizes No.4 and larger have metal shields around edges to cover partial openings for accuracy of separations. Trays with wire cloth in the No.16 to No.80 (1mm to 180µm) range have three added support ribs. No.100 (150µm) and finer trays are supplied with backup cloth support. Replaceable mesh is available in all sizes. Cloth No.4 and larger is steel; fine mesh is stainless steel. **Tray Dimensions:** 16x16.5x3in (406x419x76mm), WxDxH.

The vibrating assembly is mounted on hardened guide pins. The 1/4hp motor, drive shaft, and connecting rod are synchronized with rotating weight counterbalance system. All are enclosed by the enameled steel case. The machine is quickly leveled by foot tab adjustment of the three support legs while watching an indicator bubble on the top frame.

PSA-114 Porta Wheels may be attached for added mobility. Ball-bearing wheel assemblies with rubber tires are predrilled for quick attachment to frame of Porta-Screen®.

PSA-312 Porta Cover bolts to the top flange to enclose the sample chamber. It has a latch, and is hinged to open for introduction of samples.

PSA-367 Porta Sample Pan is helpful in emptying and cleaning trays and in weighing operations. This chute-end pan fits inverted trays and holds entire samples for cumulative weighing. Handling is easy with the top swing-away handle and end handle grip. **Product Dimensions:** 17x30x4in (432x762x102mm), WxLxD.

PSA-356 Porta-Screen® Tray Rack organizes up to eight Porta-Screen trays for storage and to protect frames and wire cloth from possible damage. Sturdy painted steel sections can be bolted together for stacking. Assembly required. **Product Dimensions:** 18.9x17.4x30.2in (480x442x767mm) WxDxH.

GILSON PORTA-SCREEN®	
Gilson Porta-Screen®, 6-Tray Capacity, 115V/60Hz	PS-3
230V/50Hz	PS-3F
Gilson Porta-Screen®, 8-Tray Capacity, 115V/60Hz	PS-4
230V/50Hz	PS-4F
Accessories	
Porta Wheels	PSA-114
Porta Cover	PSA-312
Porta Sample Pan	PSA-367
Porta-Screen® Tray Rack	PSA-356

Testing Screen & Test-Master® Trays

Porta-Screen® Trays

ASTM SCREEN TRAYS
ASTM E11, E323

ASTM Screen Trays for Gilson Testing Screen, Test-Master®, and Porta-Screen® units have stainless steel cloth and meet relevant wire cloth specifications of ASTM E11. Non-ASTM sizes of 1/8in and 1/16in are available as TSA-101 and TSA-126A or PSA-301 and PSA-326A for Porta-Screen®.

Testing Screen and Test-Master Trays with cloth No.16 (1.18mm) and finer have metal ribs installed to support mesh. No.4 stainless steel backing cloth reinforcement is included in Testing Screen Trays with No. 230 and finer cloth, and may be added to other trays with or without support ribs. The Backing Cloth is built especially for use as reinforcement, and features flat-rolled surfaces to prevent abrasion of finer cloth. Porta-Screen trays with cloth from No.16 to No.100 use metal support ribs, and No.4 stainless steel backing cloth is included on these trays with mesh from No.100 to No.400 opening sizes.

Blank trays (with no cloth) for Testing Screen and Test-Master models are available as TSA-136 to accept No.4 and coarser mesh, and TSA-137 for cloth No.5 and finer. For Porta-Screen models, order PSA-336 Blank Tray. Round Hole Punched-Plate Sizes for Testing Screen and Test-Master machines are punched openings in steel plate as used for coal testing and other special materials, and meet ASTM D4749 and E323. Verification services to ASTM E11 Inspection or Calibration Grades are available for Screen Trays. For details, see listing for Test Sieve Verification Services.

ASTM SCREEN TRAYS

ASTM SCREEN TRAYS					
ASTM E11		Testing Screen & Test-Master®		Porta-Screen®	
Alternate	Standard	Full Tray	Cloth Only	Full Tray	Cloth Only
5 in.	125.0mm	TSA-99 5"	TSA-124 5"	n/a	n/a
4.24 in.	106.0mm	TSA-110 4.24"	TSA-132 4.24"	n/a	n/a
4 in.	100.0mm	TSA-100 4"	TSA-125 4"	n/a	n/a
3 1/2 in.	90.0mm	TSA-100 3-1/2"	TSA-125 3-1/2"	n/a	n/a
3 in.	75.0mm	TSA-100 3"	TSA-125 3"	Inquire	Inquire
2 1/2 in.	63.0mm	TSA-100 2-1/2"	TSA-125 2-1/2"	Inquire	Inquire
2.12 in.	53.0mm	TSA-110 2.12"	TSA-132 2.12"	Inquire	Inquire
2 in.	50.0mm	TSA-100 2"	TSA-125 2"	PSA-300 2"	PSA-325 2"
1 3/4 in.	45.0mm	TSA-100 1-3/4"	TSA-125 1-3/4"	PSA-300 1-3/4"	PSA-325 1-3/4"
1 1/2 in.	37.5mm	TSA-100 1-1/2"	TSA-125 1-1/2"	PSA-300 1-1/2"	PSA-325 1-1/2"
1 1/4 in.	31.5mm	TSA-100 1-1/4"	TSA-125 1-1/4"	PSA-300 1-1/4"	PSA-325 1-1/4"
1.06 in.	26.5mm	TSA-110 1.06"	TSA-132 1.06"	PSA-299 1.06"	PSA-324 1.06"
1 in.	25.0mm	TSA-100 1"	TSA-125 1"	PSA-300 1"	PSA-325 1"
7/8 in.	22.4mm	TSA-100 7/8"	TSA-125 7/8"	PSA-300 7/8"	PSA-325 7/8"
3/4 in.	19.0mm	TSA-100 3/4"	TSA-125 3/4"	PSA-300 3/4"	PSA-325 3/4"
5/8 in	16.0mm.	TSA-100 5/8"	TSA-125 5/8"	PSA-300 5/8"	PSA-325 5/8"
.530 in.	13.2mm	TSA-110 .530"	TSA-132 .530"	PSA-299 .530"	PSA-324 .530"
1/2 in.	12.5mm	TSA-100 1/2"	TSA-125 1/2"	PSA-300 1/2"	PSA-325 1/2"
7/16 in.	11.2mm	TSA-100 7/16"	TSA-125 7/16"	PSA-300 7/16"	PSA-325 7/16"
3/8 in.	9.5mm	TSA-100 3/8"	TSA-125 3/8"	PSA-300 3/8"	PSA-325 3/8"
5/16 in.	8.0mm	TSA-100 5/16"	TSA-125 5/16"	PSA-300 5/16"	PSA-325 5/16"
.265 in.	6.7mm	TSA-110 .265"	TSA-132 .265"	PSA-299 .265"	PSA-324 .265"
1/4 in.	6.3mm	TSA-100 1/4"	TSA-125 1/4"	PSA-300 1/4"	PSA-325 1/4"
No.3-1/2	5.6mm	TSA-110 #3-1/2	TSA-132 #3-1/2	PSA-299 #3-1/2	PSA-324 #3-1/2
No.4	4.75mm	TSA-100 #4	TSA-125 #4	PSA-300 #4	PSA-325 #4
No.5	4.00mm	TSA-101 #5	TSA-126A #5	PSA-301 #5	PSA-326A #5
No.6	3.35mm	TSA-101 #6	TSA-126A #6	PSA-301 #6	PSA-326A #6
No.7	2.80mm	TSA-101 #7	TSA-126A #7	PSA-301 #7	PSA-326A #7
No.8	2.36mm	TSA-101 #8	TSA-126A #8	PSA-301 #8	PSA-326A #8
No.10	2.00mm	TSA-101 #10	TSA-126A #10	PSA-301 #10	PSA-326A #10
No.12	1.70mm	TSA-101 #12	TSA-126A #12	PSA-301 #12	PSA-326A #12
No.14	1.40mm	TSA-101 #14	TSA-126A #14	PSA-301 #14	PSA-326A #14
No.16	1.18mm	TSA-102 #16	TSA-126B #16	PSA-302 #16	PSA-326B #16
No.18	1.00mm	TSA-102 #18	TSA-126B #18	PSA-302 #18	PSA-326B #18
No.20	850µm	TSA-102 #20	TSA-126B #20	PSA-302 #20	PSA-326B #20
No.25	710µm	TSA-102 #25	TSA-126B #25	PSA-302 #25	PSA-326B #25
No.30	600µm	TSA-102 #30	TSA-126B #30	PSA-302 #30	PSA-326B #30
No.35	500µm	TSA-102 #35	TSA-126B #35	PSA-302 #35	PSA-326B #35
No.40	425µm	TSA-102 #40	TSA-126B #40	PSA-302 #40	PSA-326B #40
No.45	355µm	TSA-102 #45	TSA-126B #45	PSA-302 #45	PSA-326B #45
No.50	300µm	TSA-102 #50	TSA-126B #50	PSA-302 #50	PSA-326B #50
No.60	250µm	TSA-102 #60	TSA-126B #60	PSA-302 #60	PSA-326B #60
No.70	212µm	TSA-102 #70	TSA-126B #70	PSA-302 #70	PSA-326B #70
No.80	180µm	TSA-102 #80	TSA-126B #80	PSA-302 #80	PSA-326B #80
No.100	150µm	TSA-102 #100	TSA-126B #100	PSA-302 #100	PSA-326B #100
No.120	125µm	TSA-103 #120	TSA-140 #120	PSA-303 #120	PSA-328 #120
No.140	106µm	TSA-103 #140	TSA-140 #140	PSA-303 #140	PSA-328 #140
No.170	90µm	TSA-103 #170	TSA-140 #170	PSA-303 #170	PSA-328 #170
No.200	75µm	TSA-103 #200	TSA-140 #200	PSA-303 #200	PSA-328 #200
No.230	63µm	TSA-103 #230	TSA-140 #230	PSA-303 #230	PSA-328 #230
No.270	53µm	TSA-103 #270	TSA-140 #270	PSA-303 #270	PSA-328 #270
No.325	45µm	TSA-103 #325	TSA-140 #325	PSA-303 #325	PSA-328 #325
No.400	38µm	TSA-103 #400	TSA-140 #400	PSA-303 #400	PSA-328 #400
No.4 Backing Cloth		—	TSA-135	—	PSA-335
Blank Tray, No.4 & Coarser		TSA-136	—	PSA-336	—
Blank Tray, No.5 & Finer		TSA-137	—	PSA-336	—
Dust Pan		TSA-112	—	PSA-310	—

ROUND-HOLE PLATE TRAYS

ROUND-HOLE PLATE TRAYS			
ASTM		To Fit TS & TM Models	
Alternate	Standard	Full Tray	Plate Only
4.0in	101.6mm	TSA-115 4"	TSA-130 4"
3.5in	88.9mm	TSA-115 3-1/2"	TSA-130 3-1/2"
3.0in	76.2mm	TSA-115 3"	TSA-130 3"
2.5in	63.5mm	TSA-115 2-1/2"	TSA-130 2-1/2"
2.25in	57.2mm	TSA-115 2-1/4"	TSA-130 2-1/4"
2.0in	50.8mm	TSA-115 2"	TSA-130 2"
1.75in	44.5mm	TSA-115 1-3/4"	TSA-130 1-3/4"
1.5in	38.1mm	TSA-115 1-1/2"	TSA-130 1-1/2"
1.375in	34.9mm	TSA-115 1-3/8"	TSA-130 1-3/8"
1.25in	31.8mm	TSA-115 1-1/4"	TSA-130 1-1/4"
1.0in	25.4mm	TSA-115 1"	TSA-130 1"
.875in	22.2mm	TSA-115 7/8"	TSA-130 7/8"
.75in	19.1mm	TSA-115 3/4"	TSA-130 3/4"
.625in	15.9mm	TSA-115 5/8"	TSA-130 5/8"
.5in	12.7mm	TSA-115 1/2"	TSA-130 1/2"
.375in	9.5mm	TSA-115 3/8"	TSA-130 3/8"
.312in	8.0mm	TSA-115 5/16"	TSA-130 5/16"
.25in	6.4mm	TSA-115 1/4"	TSA-130 1/4"
.187in	4.75mm	TSA-115 #4	TSA-130 #4
.125in	3.2mm	TSA-115 1/8"	TSA-130 1/8"

Testing Screen & Test-Master® Trays

ISO SCREEN TRAYS
ISO 565, 3310-1

ISO Screen Trays for Gilson Testing Screen, Test-Master®, and Porta-Screen® units are fitted with ISO series stainless steel screen cloth.

Testing Screen and Test-Master Trays with cloth 1.18mm and finer have metal supporting under the mesh. No.4 stainless steel backing cloth reinforces Testing Screen Trays with cloth openings of 63µm and finer, and can be added to other trays with or without support ribs as an option. The specially built Backing Cloth features flat-rolled surfaces to prevent the abrasion of fine mesh. Porta-Screen trays with 1.18mm to 150µm openings use metal support ribs, and No.4 stainless steel backing cloth is included on these trays with mesh from 150µm to 38µm opening sizes. Dimensions for Testing Screen cloth only: 16x24in (406x609). Dimensions for Porta-Screen® cloth only: 15x15in (381x381mm).

Blank trays (with no cloth) for Testing Screen and Test-Master models are available as TSA-136 for 4.75mm and coarser mesh, and TSA-137 for 4.00mm and finer. For Porta-Screen models, order PSA-336 Blank Tray.

helpfulhint

Gilson Screen Trays can be verified to ASTM E11 or ISO 565 and 3310-1 Inspection or Calibration grades, just like our Gilson Verified Test Sieves.

- Inspection Screen Tray Verification, ASTM E11 GV-61
- Calibration Screen Tray Verification, ASTM E11 GV-66
- Inspection Screen Tray Verification, ISO 565 and 3310-1 GV-64
- Calibration Screen Tray Verification, ISO 565 and 3310-1 GV-67

See our separate listing for Test Sieve and Screen Tray Verification and Services.

See Gilson Test Sieves Reference Page for ASTM/ISO equivalent sizes.

ISO SCREEN TRAYS

ISO SCREEN TRAYS				
ISO Sizes	Testing Screen & Test-Master®		Porta-Screen®	
Standard	Full Tray	Cloth Only	Full Tray	Cloth Only
125mm	TSA-103 125M	TSA-140 125M	-	-
106mm	TSA-100 106M	TSA-125 106M	-	-
100mm	TSA-100 100M	TSA-125 100M	-	-
90.0mm	TSA-100 90M	TSA-125 90M	-	-
75.0mm	TSA-100 75M	TSA-125 75M	-	-
63.0mm	TSA-100 63M	TSA-125 63M	Inquire	Inquire
56.0mm	TSA-100 56M	TSA-125 56M	Inquire	Inquire
53.0mm	TSA-100 53M	TSA-125 53M	Inquire	Inquire
50.0mm	TSA-100 50M	TSA-125 50M	PSA-300 50M	PSA-325 50M
45.0mm	TSA-100 45M	TSA-125 45M	PSA-300 45M	PSA-325 45M
40.0mm	TSA-100 40M	TSA-125 40M	PSA-300 40M	PSA-325 40M
37.5mm	TSA-100 37.5M	TSA-125 37.5M	PSA-300 37.5M	PSA-325 37.5M
35.5mm	TSA-100 35.5M	TSA-125 35.5M	PSA-300 35.5M	PSA-325 35.5M
31.5mm	TSA-100 31.5M	TSA-125 31.5M	PSA-300 31.5M	PSA-325 31.5M
28.0mm	TSA-100 28M	TSA-125 28M	PSA-300 28M	PSA-325 28M
26.5mm	TSA-100 26.5M	TSA-125 26.5M	PSA-300 26.5M	PSA-325 26.5M
25.0mm	TSA-100 25M	TSA-125 25M	PSA-300 25M	PSA-325 25M
22.4mm	TSA-100 22.4M	TSA-125 22.4M	PSA-300 22.4M	PSA-325 22.4M
20.0mm	TSA-100 20M	TSA-125 20M	PSA-300 20M	PSA-325 20M
19.0mm	TSA-100 19M	TSA-125 19M	PSA-300 19M	PSA-325 19M
18.0mm	TSA-100 18M	TSA-125 18M	PSA-300 18M	PSA-325 18M
16.0mm	TSA-100 16M	TSA-125 16M	PSA-300 16M	PSA-325 16M
14.0mm	TSA-100 14M	TSA-125 14M	PSA-300 14M	PSA-325 14M
13.2mm	TSA-100 13.2M	TSA-125 13.2M	PSA-300 13.2M	PSA-325 13.2M
12.5mm	TSA-100 12.5M	TSA-125 12.5M	PSA-300 12.5M	PSA-325 12.5M
11.2mm	TSA-100 11.2M	TSA-125 11.2M	PSA-300 11.2M	PSA-325 11.2M
10.0mm	TSA-100 10M	TSA-125 10M	PSA-300 10M	PSA-325 10M
9.5mm	TSA-100 9.5M	TSA-125 9.5M	PSA-300 9.5M	PSA-325 9.5M
9.0mm	TSA-100 9M	TSA-125 9M	PSA-300 9M	PSA-325 9M
8.0mm	TSA-100 8M	TSA-125 8M	PSA-300 8M	PSA-325 8M
7.1mm	TSA-100 7.1M	TSA-125 7.1M	PSA-300 7.1M	PSA-325 7.1M
6.7mm	TSA-100 6.7M	TSA-125 6.7M	PSA-300 6.7M	PSA-325 6.7M
6.3mm	TSA-100 6.3M	TSA-125 6.3M	PSA-300 6.3M	PSA-325 6.3M
5.6mm	TSA-100 5.6M	TSA-125 5.6M	PSA-300 5.6M	PSA-325 5.6M
5.0mm	TSA-100 5M	TSA-125 5M	PSA-300 5M	PSA-325 5M
4.75mm	TSA-100 4.75M	TSA-125 4.75M	PSA-300 4.75M	PSA-325 4.75M
4.50mm	TSA-100 4.5M	TSA-125 4.5M	PSA-300 4.5M	PSA-325 4.5M
4.00mm	TSA-101 4M	TSA-126A 4M	PSA-301 4M	PSA-326A 4M
3.55mm	TSA-101 3.55M	TSA-126A 3.55M	PSA-301 3.55M	PSA-326A 3.55M
3.35mm	TSA-101 3.35M	TSA-126A 3.35M	PSA-301 3.35M	PSA-326A 3.35M
3.15mm	TSA-101 3.15M	TSA-126A 3.15M	PSA-301 3.15M	PSA-326A 3.15M
2.80mm	TSA-101 2.8M	TSA-126A 2.8M	PSA-301 2.8M	PSA-326A 2.8M
2.50mm	TSA-101 2.5M	TSA-126A 2.5M	PSA-301 2.5M	PSA-326A 2.5M
2.36mm	TSA-101 2.36M	TSA-126A 2.36M	PSA-301 2.36M	PSA-326A 2.36M
2.00mm	TSA-101 2M	TSA-126A 2M	PSA-301 2M	PSA-326A 2M
1.80mm	TSA-101 1.8M	TSA-126A 1.8M	PSA-301 1.8M	PSA-326A 1.8M
1.70mm	TSA-101 1.7M	TSA-126A 1.7M	PSA-301 1.7M	PSA-326A 1.7M
1.60mm	TSA-101 1.6M	TSA-126A 1.6M	PSA-301 1.6M	PSA-326A1.6M
1.40mm	TSA-101 1.4M	TSA-126A 1.4M	PSA-301 1.4M	PSA-326A 1.4M
1.25mm	TSA-101 1.25M	TSA-126A 1.25M	PSA-301 1.25M	PSA-326A 1.25M
1.18mm	TSA-102 1.18M	TSA-126B 1.18M	PSA-302 1.18M	PSA-326B 1.18M
1.12mm	TSA-102 1.12M	TSA-126B 1.12M	PSA-302 1.12M	PSA-326B 1.12M
1.00mm	TSA-102 1M	TSA-126B 1M	PSA-302 1M	PSA-326B 1M
900µm	TSA-102 900U	TSA-126B 900U	PSA-302 900U	PSA-326B 900U
850µm	TSA-102 850U	TSA-126B 850U	PSA-302 850U	PSA-326B 850U
800µm	TSA-102 800U	TSA-126B 800U	PSA-302 800U	PSA-326B 800U
710µm	TSA-102 710U	TSA-126B 710U	PSA-302 710U	PSA-326B 710U
630µm	TSA-102 630U	TSA-126B 630U	PSA-302 630U	PSA-326B 630U
600µm	TSA-102 600U	TSA-126B 600U	PSA-302 600U	PSA-326B 600U
560µm	TSA-102 560U	TSA-126B 560U	PSA-302 560U	PSA-326B 560U
500µm	TSA-102 500U	TSA-126B 500U	PSA-302 500U	PSA-326B 500U
450µm	TSA-102 450U	TSA-126B 450U	PSA-302 450U	PSA-326B 450U
425µm	TSA-102 425U	TSA-126B 425U	PSA-302 425U	PSA-326B 425U
400µm	TSA-102 400U	TSA-126B 400U	PSA-302 400U	PSA-326B 400U
355µm	TSA-102 355U	TSA-126B 355U	PSA-302 355U	PSA-326B 355U
315µm	TSA-102 315U	TSA-126B 315U	PSA-302 315U	PSA-326B 315U
300µm	TSA-102 300U	TSA-126B 300U	PSA-302 300U	PSA-326B 300U
280µm	TSA-102 280U	TSA-126B 280U	PSA-302 280U	PSA-326B 280U
250µm	TSA-102 250U	TSA-126B 250U	PSA-302 250U	PSA-326B 250U
224µm	TSA-102 224U	TSA-126B 224U	PSA-302 224U	PSA-326B 224U
212µm	TSA-102 212U	TSA-126B 212U	PSA-302 212U	PSA-326B 212U
200µm	TSA-102 200U	TSA-126B 200U	PSA-302 200U	PSA-326B 200U
180µm	TSA-102 180U	TSA-126B 180U	PSA-302 180U	PSA-326B 180U
160µm	TSA-102 160U	TSA-126B 160U	PSA-302 160U	PSA-326B 160U
150µm	TSA-102 150U	TSA-126B 150U	PSA-302 150U	PSA-326B 150U
140µm	TSA-102 140U	TSA-126B 140U	PSA-302 140U	PSA-326B 140U
125µm	TSA-103 125U	TSA-140 125U	PSA-303 125U	PSA-328 125U
112µm	TSA-103 112U	TSA-140 112U	PSA-303 112U	PSA-328 112U
106µm	TSA-103 106U	TSA-140 106U	PSA-303 106U	PSA-328 106U
100µm	TSA-103 100U	TSA-140 100U	PSA-303 100U	PSA-328 100U
90µm	TSA-103 90U	TSA-140 90U	PSA-303 90U	PSA-328 90U
80µm	TSA-103 80U	TSA-140 80U	PSA-303 80U	PSA-328 80U
75µm	TSA-103 75U	TSA-140 75U	PSA-303 75U	PSA-328 75U
71µm	TSA-103 71U	TSA-140 71U	PSA-303 71U	PSA-328 71U
63µm	TSA-103 63U	TSA-140 63U	PSA-303 63U	PSA-328 63U
56µm	TSA-103 56U	TSA-140 56U	PSA-303 56U	PSA-328 56U
53µm	TSA-103 53U	TSA-140 53U	PSA-303 53U	PSA-328 53U
50µm	TSA-103 50U	TSA-140 50U	PSA-303 50U	PSA-328 50U
45µm	TSA-103 45U	TSA-140 45U	PSA-303 45U	PSA-328 45U
40µm	TSA-103 40U	TSA-140 40U	PSA-303 40U	PSA-328 40U
38µm	TSA-103 38U	TSA-140 38U	PSA-303 38U	PSA-328 38U

TESTING SCREEN & TEST-MASTER® ACCESSORIES

TSA-157

TESTING SCREEN & TEST-MASTER® ACCESSORIES	
Low-Amplitude Drive Shaft is a factory-installed option often used in conjunction with the Speed Variation Accessory for gentle separations of fragile, sensitive, or lightweight materials. The special drive shaft has a shorter stroke than the original design. For Testing Screen or Continuous-Flow Screen models order TSA-200, and for Test-Master® order TSA-201.	TSA-200 TSA-201
Door Enclosure is a lightweight, easily removable door panel for TS-1 and TS-2 Testing Screens, designed to minimize dust and noise. Sturdy fiberboard door has a full-width hinge and sound-deadening liner to cover the top and front openings. It is held in place with permanent magnets. Specify Testing Screen serial number when ordering to insure proper fit.	TSA-157
Sound Enclosure is a sturdy, painted-steel cabinet lined with 1in (25.4mm) thick sound attenuating foam. The enclosure is designed for use with Testing Screen and Test-Master® units, but can also be used with other laboratory equipment. Full-width doors and top are hinged for easy access to equipment. When used with TS-1 or TS-2 Testing Screens, use of the TSA-157 Door Enclosure is recommended. Outside Product Dimensions: 36.5x38.5x54.5in (927x978x1,384mm), WxDxH.	TSA-180
Clean-N-Weigh Accessory provides a fast, convenient method of cleaning and collecting contents of screen trays for weighing of separated fractions. Loaded screen trays are inverted and cleaned on top of the unit and specimen is collected in the included TSA-162 Chute-End Handling Pan below. The pan can also be positioned on an electronic balance for instant display or data collection of cumulative weights. Sturdy, painted-steel construction, adjustable shelf and leveling feet. Product Dimensions: 30.5x19.5x30.5in (775x495x775mm), WxDxH.	TSA-167

TSA-180 shown with TS-1

TSA-167 shown with TSA-171

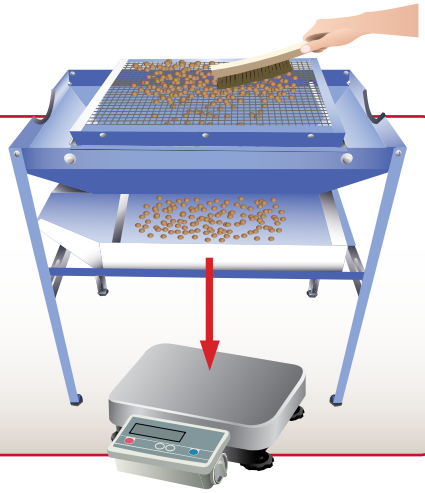
CLEAN-N-WEIGH ACCESSORY

Step 1: Place the Chute-End Handling Pan under the hopper of the Clean-N-Weigh, then invert a Screen Tray on the hopper support bars.

Step 2: Brush all particles from the Screen Tray through the hopper.

Step 3: Weigh sample in either the Chute-End Handling Pan or separate container.

Note: The Handling Pan can also be placed directly on a scale while material is collected for even faster processing



TESTING SCREEN & TEST-MASTER® ACCESSORIES

TSA-154R

TSA-169R

TSA-155

TESTING SCREEN & TEST-MASTER® ACCESSORIES	
Speed Variation Accessory is factory-installed to allow precise control of vibration speed on Testing Screen and Test-Master® machines. Control of vibration speed assures reliable separations of materials with specific gravities different from common mineral aggregates or for materials finer than No.4 (4.75mm). The TSA-154R for Testing Screens and TSA-153 for Test-Master® both feature a remotely-mounted digital controller that displays stroke values between 240 and 635 strokes per minute. Please inquire for retrofitting existing units. Controller Product Dimensions: 6.1x4.3x7.5in (159x108x191mm), WxDxH.	
Speed Variation Accessory for Testing Screen	TSA-154R
Speed Variation Accessory for Test Master	TSA-153
Digital Lab Timer controls up to 1hp single phase motors or 20 amp loads. Bright 1/2in (12.6mm) LED display shows remaining time, stops machine at zero, then resets to programmed time for next use. Test times are set with tactile panel buttons. When stopped and restarted, countdown resumes from paused time. Timer operates in four modes with capacities of: 9,999 sec, 9,999 min, 99:59 min:sec or 99:59 hr:min. Electronics are mounted in a stainless steel case. The timer has a three-wire receptacle for timed devices operating on 115V/60Hz power. TSA-169RF has two 6ft (3m) three-wire cords without plugs for connection to mains and machine. Overall Size: 4.5x5x5.5in (114x127x140mm), WxDxH.	
Digital Lab Timer with 3-Wire Receptacle	TSA-169R
Digital Lab Timer with no Plugs	TSA-169RF
Hydraulic Clamping Conversion converts the threaded manual clamping of the TS-2 to the fast-acting hydraulic system of the TS-1. Time and effort for each test cycle are reduced and clamping pressure is automatically equalized between the two sides. For serial numbers lower than 13825 order TSA-155 and higher than 13825 order TSA-159. Kit includes pump, cylinders, rods, bearings and other necessary parts, along with a drilling template and instructions.	
Hydraulic Clamping Conversion Kit, S/N 13825 and Lower	TSA-155
Hydraulic Clamping Conversion Kit, S/N 13826 and Higher	TSA-159
Screen Tray Rack provides organized storage for up to seven screen trays while protecting tray flanges and wire cloth from possible damage. Enameled steel sections fit on top of or below most lab bench tops and can be bolted together for stacking. Assembly required. **Product Dimensions:** 20.3x27.7x23.1in (516x704x587mm), WxDxH	TSA-156
Special Dustpans are available to fit TS or TM models for collecting and handling fines. 3in (76mm) deep TSA-114 and 4in (100mm) deep TSA-112S pans have extra capacity for samples with high fines fractions. The two piece TSA-116 Stationary Dustpan with Adapter, designed for use with TM models only, has a flexible sleeve, providing a dust seal to the stationary pan below. Nuisance dust generated by fines separation is reduced. TSA-117 Inclined Chute pan allows fines to be drawn off continuously into an external pan or bag. TSA-117 can not be used with TM-3, TM-4, TM-5 or TM-6 models. The TSA-114 can be used in Testing Screen without losing a tray space. The Test-Master® will lose one tray space. Other trays will reduce maximum screen tray capacity of machines by one.	
3in Deep Dustpan	TSA-114
4in Deep Dustpan	TSA-112S
Two-Piece Stationary Dustpan	TSA-116
Inclined Chute Pan	TSA-117

TSA-156

TSA-112S

TSA-114

TSA-116

TSA-117

CF-1

SS-35
(Cloth squares sold separately)

CFA-100

CONTINUOUS-FLOW SCREEN

Gilson's CF-1 Continuous-Flow Screen is extremely versatile, ideal for the laboratory where many different separation jobs are encountered. For small-scale scalping, mass separation and continuous-feed production applications with coarse sized materials CF-1 does the job practically and efficiently.

The unit can be used with one or two screen trays with screening area approximately 16x24in (406x610mm) per tray. The trays are vibrated in inclined position, with incline angle adjustable in a range of 4°—10°, and speed is digitally controlled up to 650 cycles per minute. Inclined Screen Trays are available with stainless steel wire cloth in ASTM E11 sizes 4in to No.100, or may be specified with round openings, slotted openings, or other special wire cloth.

Discharge pans are provided in two styles, for either front or bottom discharge. The trays and pan are secured by clamp rods readily accessible on top of the unit. The CF-1 is powered by a 1/2hp, fan cooled, totally enclosed motor. Screen Product Dimensions: 34x22x28in (864x559x711mm), LxWxH. Length is 41in (1041mm) with trays installed.

The vertical-throw action of the CF-1 is designed primarily for coarse materials (2in to No.4), but adjustable incline and frequency allow use with a wide range of materials. A special low amplitude drive shaft may also be specified to improve separations in sizes finer than No.4.

Continuous-flow screening is not recommended for testing applications. The versatile CF-1 may be adapted for some testing work by setting at lowest incline angle and replacing Inclined Screen Trays and pan with trays and pan Models TSA-100 to TSA-112 described elsewhere for use with the Model TS-1 Testing Screen. **Product Dimensions:** 26x34x31in (660x864x787mm), WxDxH.

CONTINUOUS-FLOW SCREEN

Continuous-Flow Screen, 110V/60Hz	CF-1
230V/50Hz	CF-1F

Accessories

Inclined Screen Tray 4in—No.4	CFA-100
Inclined Screen Tray No.5—No.14	CFA-101
Inclined Screen Tray No.16—No.100	CFA-102
Discharge Pan Inclined (for front discharge)	CFA-112
Discharge Pan Chute (for bottom discharge)	CFA-113
Replacement Cloth only 4in—No.4	TSA-125
Replacement Cloth only No.5—No.14	TSA-126A
Replacement Cloth only No.16—No.100	TSA-126B
Special Low Amplitude Drive Shaft Option	TSA-200

ROCKER SCREEN SET

Set consists of a 12in square steel frame designed for interchangeable wire cloth and bottom pan. Stainless Steel Wire Cloth squares are held in place by two bolted side clamps with wing nuts. Order required squares separately in mesh sizes desired. When not in use, all squares can be clamped into the frame for carrying or storing. Frame and rocker bottom have handles for rocking and carrying. Frame height above cloth is 5in (13cm). Not recommended for use with sizes below No.20. **Product Dimensions:** 15x12x10in (39x31x25cm).

ROCKER SCREEN SET

Rocker Screen Set	SS-35

Accessories

No.7 & Coarser Wire Cloth Squares	SSA-351
No.8—No.20 Wire Cloth Squares	SSA-355

GILSO-MATIC® SCREENING ASSEMBLIES

- **Automated in-plant quality control.**
- **Research and pilot plant production.**
- **Samples up to 10.5ft³ (0.5m³).**
- **Particle size to 4in (102mm).**

Effective quality control of coarse aggregate production requires testing large-volume samples. Gilso-Matic® Screening Assemblies equipped with Hopper/Feeders can test total sample volumes up to 10.5ft³ (0.3m³) (152mm), in batch sizes from 1—3ft³ (0.03—0.08m³). Operating principles are similar to our proven Testing Screen and Test Master laboratory models. The mechanism of the screening assembly is internally counter-balanced for smooth operation and to minimize transfer of vibration. Capacities are considerably greater and automated material handling features have been added. These are powerful, reliable units designed for integration into an automated, total quality control system.

For greatest accuracy, these large samples are screened in smaller batches, and weights are added together for total fractions. The 18ft³ (0.5m³) Hopper/Feeder assembly can dispense samples to the Gilso-Matic® in successive cycles of feeding, screening and discharge. After each batch is screened, air-actuated cylinders tilt the screen decks and fines collection pan to discharge fractions into individual collection chutes. Screen decks and pan remain mounted in the machine during testing and discharge operations, but can be unbolted and dismounted for cleaning and maintenance. At completion of the batch-testing cycles, contents of each chute can be discharged directly to a platform scale for cumulative analysis. Electronic scales connected to a PC allow automated data collection, analysis and reporting. Sized fractions can also be collected individually in pans and dollies and moved away for further processing.

Holding capacity of each collection chute is about 1.5ft³ (0.04m³) for a total capacity of 10.5ft³ (0.3m³) from the six screen decks and the fines collection pan. Each chute has an individually powered gate for controlled release of accumulated material. Replaceable ASTM E11 stainless steel wire cloth units are 24in (610mm) square and mounted in metal frames for clamping in screen decks. Six GXA-100 wire cloth units from 4in to No.4 (100mm to 4.75mm) are included and sizes must be specified at time of order.

Gilso-Matic® Screening Assemblies have 4in (102mm) topsize capacity. Inquire for models to process materials up to 6in (152mm). Minimum recommended material size is No.8 (2.36mm). The basic Gilso-Matic® unit is supplied with a 3hp electric motor, air-actuated cylinders, collection chutes, a control box, mounting rails, six wire cloth units and a pan. Models can also be ordered with 18ft³ (0.5m³) Hopper-Feeder included. Special factory-installed low-amplitude vibration and speed variation accessories are available to optimize performance and match characteristics of different materials.

GX-4A1 (Safety guards removed)

An additional 9in (230mm) of vertical clearance is required for tilt-discharge operation. An additional 60in (1.52m) of horizontal clearance is required in front of the unit for maintenance and repair. The Gilso-Matic® requires a 230 or 460V, three phase electrical supply and a minimum air supply of 80psi (533kPa). **Product Dimensions:** 86x48x85in (2.18x1.22x2.16m), LxWxH. **Dimensions with Hopper-Feeder Assembly:** 107x48x106in (2.72x1.22x2.69m).

GILSO-MATIC® SCREENING ASSEMBLIES[1]	
Gilso-Matic®, 230 or 460V/60Hz	GX-4A2
230 or 460V/50Hz	GX-4A2F
Gilso-Matic® with 18ft³ Hopper, 230 or 460V/60Hz	GX-4A1
230 or 460V/50Hz	GX-4A1F
Accessories	
Wire Cloth Units, Larger than 4in	GXA-99
Wire Cloth Units, 4in—No.4	GXA-100
Wire Cloth Units, No.5—No.14	GXA-101
Speed Variation Accessory	GXA-153
Low-Amplitude Vibration Option	GXA-200

[1] Specify electrical configuration when ordering.

helpfulhint

Gilso-Matic® Screening Assemblies in combination with Split-O-Matic Splitters can be a major part of an in-plant quality control system for automated production monitoring. Automated sampling devices can sample directly from the production stream. Electronic scales and data collection software allows real-time analysis of output for on-the-spot changes.

Inquire for assistance developing a custom-designed system.

SP-1

SP-0

SP-1 Close-Up

GILSON UNIVERSAL SPLITTERS
ASTM C702, C778; AASHTO T 27, T 248

- **Adjustable-width chutes.**
- **Lever-release hoppers.**
- **Five capacities for up to 6in topsize.**

Gilson's family of Universal Splitters features our exclusive adjustable chute system and gate-release hoppers, assuring top accuracy when reducing bulk materials. Each of these agile workhorses takes the place of two or more conventional splitters with just a few quick adjustments. Selecting the optimum chute width for each material yields the most accurate splits with minimal bridging. The lever-release hoppers allow careful placement of the bulk sample for even, consistent flow over the chutes as the gate is opened. The largest SP-0 and SP-1 models feature sample volume and particle size capacities not available anywhere else. Smaller models use the same efficient design features for materials all the way down to fine powders.

Universal Splitter chutes are formed by a series of aluminum bars pivoting on a rod through their lower ends. The operator arranges the precision-ground bars equally on alternate sides, creating V-shaped chutes of the desired width. Once set, the bars are drawn together by tightening wing nuts on threaded ends of the rod. Most specifications require eight to twelve openings per side. Chutes for SP-1 and SP-2 are sloped at 45°. Other models have standard 60° chute slopes to improve material flow of lighter and finer materials, and to meet certain coal or coke testing specifications. Only the included collection pans are required for proper use, but additional pans are available for faster, more efficient processing.

SP-0 Universal Splitter is built for large-volume bulk aggregate or raw coal samples. Other large samples with particle sizes up to 6in (152mm) can be accurately reduced with this rugged divider. Each split is evenly distributed to two pans on each side. All four pans are included. The SPA-450 Lift Cart is recommended for handling fully loaded pans. **Product Dimensions:** 56x26x41in (1,422x660x1,041mm) WxDxH.

SP-1 Universal Splitter is a rugged, large-capacity floor model for laboratory or field use with materials with particle sizes up to 4in (102mm). The convenient size and a wide range of available accessories make the SP-1 our most versatile splitter. The SPA-114 Fixed Chute Accessory converts the SP-1 into a SP-1C fixed-chute splitter with ten 2-1/4in wide chutes. The SPA-102 Chute Attachment replaces one pan to permit direct loading of material into a bag or container. PSA-114 Porta Wheels bolt easily to the splitter for added mobility. **Product Dimensions:** 29x19x39in (737x483x990mm) WxDxH..

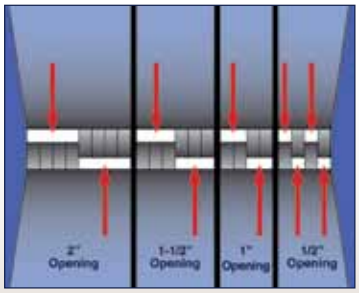
SP-2 Universal Splitter is compact and more durable than conventional portable splitters. Lightweight with ample hopper capacity for materials up to 2in (51mm), the SP-2 is convenient for use from floor or bench-top positions. This splitter provides accurate and representative samples for a wide range of materials. **Product Dimensions:** 22x14.5x20.5in (559x368x521mm), WxDxH.

SP-2.5 Universal Splitter for sizes up to 3/4in (19mm) is widely used for fine aggregates, and is rugged enough for field or laboratory use. The frame is painted steel, and most contact parts are stainless steel except for the anodized aluminum chute bars. The SPA-109 Dust Enclosure Accessory installs easily and has hinged flaps for pan access that hold in open position. **Product Dimensions:** 15.5x12.5x17.5in (394x318x445mm), WxDxH.

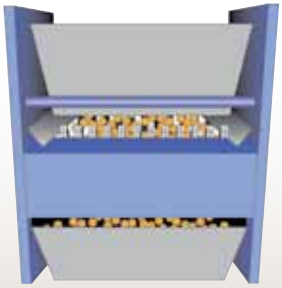
GILSON UNIVERSAL SPLITTERS

Gilson's adjustable chute bars make the Universal Splitter Series the most versatile splitters available. All of these unique splitters have a row of precision-machined aluminum bars, easily positioned by the operator to direct material into one of two sample pans. Using the adjustable bars, chute opening size is quickly adjusted to the optimum width of 3 times the largest particle size. One splitter does the work of several!

Our proprietary gated hopper holds the entire sample in place, allowing proper placement and even distribution prior to splitting. One pull of the lever releases the material to flow freely across the entire width of the chute openings, not just a portion. This method results in the most accurate and precise sample reduction possible using traditional splitters or rifflers.



SP-1 Chute bars can be positioned to create ½" to 4" chute openings.



Material released from the gated Universal Splitter Hopper flows evenly across the entire width of the chutes.

SP-2

SP-2.5

SP-3

SP-3 Universal Splitter is the smallest Universal Splitter design, suited for materials up to 1/4in (6.4mm). This benchtop model features a spring-loaded gate release, stainless steel hopper and frame. The chute bars and sample pans are of anodized aluminum. The SPA-302 Dust Enclosure Kit consists of two stainless steel panels secured by springs. The panels slide up for easy access to the pans, and quickly detach when not needed. **Product Dimensions:** 9.5x8.5x13.5in (241x216x343mm), WxDxH.

SP-33 Universal Splitter has similar design and specifications to SP-3, but features 100% stainless steel construction for enhanced durability and to reduce the risk of sample contamination. This model is a good choice for sensitive materials, food-grade samples, or abrasives. The SPA-302 Dust Enclosure Kit is compatible with this unit. **Product Dimensions:** 9.5x8.5x13.5in (241x216x343mm), WxDxH.

GILSON UNIVERSAL SPLITTERS

Model	Maximum Particle Size in (mm)	Hopper Capacity ft³ (L)	Number of Chute Bars	Chute Bar Size in (mm)	Chute Slope
SP-0	6 (152)	3.5 (99.1)	48	1 (25)	60°
SP-1	4 (102)	1.0 (28.3)	48	1/2 (13)	45°
SP-2	2 (51)	0.55 (15.6)	36	1/2 (13)	45°
SP-2.5	3/4 (19)	0.28 (7.9)	48	1/4 (6)	60°
SP-3	1/4 (6)	0.06 (1.7)	48	1/8 (3)	60°
SP-33	1/4 (6)	0.06 (1.7)	48	1/8 (3)	60°

Accessories

Lift Cart Accessory for SP-0	SPA-450
Fixed-Chute Accessory for SP-1	SPA-114
Chute Attachment for SP-1	SPA-102
Porta Wheels for SP-1	PSA-114
Dust Enclosure Kit for SP-2.5	SPA-109
Dust Enclosure Kit for SP-3 and SP-33	SPA-302
SP-0 Sample Pan	SPA-400
SP-1 Sample Pan	SPA-100
SP-2 Sample Pan	SPA-101
SP-2.5 Sample Pan	SPA-108
SP-3 Sample Pan	SPA-301
SP-33 Sample Pan	SPA-303

SAMPLE DIVIDERS
SPLITTERS

SP-1C

SP-12CA

GILSON FIXED CHUTE SPLITTER
ASTM C702; AASHTO T 248; CALIFORNIA 201

The Fixed Chute Splitter is based on our original SP-1 Universal Splitter design, featuring ten fixed-width chutes, each 2-1/4in (57.2mm) wide and a gated material hopper for equal sample distribution. The original Gilson-designed lever-release hopper with 1ft³ (28.3L) capacity assists in rapid and accurate splitting and mixing of granular materials up to 1-1/8in (28.6mm) topsize.

This steel frame, floor model splitter has a painted and baked finish and uses many of the same accessories as the SP-1. An available Chute Attachment replaces one Collection Pan for direct collection of half of sample into a bag or other container. Porta Wheels may be attached for added mobility and an Enclosure Adapter Set converts this splitter into a Totally Enclosed Sample Splitter similar to the SP-10 for control of nuisance dust in the lab. Two Collection Pans are included, and extras may be ordered for more efficient sample processing. The SPA-102 Chute Attachment replaces one pan to direct loading of material into a bag or container. PSA-114 Porta-Wheels bolt to the splitter for added mobility. SPA-114 fixed chute adapter set is available to convert an existing SP-1 Adjustable Chute Splitter to the SP-1C Fixed Chute model. **Product Dimensions:** 29x19x39in (737x483x991mm).

GILSON FIXED CHUTE SPLITTER	
Gilson Fixed Chute Splitter	SP-1C
Accessories	
Fixed-Chute Adapter	SPA-114
Sample Pan	SPA-100
Chute Attachment	SPA-102
Porta-Wheels, set of 2	PSA-114

GILSON CALIFORNIA SPLITTER
ASTM C702; AASHTO T 248; CALIFORNIA 201

Designed by and constructed for the California Department of Transportation, the SP-12CA Splitter meets CalTrans 201 requirements for coarse aggregate splitters. Large capacity, 1.9ft³ (53.8L) gate release hopper assures accuracy when mixing and dividing bulk aggregate into representative samples. Ten 2-1/4in (57.2mm) fixed chutes process particle sizes up to 1-1/8in (28.6mm). Sturdy, heavy-gauge steel frame with painted, baked finish is built for extended service life with heavy use. Swivel casters permit mobility and easy storage.

SP-12CA includes two 1.2ft³ (34L) capacity, welded steel sample pans. SP-12CG includes same size sample pans, but fabricated of light-weight aluminum. Reinforced pans have sturdy handles for convenient handling of heavy samples. Order extra Steel Sample Pans as SPA-120. SPA-122 lightweight aluminum pans are also available as replacements. **Product Dimensions:** 29x28x46in (737x711x1,169mm), WxDxH.

GILSON CALIFORNIA SPLITTER	
Gilson California Splitter with Steel Pans	SP-12CA
Gilson California Splitter with Aluminum Pans	SP-12CG
Accessories	
Steel Sample Pan	SPA-120
Aluminum Sample Pan	SPA-122

SP-10

SP-6 Tilt-feeding Mechanism at loading position

SP-6

GILSON TOTALLY-ENCLOSED SPLITTER
ASTM C702, C778; AASHTO T 27, T 248

Gilson's Totally-Enclosed Splitter can be loaded and operated through a complete splitting cycle without releasing dust into the room or losing sample material. Dust-tight hinged panels enclose the hopper and pans during operation and are easily opened at completion to retrieve divided sample material.

The SP-10 is an adaptation of the top-selling SP-1 Universal Splitter, but designed so that all in-lab sample handling operations are done inside the splitter. Samples in an SPA-100 pan are placed in a slot inside the top of the splitter through a hinged door. After closing the door, the pan is dumped into the hopper by external lever. When internal dust settles, the door may be opened momentarily to level the sample material in the hopper if desired before using a second lever to release sample through the adjustable chutes and into two lower pans enclosed by spring-held covers. To continue splitting to 1/4, 1/8, etc. a bottom pan is switched with the feed pan, covers closed, and the process repeated until the needed sample fraction is obtained in the bottom pan. **Product Dimensions:** 33x21x51.3in (838x533x1303mm) WxDxH.

GILSON TOTALLY-ENCLOSED SPLITTER	
Gilson Totally-Enclosed Splitter	SP-10
Accessories	
Sample Pan	SPA-100
Porta Wheels, set of 2	PSA-114
Fixed-Chute Adapter	SPA-114

GILSON QUADRI-SPLITTER
ASTM C702, D346, D2013, E276, E389, E877

The Gilson Quadri-Splitter yields four equal samples of up to 0.4ft³ (11.3L) each for total sample capacity of 1.6ft³ (45.3L). Unit is totally enclosed including feed inlet and sample outlets. Fully enclosed construction controls nuisance dust and prevents moisture loss during operation. Gilson's unique tilt-feeding mechanism lifts and rotates the removable feed pan to the hopper opening using the feed lever. The pan seals to the hopper inlet as the material is dumped, preventing the release of dust into the room and avoiding sample loss. Sample pans seal to splitter body, yet easily slide out using pan handles. Body has hinge-mounted doors on both sides for inspection and cleaning of chute sections. The three chute decks each have fourteen chutes of 1in (25.4mm) width and 60° slope for smooth sample flow.

The Quadri-Splitter can be used to divide any free-flowing material and is ideally suited to coal and coke since dust and moisture loss are minimized by fewer passes and less handling. Three passes (1/4x1/4x1/4 = 1/64th) or fewer reduces most bulk samples to amounts needed for lab testing. Final split four simultaneous representative samples.

The SP-6 Quadri-Splitter has stainless steel contact parts (chutes and pans); other parts fabricated from galvanized steel, spot welded, riveted, and painted for long life and durability. It includes four Sample Pans of 0.4ft³ (11.3L) and one Feed Pan of 0.7ft³ (19.8L). Both pans fit tilt mechanism and seal feed inlet after dumping. **Product Dimensions:** 24x34x55in (610x864x1,398mm), WxDxH.

GILSON QUADRI-SPLITTER	
Gilson Quadri-Splitter	SP-6
Accessories	
Sample Pan	SPA-110
Feed Pan	SPA-111

SP-55 shown with SPA-22 Bucket Liner Sample Bags

SPA-22 shown with SPA-23 and SPA-24

SPA-21

HMA-68

GILSON QUARTERMASTER ASPHALT SAMPLE DIVIDER
ASTM PENDING; AASHTO R 47

- **Quickly and safely divides bulk asphalt samples for testing**
- **Rugged construction stands up to field use**
- **New Bucket-Liner sample bags streamline sample handling**
- **Proven history of accurate performance**

NEW! Ship Weight Index
The Estimated Ship Weight for every product is easy to find in the NEW Ship Weight Index!

Gilson's patented SP-55 Quartermaster quickly and accurately divides the large bulk samples required in Superpave® specifications for quality control analysis. Hot-mix asphalt samples of 120lb (55kg) or more are easily reduced, ensuring representative samples for consistent laboratory results. The large hopper reduces handling of hot material during preparation of laboratory specimens. Quartermaster has a proven history of significantly reducing bias in sample reduction.

Once a bulk hot-mix asphalt sample is loaded evenly into the hopper, the handle is released and the sample falls through the divider, and is distributed into the four included galvanized steel containers. SPA-22 Bucket-Liner Sample Bags simplify collection and handling of divided specimens and eliminate cleaning of the sample containers. One person can easily collect and secure samples. Fabric and thread of the sturdy cotton Bucket-Liner bags are temperature-rated to 400°F (204°C). Double loop Wire Ties and Wire Tie Twister allows bag openings to be quickly and securely closed. Only occasional clean-up is required to prevent buildup on the exposed splitting surfaces.

Rugged two-part steel construction stands up to field conditions and allows portability between jobsites. The SPA-21 Quick-Funnel Hopper Insert (purchased separately), drops into the top of the Quartermaster to significantly reduce hopper volume and allow accurate reduction of smaller samples. Four Galvanized Steel Sample Containers are included. Extras can be ordered to increase sampling efficiency. Four Bucket-Liner Sample Bags are also included. Order additional liner bags in quantities of 10, 100 or 1,000. SPA-23 8in Double-Loop 16 gauge Wire Ties securely close bag openings when used with the SPA-24 Wire Twister. HMA-68 Material Handling Chute allows fast loading of hopper. **Product Dimensions:** 14x17x48in (356x432x1,219mm), WxDxH.

GILSON QUARTERMASTER ASPHALT SAMPLE DIVIDER	
Gilson Quartermaster Asphalt Sample Divider	SP-55
Accessories	
Quick-Funnel Insert	SPA-21
Bucket-Liner Sample Bags, qty. of 10	SPA-22
Bucket-Liner Sample Bags, qty. of 100	SPA-22C
Bucket-Liner Sample Bags, qty. of 1,000	SPA-22K
8in Double-Loop Wire Ties, qty. of 50	SPA-23
Wire Tie Twister w/Plastic Grip	SPA-24
Galvanized Steel Sample Containers	MA-950
Material Handling Chute	HMA-68

SP-1015FX

SP-1070

SP-50 shown with SPA-51

HOLMES ENCLOSED SAMPLE SPLITTERS
ASTM C702, D346, D2013; AASHTO T 27, T 248

Enclosed splitters are suggested for samples of fine, dusty powders, or where moisture retention is important. Holmes splitters have 60° chute slopes, feed hopper-guide, and enclosure, as preferred for coal and coke applications to meet ASTM D2013 and D346.

Small Enclosed Splitters have twenty-four chutes, 3/8in (9.5mm), 1/2in (12mm) or 3/4in (19mm) wide, depending on model. FX models have built-in hopper-guide to introduce sample evenly across chutes through an open vertical slot. Riffle chutes, sample drawers, and hopper-guide are stainless steel. Model SP-1015FX has no hopper-guide, and sample is poured directly into chutes.

Large Enclosed Splitters are manufactured with fixed chute widths of 1/2in (12mm), 3/4in (19mm) or 1in (25mm), all with built-in hopper-guide. Lugs on drawer top-ends fit slotted brackets on hopper-guide for pour feeding. Models with stainless steel contact surfaces are designated with an "X" suffix on the model number. Other models have galvanized surfaces. Dolly accessory SPA-502 has four 2-1/2in (63mm) diameter casters on mounting base for mobility in the lab.

All enclosed splitters have enameled steel enclosure. Two sample drawers are included; extras are suggested for pouring to hopper-guide for repetitive splits.

HOLMES ENCLOSED SAMPLE SPLITTERS

Model	Chute Width in (mm)	No.	Capacity ft³ (L)	WxDxH, in	Extra Pan
SP-1015FX	3/8 (9.5)	24	0.24 (6.8)	11x15x22	SPA-151
SP-1017FX	1/2 (12.7)	24	0.36 (10.2)	15x15x22	SPA-171
SP-1018FX	3/4 (19.1)	24	0.48 (13.6)	21x15x22	SPA-181
SP-1060	1/2 (12.7)	28	1.40 (39.6)	17x31x34	SPA-501
SP-1070	3/4 (19.1)	18	1.40 (39.6)	17x31x34	SPA-501
SP-1050	1 (25.4)	14	1.40 (39.6)	17x31x34	SPA-501
SP-1060X	1/2 (12.7)	28	1.40 (39.6)	17x31x34	SPA-501X
SP-1070X	3/4 (19.1)	18	1.40 (39.6)	17x31x34	SPA-501X
SP-1050X	1 (25.4)	14	1.40 (39.6)	17x31x34	SPA-501X

Accessories

Dolly SPA-502

1/16 SAMPLE REDUCER

The Sample Reducer cuts a representative 1/16th from feed material by systematically rejecting segments of material flowing down the adjustable 45° or 60° cast aluminum incline. Adjustable 0.25ft³ (7.1L) hopper can be used batchwise or locked in open position for pouring larger samples. Use for up to 1/2in (12.7mm) particle sizes.

Reducer adjusts about 10in (254mm) vertically on removable legs. Main components are aluminum. **Product Dimensions:** 27x18x36in (686x457x914mm), WxDxH.

SP-50 is supplied without pans, but SPA-51 Pan Set can be ordered separately. The Pan Set includes heavy painted steel rejects pan 22x13x11in (559x330x279mm), LxWxH and lightweight 12qt (11L) polyethylene sample container, 10in dia. x 11-1/2in H (254x292mm) with lid.

SAMPLE REDUCER

Sample Reducer SP-50

Accessories

Pan Set SPA-51
Polyethylene Container w/lid, 12qt SC-20

SAMPLE DIVIDERS
SPLITTERS

SP-306

SP-302

SP-171X

SP-177

GILSON PRECISION SPLITTERS

Gilson Precision Splitters quickly divide granular materials and fine powders. These riffle-type splitters feature precision fixed-width chutes and a gate-controlled hopper to produce greater accuracy. Completely constructed of heavy-gauge type 304 stainless steel, avoiding potential sample contamination, corrosion, and standing up to rugged daily use. The easy-flip gate hopper control allows the sample to be loaded completely and distributed evenly before opening. Side panels control dust, reducing the loss of fines during processing. The unit quickly and easily disassembles for cleaning, and all parts are autoclavable. Two type 3 or 4 stainless steel sample pans are included. Additional sample pans can be ordered separately.

SP-300 Gilson Precision Splitter hopper capacity is 132in³ (2.2L) and the sixteen 1/2in (12.7mm) chutes have a discharge angle of 45°. Suitable top size is 4 to 5mm. **Product Dimensions:** 11.5x9x12in (292x228x305mm), WxDxH.

SP-302 Gilson Precision Splitter has a hopper capacity of 61in³ (1L), and the discharge angle from the sixteen 1/4in (6.3mm) fixed chutes is 45°. The SP-302 is suitable for materials finer than 2.2mm top size. **Product Dimensions:** 8.8x7.4x12in (223x188x305mm), WxDxH.

SP-304 Gilson Precision Splitter has a hopper capacity of 61in³ (1L), and the thirty 1/8in (3.2mm) fixed chutes have a discharge angle of 45°. Suitable for materials finer than 1mm top size. **Product Dimensions:** 8.8x7.4x12in (223x188x305mm), WxDxH.

SP-306 Gilson Precision Splitter is more compact for smaller samples of fine powders. Hopper capacity is 8.8in³ (0.14L). The thirty fixed chutes are 1/16in (1.6mm) wide and have a 60° discharge angle. Suitable for materials with up to 0.6mm top size. **Product Dimensions:** 5.3x5.3x7in (135x135x178mm), WxDxH.

GILSON PRECISION SPLITTERS

Model	Description	Chute Opening in (mm)	Number of Chutes	Hopper in³ (L)	Extra Pan
SP-300	Gilson Precision Splitter	1/2 (12.7)	16	132 (2.2)	SPA-129
SP-302	Gilson Precision Splitter	1/4 (6.4)	16	61 (1)	SPA-130
SP-304	Gilson Precision Splitter	1/8 (3.2)	30	61 (1)	SPA-130
SP-306	Gilson Precision Splitter	1/16 (1.6)	30	8.8 (0.14)	SPA-132

JONES SPLITTERS

Micro Splitter model SP-171 is ruggedly constructed for long service life. The stainless steel feeder guides material directly past fixed-width chutes and into two sample pans. Chutes and pans are both made of hardened aluminum. 1/8in (3.2mm) chutes are designed for materials with 1.0 to 1.5mm top size. Four standard pans are included, and have an extended back to prevent spillage. SPA-242 0.5L High-Volume Pans are available for handling larger samples volumes. Special SP-171X model features all stainless steel contact parts to avoid sample contamination, and includes three stainless steel pans.

Precision Splitters are similar in design and quality to Micro Splitters, but feature larger capacities and gated hoppers that hold material until released. The gated hopper permits easy mixing and distribution of samples prior to splitting, and requires only the two included pans for processing. Frames and hoppers are stainless steel, while riffle plates and pans are hardened aluminum. Pans for SP-174 are stainless steel. Models with 1/4, 3/8, or 1/2in (6.4, 9.5, or 12.7mm) chute openings are offered.

JONES SPLITTERS

Model	Description	No. of Chutes	Extra Pan
SP-171	1/8in Chute Microsplitter	14	SPA-241
			SPA-242
SP-171X	1/8in SS Chute Microsplitter	14	SPA-240X
SP-173	1/4in Chute Precision Splitter	32	SPA-244
SP-174	1/4in Chute Precision Splitter	64	SPA-245X
SP-175	3/8in Chute Precision Splitter	22	SPA-244
SP-177	1/2in Chute Precision Splitter	16	SPA-244

SP-230

SPA-260

SPA-261

SPA-262

SPA-267

SPA-268

SPA-264

GILSON SPINNING RIFFLER

Spin riffling is the method of choice for sampling accuracy and reliability of the highest order with dry materials. Gilson's expertise in sampling and analyses of powders and granular material is utilized to produce this next-generation Spinning Riffler. The SP-230 features a custom designed touch-screen controller/display, minimal moving parts and an outer case designed for easy clean-up and maintenance. Operation is quieter and safer thanks to an isolated motor and vibrator, automatic belt-drive system and sample vessel enclosure. Both rotation speed and vibration level are displayed on and precisely controlled from the touch screen.

technote

The Gilson Spinning Riffler virtually eliminates operator error and bias associated with other types of sample dividing. The accuracy of spin riffling has been demonstrated in the 1968 M.Sc. thesis of A. A. Khan, Bradford University. Sampling tests based on a 60/40% mixture of coarse and fine sands produced the following comparisons:

COMPARISON OF SAMPLE DIVIDING METHODS

Method	Std. Dev. of Samples (%) σ	Var. (P_n)	Est. Max. Sample Error (%) E
Cone & Quartering	6.81	46.4	22.7
Scoop Sampling	5.14	26.4	17.1
Table Sampling	2.09	4.37	7.0
Chute Riffling	1.01	1.02	3.4
Spinning Riffling	0.125	0.016	0.42
Random Variation	0.076	0.0058	0.25

A built-in vibratory feeder provides a constant flow of material from a stainless steel hopper with 1L capacity. A durable urethane-based resin dividing head sharply separates flowing material into as many as sixteen 60ml glass sample vessels. Standard Tube vessels may be used, or vials with screw-top caps in different sizes of amber or clear glass are available. The vials enable freshly divided samples to be capped and stored immediately, with minimal handling and little chance for contamination. Either type of vessel is contained within the drum during operation to minimize exposure of moving parts and contain spillage. The number of final fractions can be controlled by simply leaving tubes or vials out of the drum. Excess material will then flow directly into the drum. Rotation speed is continuously variable between 0—20rpm and the vibration amplitude of the feeder is variable as well. All adjustments are controlled and displayed on the touch screen. The unique, digitally controlled stepper motor turns a toothed belt and cogged drive wheel. Speed control is very accurate with no slippage under normal loads. A separate motor operates the vibratory feeder at 60Hz frequency and digitally controlled variable amplitude. A "sleep" mode conserves power when the unit is not operating. Main power supply voltage is automatically sensed, allowing any AC input from 85—264V, and 47—63Hz single phase. A power cord is supplied for use with standard North-American outlet configurations. Power cords for other configurations are readily available locally.

The SP-230 includes a sixteen-port Dividing Head, a set of sixteen Standard Tube Sample Vessels, a Sample Drum to contain the vessels and a Holder Plate for positioning the vessels in the drum. All are listed below as separate accessories for more efficient sample processing or as replacements. Glass Sample Vials with threaded tops and included caps are also available. **Product Dimensions:** 13x20.5x23in (330x521x584mm), WxDxH.

GILSON SPINNING RIFFLER	
Gilson Spinning Riffler, 85-264V, 47-63Hz	SP-230
Accessories	
Standard Test Tube, qty. 12	SPA-260
60ml, Clear Sample Vials with Screw Caps, qty. 12	SPA-261
40ml, Clear Sample Vials with Screw Caps, qty. 12	SPA-267
40ml, Amber Sample Vials with Screw Caps, qty. 12	SPA-268
20ml, Clear Sample Vials with Screw Caps, qty. 12	SPA-265
20ml, Amber Sample Vials with Screw Caps, qty. 12	SPA-266
Sample Vessel Holder Plate	SPA-262
Sample Drum	SPA-263
Dividing Head	SPA-264

SP-52 shown with SC-20

GILSON 1/16TH SAMPLE REDUCER
ISO 13503-2-2006; API RP19C

The new 1/16th Sample Reducer by Gilson has up to four times more bulk sample capacity than traditional 1/16th reducer models. Suitable for any free-flowing granular material with particle sizes up to 1/2in (12.7mm), the SP-52 is especially useful in sample preparation and dividing of proppant materials for hydraulic fracturing operations. Final yield is a 1/16th representative specimen of the bulk sample in a single pass.

The Reducer quickly adjusts to either 45° or 60° dividing positions using a spring-loaded positive-locking knob. The fully-adjustable sliding gate of the large 1.0ft³ (28L) capacity hopper allows precise control of flow rate, or can be locked fully open for continuous flow-through of large samples. The fixed-height integral frame/floor stand is optimal for ergonomic loading and operation. A sturdy welded steel pan is included to collect the waste fraction, and the divided specimen can be collected in the optional SC-20 12qt Polyethylene Container with Lid, or in a container supplied by the user. An additional SPA-115 Steel Waste Pan can be ordered for greater efficiency in sample processing.

The Sample Reducer features sturdy painted-steel welded construction, and the flow table is designed to leave minimal sample residue behind after use. **Product Dimensions:** 22x28.5x41in (559x724x1041mm) WxDxH.

GILSON 1/16TH SAMPLE REDUCER	
Gilson 1/16th Sample Reducer	SP-52
Accessories	
Additional Waste Pan	SPA-115
12qt Polyethylene Container	SC-20

SP-245

ACCU-MAX SPINNING RIFFLER

Gilson's Accu-Max Spinning Riffler scales up precision dividing and sample preparation for large bulk samples. Aggregates, coal, or ores with particle topsize to 2in (50.8mm) are quickly and accurately split to 1/8 or 1/4 fractions with less handling and risk of sample loss. The unit works equally well for finer granular materials or powders with large volumes. Samples that do not flow well through fixed-chute gravity splitters process more effectively with the Accu-Max vibratory feeder. High power vibratory feeder enhances accuracy and efficiency, as well as improved sampling accuracy. All contact parts are of quality stainless steel for long service life and low contamination.

Total capacity of the hopper is 1.8ft³ (51L). Feed rate through the 6.5in (165mm) wide hopper discharge is controlled by a sliding gate that adjusts for openings from 0—4in (0—102mm), and by power settings of the variable-amplitude vibratory feeder. Adjustable angle of the vibratory feeder and feed trough assembly assures a constant, controlled flow of material. Eight precise sample fractions are divided into special stainless steel collection pans rotating at a constant 14rpm (12rpm at 50Hz) on the turntable. A precision 1/3hp gearmotor assembly drives the turntable, and the 0.32ft³ (9L) collection pans lock together with unique overlapping cutting edges to prevent loss of fines. Lifting bars in the pans are positioned for easy and convenient handling.

Working components are mounted in a durable, painted steel frame. Eight Collection Pans for 1/8 fractions are included. Extras are available as SPA-30. Double-sized pans for 1/4 fractions are also available as SPA-31. **Product Dimensions:** 50x35x58in (1,270x890x1,473mm), WxDxH.

ACCU-MAX SPINNING RIFFLER	
Accu-Max Spinning Riffler, 115V/60Hz	SP-245
230V/50Hz	SP-245F
Accessories	
Collection Pan, 1/8 Fraction	SPA-30
Collection Pan, 1/4 Fraction	SPA-31

SP-42 shown with SPA-60 and SPA-64

GILSON MIXING WHEELS
ASTM D2013

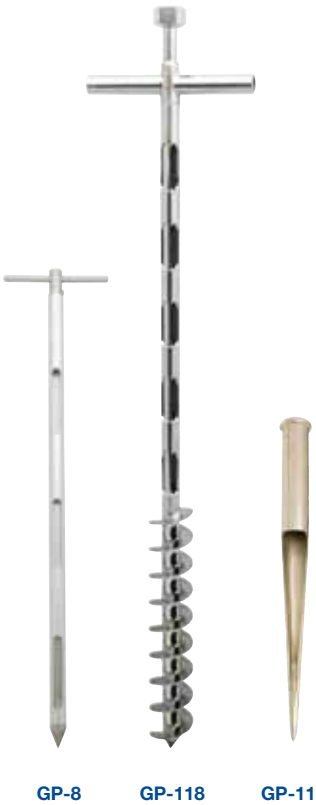
Proper sample preparation for materials such as coal or ores requires careful and thorough mixing to assure consistent and accurate results. Gilson offers bench-mounted, wall-hung, and floor-mounted Mixing Wheels for a wide range of sample quantities.

SP-42 Mini Mixing Wheel rotates up to six 8oz (237ml) sample jars over a 10—60rpm adjustable speed range. Clamps lock bottles securely in a variety of positions. The sturdy bench unit has painted steel frame, resilient rubber feet, and includes a 6ft (1.8m) three-wire cord. Control module can be mounted remotely for safe operation. The continuous-duty Clamps accept jars up to 3.5in (89mm) diameter, but SPA-60 wide mouth, 8oz (236ml) jars with 58mm cap are recommended. When permissible, SPA-64 metallic Jack Rocks may be added to speed the mixing process. Order the TR-502 transformer for 230V applications. **Product Dimensions:** 9.5x10x10in (241x254x254mm), WxDxH without jars.

SP-48R Floor Mount Mixing Wheel has ten sample stations to mount large 0.5gal (2L) sample containers at a 45° angle. Rotation speed is variable from 0—25rpm. Numbered sample stations secure sample jars with spring-loaded clamping. SC-108 Wide-mouth polyethylene sample containers with screw-top lids are 4.7x9.4in (119x239mm), dia.xH, and ordered separately in cases of 12. The wheel is mounted on a rugged, welded steel heavy-duty painted floor stand. **Product Dimensions:** 48x40x50in (1,220x1,020x1,270mm), WxDxH.

GILSON MIXING WHEELS	
Mini Mixing Wheel, 115V, 50/60Hz	SP-42
Floor Mount Mixing Wheel, 115V/60Hz	SP-48R
230V/50Hz	SP-48RF
Accessories	
Sample Jar for SP-42, 8oz (236ml), case/24	SPA-60
Sample Jar for SP-48R, 0.5gal (2L), case/12	SC-108
Jack Rocks, case/500	SPA-64
230V Transformer for SP-42	TR-502

GP-12 GP-6 GP-82



GP-8 GP-118 GP-112

SAMPLING PROBES

SAMPLING PROBES					
Description	**Model**	**Length in (mm)**	**O.D. in**	**Material**	**Openings/ Partitions**
Double-Tube Probes are seamless construction with durable points. Inner tube is rotated to open/close sampling holes. Probes with partitions between holes have closed-end handle, and pockets are emptied individually. Those without partitions have open-ended handle for convenience of emptying total sample. Partition type is USDA approved for grain sampling. GP-16 meets ASTM C183 and AASHTO T 127 for bulk sampling of hydraulic cement. GP-25 Spiral Probe has offset inner tube openings that open in sequence from bottom to top as the probe is rotated. Smaller diameters may be used for in-bag sampling. Use stainless steel probe for foods, pharmaceuticals, fertilizers.	GP-12 GP-14 GP-16 GP-22 GP-24 GP-25 GP-29 GP-29A GP-68A GP-70A GP-4 GP-5 GP-6 GP-6S	40 (1,020) 50 (1,270) 63 (1,600) 63 (1,600) 63 (1,600) 62 (1,575) 72 (1,829) 72 (1,829) 96 (2,438) 120 (3,048) 18 (457) 30 (762) 39 (991) 39 (991)	1-3/8 1-3/8 1-3/8 1-3/8 1-3/8 1-3/8 1-3/8 1-3/8 1-3/8 1-3/8 1/2 1/2 7/8 7/8	Extruded Brass with Cast Bronze Point Chrome- Plated Brass Stainless	6/No 8/No 10/No 10/Yes 11/Yes 10/No 12/Yes 12/No 16/No 20/No 5/No 9/No 6/No 6/No
Single-Tube, Single-Slot Probes are useful for fertilizers, foods, pharmaceuticals, etc. GP-80 for flour and similar materials has solid wooden handle, and the outside diameter tapers from 1—11/16in (24.5—17.5mm) at the end. Slot width is 1/2in (12.7mm). GP-82 fertilizer tube has an open-end handle with score marks at 28 and 31in (711 and 787mm) from the tip.	GP-80 GP-82	34 (864) 36.5 (927)	11/16 7/8	Stainless Stainless	1/No 1/No
Triple-Zone Sampler has three partitioned cells to collect 9cc samples of powders, pellets, and other bulk granular materials from drums, bags, bins, or stockpiles. The sampler is inserted and the "T" handle is rotated one-half turn to collect samples through the 3x0.4in (76x10mm) openings. After closing the ports, samples representing three separate zones are easily recovered for inspection. Made of anodized aluminum with sharp stainless steel point.	GP-8	22 (559)	3/4	Aluminum & Stainless	3/Yes
Keystone Carbon Sampling Probe is designed especially to sample fine powders that tend to compact. Ideal for powdered metals and chemicals. Double-tube construction, 1in O.D.x39in (25.4x991mm). Thirteen openings with partitions; inner tube rotates to close openings for removal. An auger vane on bottom 13in (330mm) of outer tube, and a "T" handle on top aids augering.	GP-118	42.5 (1,080)	1	Chrome-Plated Steel	13/Yes
Bag Triers are nickel-plated steel, tapered to a point with a single large opening for sampling granular material through bags. Sample can be poured through hollow handle.	GP-106 GP-112	6 (152) 12 (305)	1/2 1	Nickel Plated Steel	1/No 1/No

SPA-400

HMA-68

HM-275

TSA-162

QUARTERING CLOTH KIT
ASTM C702; AASHTO T 248

The HM-275 Quartering Cloth Kit includes required cloth, broom, and shovel specified in the standard procedures for sampling and splitting aggregates and asphalt mixes.

HMA-591 Quartering Cloth is a 6x8ft, heavy-duty, finished canvas. The HMA-592 Square-point Shovel has a 9.75x12in (248x305mm) blade and a 30in (762mm) D-handle. The HMA-593 Broom is 16in (406mm) wide and has a 4ft (1.2m) handle. Made of wood with a brown Prolene plastic brush head, this durable broom is ideal for heavy sweeping.

QUARTERING CLOTH KIT

Quartering Cloth Kit HM-275

Accessories

Quartering Cloth, 6x8 ..... HMA-591
Square-point Shovel HMA-592
Prolene Broom HMA-593

also available

See our Pans, Tools & Glassware section for a complete selection of Material Pans.

MULTI-PURPOSE SAMPLE PANS

These rugged pans handle heavy loads in lab and field conditions, and are suitable for use in drying ovens. They are durable heavy gauge steel, welded and painted for long service life.

Material Handling Pans have a swinging handle mounted at the balance point and a flanged end for safe, easy lifting. The chute end allows efficient emptying and distribution. Handling Pans can be cross-stacked for storage.

Sample Pans have lifting flanges at both ends, and will nest together for storage.

MULTI-PURPOSE SAMPLE PANS

Type	Model	Size, WxDxH in (mm)	Capacity qt (L)
Material Handling Pans	TSA-162	15x30x4 (381x762x102)	39 (37)
	TSA-163	12x20.5x4 (305x521x102)	17 (16)
Sample Pans	SPA-105	29x12x9 (737x305x229)	48 (45)
	SPA-104	22x13x11 (559x330x279)	49 (46)
	SPA-400	25x9x8 (635x229x203)	31 (29)
	SPA-100	26x9x6 (660x229x152)	24 (23)
	SPA-101	20x7x6 (508x178x152)	14 (13)

MATERIAL HANDLING CHUTE

- **Fills large Gyratory compaction molds in a single lift.**
- **Makes handling of HMA samples safe and efficient.**
- **Works equally well for aggregate and soil samples.**
- **Stable for use as a weighing scoop.**

HMA-68 Material Handling Chute is an all-purpose chute that allows loading, filling, and handling of any bulk material, including Asphalt, Aggregates, and Soils. It quickly and uniformly fills Gyratory, Marshall, Proctor, CBR, Relative Density molds, Quartermaster™ or Universal splitters. The Handling Chute conforms to mold loading procedures in ASTM D4013 and AASHTO T 312.

The flat bottom and integral feet make weighing convenient. The two sturdy aluminum bar handles reinforce the unit and enable balanced handling for easy and accurate placement of sample materials. Material Handling Chute is constructed of 24-gauge stainless steel with rolled edges. The open end is formed with a 2in (51mm) radius to fit most mold openings. The unit stands horizontally or vertically. **Product Dimensions:** 22x11.5x10.5 (559x292x267mm).

MATERIAL HANDLING CHUTE

Material Handling Chute HMA-68

helpful hint

AASHTO accepted SP-55 Quartermaster Asphalt Sample Divider is ideal for quartering asphalt or other difficult to handle materials.

LABORATORY SPLIT-O-MATIC® SPLITTERS
ASTM C702, C778; AASHTO T 27, T 248

- **1/2, 1/4, or 1/8 fractions in a single pass.**
- **High-capacity hoppers with gate-release.**
- **Fixed-width chutes.**
- **Particle topsize up to 2in.**

Laboratory Split-O-Matic® Splitters are the best choice for large samples that must be quickly and accurately reduced. With a single pass, these higher-capacity units process bulk samples of granular materials into small fractions for efficient preparation of test specimens. Exclusive Gilson three-stage design allows the user to select sample fractions of 1/2, 1/4, or 1/8 of bulk sample. A selection lever sets internal sample fraction positions, directing selected fraction to the sample pan and the balance to the reject pan. V-bottom chutes precisely align material flow for more accurate divisions. Laboratory Splitters are well-suited for aggregates, sand, gravel, ores, coal and coke or other free-flowing granular materials up to 2in (51mm) topsize.

Laboratory Splitters have heavy, welded-steel construction with painted and baked finish. Sample hoppers have a gate-release mechanism for greater control of sample dividing. Front panel doors latch shut for superior dust control, and open wide for easy cleaning. Sample pans are included, and are size-matched to hopper capacity. Bottom flange is suitable for anchored or freestanding lab use. Standard models feature three stages of 45° chute slopes, suitable for most materials. Steeper 60° chute slope models are recommended for low specific gravity materials such as coal or coke, or materials with a large fraction of fines. The 60° Laboratory Splitters are approximately 20% taller, slightly heavier, and are ordered by adding a “C” suffix to model numbers.

For best results, choose a splitter with chute width at least twice that of the material’s topsize to avoid bridging over chute openings. For coal or coke, or for materials with oblong pieces, 3 to 4 times topsize is recommended. Any Laboratory Splitter can be custom-ordered with special larger hopper and sample pans if needed. Custom models may also be ordered with four or more chute stages for sample fractions smaller than 1/8.

SM-4L

LABORATORY SPLIT-O-MATIC® SPLITTERS

Model	Chutes per Stage	Sample Fractions	Chute Width in (mm)	Chute Angle	Maximum Particle Size in (mm)	Dimensions without Hopper WxDxH, in (mm)	Hopper Capacity ft³ (L)
SM-3L	8	1/2, 1/4, 1/8	4 (102)	45°	2 (51)	42x25x79 (1,067x635x2,007)	3.0 (85)
SM-4L	8	1/2, 1/4, 1/8	2 (51)	45°	1 (25)	25x16x53 (635x406x1,346)	1.6 (45)
SM-4XL	12	1/2, 1/4, 1/8	2 (51)	45°	1 (25)	34x16x53 (864x406x1,346)	2.4 (68)
SM-5L	24	1/2, 1/4, 1/8	1 (25)	45°	1/2 (13)	32x17x47 (813x432x1,194)	1.8 (51)
SM-6L	36	1/2, 1/4, 1/8	1/2 (13)	45°	1/4 (6)	33x13x40 (838x330x1,016)	1.6 (45)
SM-6SL	18	1/2, 1/4, 1/8	1/2 (13)	45°	1/4 (6)	22x13x40 (559x330x1,016)	0.8 (23)
SM-3LC	8	1/2, 1/4, 1/8	4 (102)	60°	2 (51)	42x25x99 (1,067x635x2,515)	3.0 (85)
SM-4LC	8	1/2, 1/4, 1/8	2 (51)	60°	1 (25)	25x16x67 (635x406x1,702)	1.6 (45)
SM-4XLC	12	1/2, 1/4, 1/8	2 (51)	60°	1 (25)	34x16x67 (864x406x1,702)	2.4 (68)
SM-5LC	24	1/2, 1/4, 1/8	1 (25)	60°	1/2 (13)	32x17x60 (813x432x1,524)	1.8 (51)
SM-6LC	36	1/2, 1/4, 1/8	1/2 (13)	60°	1/4 (6)	33x13x49 (838x330x1,245)	1.6 (45)
SM-6SLC	18	1/2, 1/4, 1/8	1/2 (13)	60°	1/4 (6)	22x13x49 (559x330x1,245)	0.8 (23)

SAMPLE DIVIDERS
BULK SPLITTERS

SM-5 and MH-5 shown with Pneumatic Release Option

helpfulhint

Gilson can design and manufacture complete automated sampling and screening systems. We can also work as part of a design team to integrate quality control ideas and products into an existing system.

Contact us for help at any level with your quality control program.

PRODUCTION SPLIT-O-MATIC® SPLITTERS

Production Split-O-Matic® Splitters accurately divide large amounts of material through multiple stages in a single pass. The Production series allows this unique Gilson design to be adapted to different applications and sampling environments. These units frequently feature custom design or special fabrication for installation in production or pilot-plant facilities. Our most popular Production Split-O-Matic® configurations are listed in the accompanying chart.

Production Split-O-Matics can be configured with three to six stages of riffles and chute widths from 1/2—12in (13—305mm). Standard chutes are sloped at 45°. Three-position fraction control gates allow a choice of three final sample fractions, ranging from 1/2 to 1/32. Non-adjustable, single-fraction models are also available. V-bottom chutes precisely align material flow for more accurate divisions. Rugged, heavy steel construction throughout assures long service life.

Custom options include chutes with 60° slopes for low-density materials, fabrication with all stainless steel contact parts, specially-sized material hoppers, pneumatic operation for hopper gates and/or fraction gates, fixed-fraction models, mounting or positioning fixtures, and special collection pans. Material Hoppers are sold separately for design flexibility. Bulk material is accumulated in hoppers before distribution through the chutes, assuring even divisions. Capacities from 1.6—12ft³ (45—340L) are available. Recommended standard hopper sizes for the Split-O-Matic® assemblies are indicated in the chart.

Production Split-O-Matics have a useful range for material particle sizes from 5in (127mm) to fine sand. Chute widths should be specified at more than twice as wide as the largest particle to avoid bridging over chute openings. For oblong shapes, or low density materials such as coal or coke, three to four times topsize is recommended.

Contact Gilson to discuss custom design requirements best suited for your application.

PRODUCTION SPLIT-O-MATIC® SPLITTERS[1]

Model	Chutes per Stage	Number of Stages	Sample Fractions	Chute Width in (mm)	Dimensions without Hopper WxDxH, in (mm)	Recommended Material Hopper Model	Hopper Capacity ft³ (L)
SM-1	4		1/2, 1/4, 1/8	12 (305)	68x60x112 (1,727x1,524x2,845)	MH-1	12.0 (340)
SM-2	6		1/2, 1/4, 1/8	8 (203)	64x49x82 (1,626x1,245x2,083)	MH-2	8.0 (227)
SM-3	8		1/2, 1/4, 1/8	4 (102)	42x25x47 (1,067x635x1,194)	MH-3	3.0 (85)
SM-4	8	3	1/2, 1/4, 1/8	2 (51)	25x16x26 (635x406x660)	MH-4	1.6 (45)
SM-4X	12		1/2, 1/4, 1/8	2 (51)	34x16x26 (864x406x660)	MH-4X	2.4 (68)
SM-5	24		1/2, 1/4, 1/8	1 (25)	32x17x24 (813x432x610)	MH-5	1.8 (51)
SM-6	36		1/2, 1/4, 1/8	1/2 (13)	33x10x18 (838x254x457)	MH-6	1.6 (45)
SM-31	8		1/32	4 (102)	45x22x63 (1,143x559x1,600)	MH-3	3.0 (85)
SM-41	12		1/32	2 (51)	31x15x38 (787x381x965)	MH-4X	2.4 (68)
SM-51	24	5	1/32	1 (25)	32x16x35 (813x406x889)	MH-5	1.8 (51)
SM-61	36		1/32	1/2 (13)	27x9x21 (686x229x533)	MH-6	1.6 (45)

[1] Most popular basic models shown. Contact Gilson to discuss specific requirements.

MICRO-DEVAL APPARATUS

HMA-920 shown with HMA-922

MD-2000

MICRO-DEVAL APPARATUS
ASTM D6928, D7428; AASHTO T 327; TxDOT: 845-49-40; ONTARIO LS-618

- **Multi-function electronic controller tracks time, speed, and total revolutions.**
- **Easier, safer, and less expensive to operate.**
- **Lexan doors and safety interlocks insure no exposed moving parts.**

The increasingly popular Micro-Deval test measures abrasion resistance and durability of mineral aggregates. An aggregate sample is placed in a sealed stainless steel jar with an abrasive charge of up to 5,000g of 9.5mm diameter stainless steel balls and water, then rotated at 100rpm for two hours. Aggregate quality is determined by percentage loss in gradation results at completion. Smaller equipment size, lower sample quantities and a simpler procedure make the method easier and less costly to perform than traditional methods.

The MD-2000 meets current ASTM, AASHTO, and Canadian test methods, as well as more stringent Texas DOT requirements. This contemporary version of the Micro-Deval test should not be confused with older versions originating in Europe which use different equipment and test protocol. Gilson's MD-2000 Micro-Deval Apparatus is a second generation, state-of-the-art machine. A sophisticated electronic controller with optical sensing system accurately tracks test time, total revolutions and rpm of jars. Test duration may be controlled by either elapsed time or total revolutions. Jars stop within a fraction of one revolution at test termination. Jar revolution and speed data may also be used as a verification of machine performance.

The jars revolve behind closed Lexan™ doors with safety interlocks. No moving parts are exposed during operation. Other manufacturers use separate timers to control test duration, which does not permit tracking of jar revolutions or speed and allows variations up to ±6% of the optimum number of revolutions. In addition, other machines rotate the jars on unguarded open rollers, creating a hazardous situation.

helpfulhint

SIEVES TO MEET ASTM & AASHTO SPECIFICATIONS*

Coarse Aggregate		Fine Aggregate	
3/4"	19.0mm	No.4	4.75mm
5/8"	16.0mm	No.8	2.36mm
.530"	13.2mm	No.16	1.18mm
3/8"	9.5mm	No.30	600mm
.265"	6.7mm	No.100	150mm
No.4	4.75mm	No.200	75mm
No.16	1.18mm		

* Order required sieves separately in 8in, 12in, 200mm, or 300mm diameters. See separate listing for wet sieving accessories, useful for washing sample at completion of abrasion cycle.

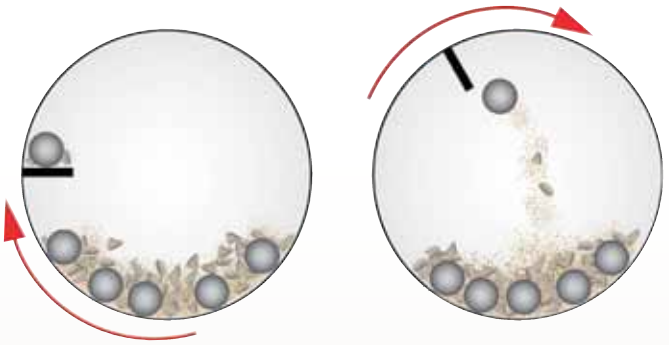
The Micro-Deval machine is a two-tier unit with sturdy steel frame. Each tier carries one stainless steel 5L jar, 194mm ID, 170mm internal height with locking cover. Power to the rubber-covered rollers is supplied by a 3/4hp, electric motor through a gear transmission and chain drive. The unit is supplied with two jars and two sets of 5,500g abrasive charges. A magnet is included to assist in removing the abrasive charge after the test is complete. For additional sample preparation capacity and greatly reduced testing times, order additional Jars HMA-920 and Abrasive Charge HMA-922. Electrical: operates on 115V/60Hz. Add "F" to model number for operation on 230V/50Hz power supply. MD-2000C model is equipped with thermally protected motor to meet stricter requirements in some areas. **Product Dimensions:** 20.5x13.5x38in (521x343x965mm).

Slightly different equipment meeting European Standard EN 1097-1 is also available and quoted upon request.

MICRO-DEVAL APPARATUS	
Micro-Deval Apparatus, 115V/60Hz	MD-2000
115V/60Hz	MD-2000C
230V/50Hz	MD-2000F
Accessories	
Jar with Locking Cover, 5L	HMA-920
Abrasive Charge	HMA-922
Magnet	HMA-924

HM-70A

LOS ANGELES ABRASION MACHINE



The Los Angeles Abrasion machine rotates at 30-33rpm, and is shown here with the shelf plate catching and dropping the aggregate sample and abrasive charge to the other side of the drum. This creates an impact-crushing effect. Aggregate sample and abrasive charge then roll within the drum creating abrading and grinding action. This action is repeated for 500 revolutions and degradation is determined as a percent loss of mass during the process.

LOS ANGELES ABRASION MACHINE
ASTM C131, C535; AASHTO T 96

- **Fully enclosed and lined with sound attenuating foam.**
- **Electronic safety interlocks allow operation only with doors secured.**
- **Powerful 1hp motor rotates drum through slip-clutch protected chain drive.**

The Los Angeles Abrasion test is widely used as an indicator of relative quality of aggregates. Test measures degradation of standard gradings of aggregates when subjected to abrasion and impact, in a rotating steel drum containing an abrasive charge of steel balls. Up to twelve balls are used, depending on gradation of test sample.

Gilson's design has built-in safety features with user controls on the outside of the integral sound enclosure. An electrical interlock allows the machine to operate only when the double-hinged lid is closed and a safety key is inserted. Drum is positioned for loading and unloading using a jog button while watching through a viewing window in the enclosure. Sound is absorbed by the heavy, painted steel enclosure with sound attenuating foam and membrane lining.

The 1/2in (12.7mm) thick welded steel drum has 28in (711mm) ID and 20in (508mm) inside length, and is mounted on a rigid welded steel support frame. The 6in (152mm) wide opening for introducing and discharging sample has a bolted cover which fits flush with inside contour of drum when tightened securely with a dust-tight gasket. A 3.5in (89mm) wide steel shelf, per ASTM's "preferred design", extends the full length of the drum interior. The shelf thickness is 1in (25mm) and is attached securely to the drum using fine 3/4in (19mm) x 1-1/2in (37.5mm) long bolts, providing a firm and rigid shelf that is also easily removed for replacement or maintenance.

A 1hp electronically controlled gear-motor rotates the drum at 30—33rpm via enclosed chain drive. Drum assembly rotates in flanged ball bearings with dust seals and grease fittings. Controller console with overload protection has large JOG and On/Off push button controls, and automatic counter stops rotation after a preset number of revolutions. Abrasive charge of twelve hardened steel balls is included. Heavy-duty catch pan with handle measures 24x26x2.5in (610x660x63mm), WxDxH. **Product Dimensions:** 38x40x46.5in (965x1,016x1,181mm), WxDxH.

LOS ANGELES ABRASION MACHINE	
Los Angeles Abrasion Machine, 220V/60Hz, 1 phase	HM-70A
220V/50Hz, 1 phase	HM-70AF
Accessories	
Abrasive Charge, set of 12 Balls	HMA-130
Catch-Pan	HMA-131
Replacement Steel Shelf	HMA-132
Wear-Resistant Steel Shelf	HMA-132WR

SULFATE SOUNDNESS TEST

ASTM C88; AASHTO T 104; CALIFORNIA 214; PTM 510

During the Sulfate Soundness test, aggregate samples are subjected to alternating immersion in sodium or magnesium sulfate solution and oven drying processes. Shown here; aggregates are placed in the sample sieves, stacked in the sieve holder, and lowered into the sulfate solution buckets. The solution buckets are placed inside the water bath tank which is used to help maintain the temperature at 70 degrees.

HM-447

HM-444

HM-452

MA-168 & MA-169

HM-442

MA-245

SULFATE SOUNDNESS TEST	
Aggregate Sample Sieves hold sample materials for immersion in sulfate solution. Sieves for coarse aggregate are 8in (203mm) diameter, full-height stainless steel No.5 or No.10. Fine Aggregate Sieves are Full or Half-Height, 8in stainless steel No. 70 sieves. Blank Frame Sieves are full-height, 8in diameter sieves with no mesh. Blank frame sieves extend height for large samples.	
8in Full-Height, No.5	V8SF #5
8in Full-Height, No.10	V8SF #10
8in Full Height, No. 70	V8SF #70
8in Half-height, No. 70	V8SH #70
8in Full-Height Blank Frame	SV-800
8in Sample Sieve Holders hold up to seven stacked Sample Sieves, depending on sieve height. Stainless steel frames allow optimum fluid circulation. Handles lock upright, but fold for easy loading into drying ovens.	HM-447
Solution Buckets hold sulfate solution for immersion of samples. One Bucket is required for each Sieve Holder. 6gal. (22L) Buckets are thick-wall, high-density polyethylene with bail handles.	HM-452
Washing Buckets are used to rinse sulfates out of specimens after immersion cycles. Water flows in through bottom and out through top overflow. 1/4in (6.4mm) thick, white polyethylene. Each Washing Bucket holds one Sieve Holder. Interior Dimensions: 12x12x18in (305x305x457mm), LxWxH.	HM-444
Solution Hydrometers measure specific gravity of sulfate solutions to ±0.001 SG. Choose hydrometer for use in Sodium Sulfate or Magnesium Sulfate solutions.	
Sodium Sulfate Hydrometer, 1.120—1.190	MA-168
Magnesium Sulfate Hydrometer, 1.240—1.310	MA-169
Heating/Cooling Circulator is used when temperature of sulfate solution cannot be maintained at required 70°F (21°C). This unit circulates water only to the Water Bath Tank (purchased separately), where Solution Buckets are immersed. Up to 5gal (20L) per minute of water is heated or cooled to the specified temperature. Advanced digital controller has temperature read out accuracy of 0.25°C, stability of 0.01°C and allows temperature control between 14°—212°F (-10°—100°C). Unit has 7L reservoir, 1,000 Watt heating and 600 Watt cooling at 110V/60Hz. Product Dimensions: 17x9x24in (430x229x610mm), WxDxH.	MA-76
Water Bath Tank is connected to the Heating/Cooling Circulator for use when additional temperature regulation is required. The Tank holds plain water and accepts up to four Solution Buckets. A lid is supplied to reduce evaporation loss and reduce temperature fluctuations. Thermometer for monitoring Bath temperature is purchased separately. The tank is 1/4in (6.4mm) thick white polyethylene and includes circulation and drain fittings. Interior Dimensions: 36x24x18in (914x610x457mm), LxWxH.	HM-442
Datalogging Thermometer captures 5.9 million date, time and temperature readings on a 256mb SD memory card. Data is quickly uploaded to any Windows™ PC via the included USB flash drive with built-in SD card reader port. Features include max/min memory and user-adjustable high/low alarms. Four-line display shows probe and ambient temperatures, relative humidity, and time of day. Range is -22° to 158°F (-30° to 70°C) with 0.1° resolution. Accuracy is ±0.6°C from 0° to 50°C, and ±1.2°C otherwise. Stainless steel probe is 0.16x1in (4x25mm) ODxL. A 256mb SD card, USB card reader, bench stand, wall mount, batteries, AC adaptor, and certificate are included.	MA-245
ASTM S63F Thermometer can be used for checking temperatures while mixing solution, and for periodic checks of water bath temperatures. Total immersion, 18°—89°F range, 0.2°F readability. Blue spirit-filled, white-backed glass with permanent graduations.	MA-531F

PR-10

PRA-14

NEW! Ship Weight Index

The Estimated Ship Weight for every product is easy to find in the NEW Ship Weight Index!

PROPPANT CRUSH TEST SYSTEM
API RP 19C; ISO 13503-2

Sand and engineered ceramic particles (proppants) used for hydraulic fracturing operations in oil and gas production are subjected to tremendous pressures thousands of feet beneath the surface. To assure top performance in the harshest of conditions, tests are performed to determine resistance to crushing and degradation of the materials.

Collaborative efforts between Gilson and Karol-Warner combined over a century of knowledge and experience to produce our new Proppant Crush Test Load Frame, the heart of this system. This sophisticated and efficient unit is compact and has a total rated capacity of 25,000lbf (111kN). A unique hybrid motor system is used to drive pressures up to 7,000psi (48.3mPa), using the included Crush Cell. This equipment meets the newest API requirements as well as proposed ISO standards.

Front panel controls allow settings for crush cell diameter, load rate, maximum load and hold time through the menu-driven four-line, backlit LCD display. Tare and Peak hold buttons are provided, and status is displayed during testing. A jog switch provides rapid positioning of the loading platform, and a large emergency stop button improves operator safety and protects the system from damage. LED indicators are provided for maximum travel limit and home position of the platform. Travel distance is 1.5in (38mm), and tracked by the LVDT flow sensor. Solid steel crosshead adjusts easily for a total daylight opening of up to 4.5x8.5in (114x216mm) WxH. A precision machined 3in (76mm) diameter Crush Cell with piston dimensions of 2.0x3.5in (50.8x89mm) dia.xL is included; inquire for other sizes. Additional Proppant Crush Cell assemblies are available separately to facilitate sample preparation. Adjustable centering cams on the loading platform allow precise and repeatable positioning of Crush Cells with outside diameters up to 3.5in (89mm).

Default loading rate is set at 2000psi (13.8mPa) per minute, and is adjustable up to 4000psi (27.6mPa) per minute. Load hold time is pre-set at two minutes, but is adjustable for up to five minutes. There is an automatic rapid release of the load at completion of the hold time. Load, rate, and time values are displayed in real time and documented through the custom software installed on the included laptop computer. A serial port connection is provided. Enclosure is rugged painted steel. The Crush Test Frame is mounted on a sturdy rolling cart for optimum positioning in the lab. Operates on 120V/60Hz electrical supplies. **Product Dimensions:** 22x27x54in (559x686x1.372mm) WxDxH.

PROPPANT CRUSH TEST SYSTEM

Proppant Crush Test System, 120V/60Hz PR-10

Accessories

Proppant Crush Cell PRA-14

technote

A Crush Test System with a 50,000lbf (222kN) capacity for testing high-strength proppants is currently under development. Inquire for details.

HM-602W

HM-614

PENDULUM SKID TESTER
ASTM D3319, E303; AASHTO T 278, T 279; BS 812-114; BS EN 1097-8

The Pendulum Skid Tester measures skid resistance when a rubber slider on a 20in (508mm) pendulum arm contacts a test surface. A drag pointer on a 0—150 scale measures friction. The unit quantifies the potential of automotive tire skidding and also evaluates skid resistance of surfaces and polishing tendencies of aggregates. A supplementary 0—10 scale is provided for work using smaller sliders. Adjustments to the arm position and base maintain a true circular path when operated on sloping road surfaces. Sliders are made with a graded rubber strip bonded to an aluminum backing plate.

Gilson supplies both large and small rubber sliders mounted to aluminum plates or as unmounted replacement pads. Order 3in (76mm) wide Large Sliders for testing road surfaces or 1-1/4in (32mm) wide Small Sliders for testing polishing wheel specimens.

The Tester includes a setting gauge, three wrenches, water bottle, instrument case, traceable calibration certificate, and instructions. Large or Small Sliders are ordered separately. When evaluating specimens from Accelerated Polishing Machines, order Laboratory Base Plate HMA-204W and HMA-207 Small Sliders separately. Base Plate is 25x19x2in (635x480x50mm), LxWxH, including a specimen mounting block. Order HMA-208 6x24in (152x610mm) No.60 grade silicon carbide Slider Conditioning Cloth in packs of ten to condition sliders per ASTM E303. Molds to form Accelerated Polishing Machine specimens are also available. **Product Dimensions:** 28.3x28.7x8.7in (720x730x220), WxDxH.

PENDULUM SKID TESTER	
Pendulum Skid Tester	HM-602W
Accessories	
Slider Conditioning Cloth, pkg 10	HMA-208P
Laboratory Base Plate	HMA-204W
Large Pad, Unmounted	HMA-228
Small Slider, Mounted	HMA-207
Small Pad, Unmounted	HMA-229
Accelerated Polishing Specimen Mold	HMA-258
Mold Plate	HMA-259

ACCELERATED POLISHING MACHINE
ASTM D3319; AASHTO T 279

The Accelerated Polishing Machine determines aggregate wear through action of vehicle tires. 3/8—1/2in (9.5—12.7mm) pieces of aggregate are bonded in molds to form fourteen curved segments. Segments are clamped to the "road wheel" to form a continuous aggregate surface 1-3/4in (44.5mm) wide and 16in (406mm) in diameter. In testing, the road wheel is driven at 320 ±5rpm in loaded contact with an 8in (203mm) diameter rubber-tired wheel while abrasive is fed to the contact area. Friction values are determined after polishing by use of a Pendulum Skid Tester.

The HM-614 is designated for ASTM/AASHTO test method and consists of a welded steel frame on adjustable pads. This unit maintains an 88lbf (391N) load on the road wheel and utilizes silicon carbide grit abrasive with a special grit feeder and Goodyear pneumatic-tired wheel assembly. The road wheel is driven by TEFC motor via an adjustable timing belt. Tests are automatically terminated by a preset revolution counter. Water is gravity fed from a tank through a calibrated flow meter, and is collected with used abrasive in a removable tray. Tire loadings to the road wheel are controlled by a mechanical lifting device. Units are supplied with two specimen molds, two mold plates, required feeders, wheel assemblies, wrenches, mounting pads, and operating instructions. Order abrasives separately. Each ASTM/AASHTO test requires about 10lb (4.5kg) of silicon carbide grit. Inquire for a version of this machine meeting BS812/EN 1097-8, available as HM-615. **Product Dimensions:** 32x31x48in (810x790x1,230mm), WxDxH.

ACCELERATED POLISHING MACHINE	
Accelerated Polishing Machine, 115V/60Hz	HM-614
230V/50Hz	HM-614F
Accessories	
Abrasive Silicon Carbide Grit, 50lb (23kg) box	HMA-240
Tired Wheel Assembly ASTM (for Silicon Carbide)	HMA-250
Replacement Tire (Pneumatic) with Tube	HMA-251
Accelerated Polishing Specimen Mold	HMA-258
Mold Plate	HMA-259

helpfulhint

The original "British Wheel" version of this equipment complying with BS 812, is available as HM-615. Inquire for details.

SS-18 shown with SSA-22

SEA-100

DURABILITY INDEX AGITATOR
ASTM D3744; AASHTO T 210; CALIFORNIA 227, 229

Durability Index measures the relative resistance of aggregates to producing clay-like fines when mechanically agitated in a special washing vessel. Resulting fines material is evaluated using sand equivalent apparatus listed separately. The versatile Gilson SS-18 Agitator runs at 285cpm, and may also be used as a sieve shaker for up to six full-height 8in or 200mm diameter sieves and pan.

Holes are provided in case flanges for securing to floor or bench. Switch, cord, and plug are provided; order Timer and Wash Vessel separately. **Product Dimensions:** 16x14x30in (406x356x762mm), WxDxH.

SSA-22 Stainless Steel Wash Vessel is approximately 8in (203mm) diameter x 9-1/2in (241mm) high and is complete with lid, gasket, and clamps.

DURABILITY INDEX APPARATUS	
Durability Index Apparatus, 115V/60Hz	SS-18
230V/50Hz	SS-18F
Accessories	
Washing Vessel	SSA-22
Timer	TSA-169R

NEW! Ship Weight Index
The Estimated Ship Weight for every product is easy to find in the NEW Ship Weight Index!

SAND EQUIVALENT TEST SETS
ASTM D2419; AASHTO T 176, T 210; CALIFORNIA 217, 229

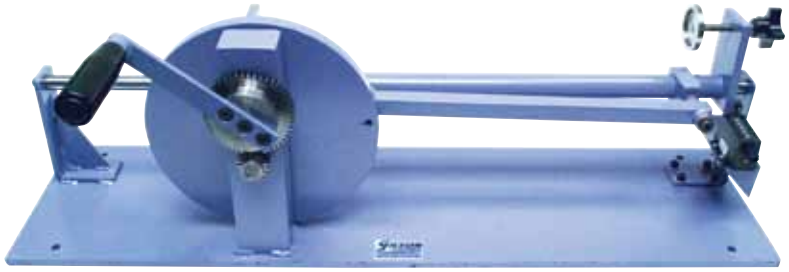
Gilson's Sand Equivalent Test Sets include everything required to conduct the test except the shaker. All components are available separately as accessories.

SEA-100 Sand Equivalent Test Set includes four Clear Plastic Graduated Cylinders, a Siphon Assembly, Irrigator Tube, Weighted Foot, Funnel, Measuring Tin, Solid Stopper and 8oz of Stock Solution. All items are packed in a convenient, vinyl-covered latching wooden case with carrying handle. **Product Dimensions:** 22x5x13in (559x127x330mm), WxDxH.

SEA-99 Basic Sand Equivalent Test Set includes all components of the standard set, but is supplied without the carrying case.

SEA-101 Plastic Graduated Cylinder is 17x1.25in (432x31.8mm), HxID, with 0.1in graduations from bottom of cylinder to 15in height. SC-500-1 Measuring tin is approximately 2.25in (57mm) diameter with 85ml capacity. SEA-100A Weighted foot assembly weighs 1,000g. SEA-102 and SEA-103 stock solution has limited shelf life.

SAND EQUIVALENT TEST SETS	
Sand Equivalent Test Set	SEA-100
Basic Sand Equivalent Test Set	SEA-99
Accessories	
Clear Plastic Graduated Cylinder	SEA-101
Stock Solution, 8oz	SEA-102
Stock Solution, 1gal	SEA-103
Weighted Foot Assembly	SEA-100A
Siphon Assembly	SEA-100B
Funnel	SEA-100C
Measuring Tin, 3oz	SC-500-1
Carrying Case	SEA-100E
Solid Stopper	SEA-100F
Irrigator Tube	SEA-100G



SE-6

SE-2B shown with SEA-101

SE-5

SAND EQUIVALENT SHAKERS
ASTM D2419; AASHTO T 176, T 210; CALIFORNIA 217, 229

The Sand Equivalent Test indicates the portion of undesirable clay-like fines in granular soils and fine aggregates. It is also used in the Durability Index Test, measuring the resistance of aggregates to producing clay-like fines when subjected to degradation. The sample is placed in a clear plastic cylinder with sand equivalent solution, consisting of calcium chloride, formaldehyde, and glycerine. After agitating the cylinder, it is allowed to stand for a sedimentation period. Readings are taken for the clay suspension, and for the sand level. "Sand Equivalent" is the sand reading divided by the clay reading x 100.

SE-2B Motorized Sand Equivalent Shaker is recommended for labs performing sand equivalent tests on a regular basis. Positive DC drive assures precise speed and stroke and eliminates errors. A selection switch gives options of precise fixed times of 45 seconds and 10 minutes. The 8in (203mm) throw at 175cpm is smooth, quiet, and efficient. The 1/8hp DC sealed gear motor is housed in a sturdy metal case. The hinged safety cover with top viewing windows must be closed to operate the shaker. Test cylinder is held securely by base pin and spring-loaded holder on stoppered end. **Product Dimensions:** 35x14x20in (889x356x508mm), WxDxH; allow 10in (254mm) additional height for opening of safety cover.

SE-6 Hand-Crank Sand Equivalent Shaker has 3 cycles per revolution of crank. Operator cranks at one turn per second until the digital counter reaches 131 cycles. Cylinder mounts to fixed-travel guide rod by base pin and threaded clamp holder on stoppered end. Base has holes for mounting. **Product Dimensions:** 30x14x10in (762x356x254mm), LxWxH.

SE-5 Hand-Operated Spring Sand Equivalent Shaker conforms to ASTM, AASHTO and California 217 test methods. Unit has cylinder mounting bracket suspended by two steel straps. Operator manually oscillates cylinder to a preset mark on the case at proper rate. Digital counter records stroke counts. Components are mounted in a vinyl-covered, plywood case with reinforced corners, removable front and a top handle. **Product Dimensions:** 24x6x25in (610x152x635mm), WxDxH.

SAND EQUIVALENT SHAKERS	
Motorized Sand Equivalent Shaker, 115V/60Hz	SE-2B
230V/50Hz	SE-2BF
Hand-Operated Spring Sand Equivalent Shaker	SE-5
Hand-Crank Sand Equivalent Shaker	SE-6

SG-40 shown with HMA-11A & SC-74

SG-42

HM-137

FINE AGGREGATE ANGULARITY APPARATUS
ASTM C1252; AASHTO T 304

This Apparatus is used to determine the uncompacted void content of a fine aggregate sample. The method indicates the angularity, sphericity, and workability of fine aggregate in a mixture for which it may be used. Each sample is mixed with a spatula until it is homogeneous. After filling the hopper, the sample is allowed to flow into the 100ml copper cylindrical measure. The measure has a locating hole to fit a lug on the Funnel Stand to ensure each sample is tested with precision and repeatability. Once the user strikes off excess material, mass is determined and void content is computed. Gilson recommends SC-74 Stainless Steel Pan as a sample retainer.

Included with the SG-40 is a 100ml copper Cylindrical Measure, Funnel with specified hopper, Funnel Stand and a Glass Plate for calibration. **Product Dimensions:** 8x8x27.3in (203x203x693mm), WxDxH.

FINE AGGREGATE ANGULARITY APPARATUS	
Fine Aggregate Angularity Apparatus	SG-40
Accessories	
Glass Plate	SGA-91
100ml Measure	SGA-92
Pan, Stainless Steel 12.5x2in, Dia.xH	SC-74
Spatula	HMA-11A

COARSE AGGREGATE ANGULARITY APPARATUS
AASHTO T 326

The SG-42 apparatus for uncompacted void content of coarse aggregate utilizes a scaled-up apparatus and procedure similar to that used for evaluation of fine aggregate. Gradation and void content data provide an indication of angularity, sphericity, and surface texture. As concluded by NCAT's work, test results relate to permanent deformation and fatigue cracking of asphalt. The test has therefore been recommended to evaluate aggregates for hot-mix asphalt pavement.

Aggregate is allowed to free fall from the hopper into a cylindrical measure. Excess heaped aggregate is struck off using the included bar, the mass is measured, and void content is computed.

The hopper, stand and measure are stainless steel. The apparatus also includes glass plate for calibration of the measure. A locator pin and circle on the bottom plate of the stand assure centering the measure below the hopper. The apparatus measures 10x10x27in (254x254x686mm), WxDxH. SC-181 lightweight fiberglass reinforced plastic pan is 21.2x15.6x6in (538x396x152mm), LxWxH and recommended for containment of particles during testing. The TSA-163 Chute-end Aggregate Handling Pan is useful for weighing and loading of aggregate test material. **Product Dimensions:** 8x8x14.5in (203x203x368mm), WxDxH.

COARSE AGGREGATE ANGULARITY APPARATUS	
Coarse Aggregate Angularity Apparatus	SG-42
Accessories	
Overflow Pan	SC-181
Chute-end Aggregate Handling Pan	TSA-163
Glass Plate	SGA-94
Stainless Steel Measure	SGA-95

ORGANIC IMPURITIES TEST
ASTM C40; AASHTO T 21

This simple test is widely used to determine possible presence of organic compounds in fine aggregates. Samples are shaken in a special graduated bottle with a 3% sodium hydroxide solution, then allowed to stand for 24 hours. If the resulting color of the liquid above the test sample is darker than a reference standard color, organic compounds may be present and further testing should be done before approval.

Gilson offers a complete HM-137 Organic Impurities Test Set or individual set components. The set includes six HM-817 graduated 8oz (237ml) colorless glass Impurities Test Bottles, a 1lb (454g) bottle of Sodium Hydroxide (NaOH) Pellets (HM-816), and an HM-815 Color Reference Chart. The sodium hydroxide pellets make enough 3% solution to perform over 150 tests. For strict compliance to ASTM and AASHTO Standards, order HM-818 Reagent Grade Sodium Hydroxide Pellets. The Color Reference Chart has been upgraded to meet the latest ASTM revisions, and has five permanent reference colors mounted in a durable protective plastic case. For areas with shipping restrictions, the HM-137F includes all items listed except the sodium hydroxide reagent. The HM-817 Test Bottles are graduated in oz and ml and have watertight screw-on caps.

ORGANIC IMPURITIES TEST	
Organic Impurities Test Set	HM-137
Organic Impurities Test Set	HM-137F
Accessories	
Color Reference Chart	HM-815
Sodium Hydroxide Pellets, 1lb	HM-816
Sodium Hydroxide Pellets, Reagent Grade, 1lb	HM-818
Impurities Test Bottle	HM-817

HM-58R

HM-38R

HM-38B

HM-925

HM-926

METHYLENE BLUE VALUE SET
AASHTO T 330

The Methylene Blue Value (MBV) of fine aggregate is a measure of the amount of potentially harmful fine material present such as clay and organic material. Material passing the No.200 (75µm) sieve is maintained in dispersion with distilled water by mixing with a magnetic stirrer. Methylene Blue solution is titrated into the stirred dispersion in increments until a drop of the mixture on filter paper shows a blue ring indicating that the sample can absorb no more reagent. The MBV is simply a measure of the amount of reagent absorbed, and is proportional to the amount of clay or organic material present.

Methylene Blue Reagent solution is light sensitive. The solution shelf life is 4—6 months maximum, when stored in a dark cabinet in foil-wrapped amber bottles. The HM-58R Set includes 25g of methylene blue reagent in stable powder form, a 50 x 0.1ml special amber glass burette, a burette clamp and stand, two amber 500ml solution storage bottles, three glass 600ml beakers, two glass dropping rods, a 1L volumetric flask, and a 100 sheet pack of 24cm diameter filter paper. Instructions for preparation and storage of solution are provided along with details of the test procedure. The 25g of powder reagent provided in the set is sufficient to prepare solution for over 500 tests. Other required accessories should be ordered if not available in the lab.

METHYLENE BLUE VALUE SET

Methylene Blue Value Set HM-58R

Accessories

Powder Reagent, 25g HMA-78
Filter Paper, pkg. 100 . . . . . HMA-79

technote

Coming Soon! New ASTM test methods allow for a Digital Methylene Blue Test.

PROPORTIONAL CALIPERS
ASTM D4791

Shape characteristics of coarse aggregates are important to performance of materials or mixes. HM-38R and HM-38B Proportional Calipers are timesaving devices. Use either for rapid determination of percentages of flat and elongated particles in coarse aggregate fractions of 3/8in (9.5mm) or larger. Both units are constructed of durable aluminum, precision tooled for accuracy.

For shape determination of flat particle sizing, set the width of a particle in the larger end of the Caliper, then tighten the pivot screw. Without adjusting the Caliper, determine the thickness of the same particle in the smaller measuring end of the Caliper. If the particle fits within the smaller gap, it is considered flat. Elongated particle determination uses the same steps. If the particle is larger than the small measurement in both situations then the particle is considered neither flat nor elongated.

HM-38R Budget Caliper consists of a base plate with two fixed posts and a 13in (330mm) pivoting arm mounted between the posts so that there is an opening at each end of the arm. The pivoting arm adjusts by securing a pivot screw at one of four threaded positions to provide end opening ratios of 1:2, 1:3, 1:4, or 1:5. **Product Dimensions:** 6x16in (152x406mm), WxDxH.

HM-38B Four-Station Caliper is similar, but provides openings for all four ratios simultaneously, without the need to reposition the pivot screw. Moveable posts are also replaceable. **Product Dimensions:** 16x8x3in (406x203x76mm), WxDxH.

PROPORTIONAL CALIPERS

Budget Caliper. HM-38R
Four-Station Caliper. HM-38B

FLAKINESS & ELONGATION OF AGGREGATE
BS 812

This aggregate classification system uses a HM-925 Thickness Gauge for determining flakiness index and a metal HM-926 Length Gauge for determining elongation index. Aggregate is separated into seven sieve fractions from 63—6.3mm, and each fraction is evaluated separately.

HM-925 Thickness Gauge has seven labeled slots for rapid hand trying of particles from each of the seven sieve cuts. The mass of all flaky particles as percent of the sample is the flakiness index. Thickness Gauge is enameled sheet metal with clearly marked sieve fraction ranges for each slot.

HM-926 Length Gauge has six labeled openings between pairs of metal pins for measuring length of particle from each of the six sieve cuts below 50mm. The mass of all elongated particles as percent of the sample is the elongation index. The Length Gauge has stainless pins set in a brushed aluminum base stamped with sieve fraction ranges between pins.

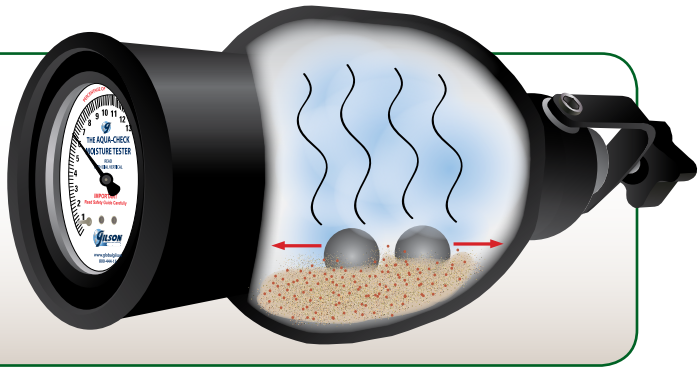
Test aggregates must be sieved using sieves with openings of 63, 50, 37.5, 28, 20, 14, 10, and 6.3mm. These are available separately (listed elsewhere) as standard 200mm or special order 3in diameter sieves with stainless steel cloth in the ISO Test Sieves chart.

FLAKINESS & ELONGATION OF AGGREGATE

Thickness Gauge (Flakiness Index) HM-925
Length Gauge (Elongation Index) HM-926

GAS PRESSURE MOISTURE TESTERS

The gas-pressure method for moisture determination has long been in use and is widely accepted for accurate field testing of soils, aggregates, coal, abrasives and other materials. These devices are essentially pressure vessels and depend on the formation of gas when the calcium carbide reacts with moisture in the sample. A precision gauge in the sealed chamber measures pressure for relative readings, and results are easily correlated to laboratory results for enhanced accuracy.



MA-26X

MAA-45

MA-26X additional views

GILSON *AQUA-CHECK* MOISTURE TESTER
ASTM D4944; AASHTO T 217; FLORIDA FM 5-507

Gilson *Aqua-Check* is made in the USA, and an affordable choice for rapid, accurate, and reliable moisture tests on sand, aggregates, ores, coal, soils, and other materials with particle size up to 20mm. Samples can be quickly tested on-site, eliminating risk of moisture loss during transport. Portable units are easy to use, and meet ASTM, AASHTO and Florida DOT requirements. The Gilson *Aqua-Check* was evaluated by the Florida DOT and verified to meet FM5-507 DOT requirements.

A pre-weighed 20g sample is placed in the test chamber, along with a measured quantity of calcium carbide reagent. When the chamber is sealed and agitated for one to three minutes, free moisture in the test sample reacts with the reagent to produce acetylene gas. The integral pressure gauge registers 0—20% moisture by weight in 0.2% graduations. Moisture range can be doubled by halving the pre-weighed sample weight.

MA-26X *Aqua-Check* has a rugged, die-cast aluminum body with a tough, wear-resistant coating and includes a 0—20x0.2% pressure gauge, with certificate of calibration. Also included; electronic digital balance, two 1.25in (32mm) dia. steel pulverizing balls, reagent measuring scoop, brush, and instructions in a heavy-duty, waterproof plastic case. Approximate pressure chamber dimensions: 14x5.5in (356x140mm), LxDia. Recalibration of existing *Aqua-Check* gauges is available as MAA-53, inquire. Calcium Carbide Reagent is available separately in 10lb (4.5kg) cans as MAA-44. These bulk containers can be used to refill smaller containers for field use. Repair parts are normally in stock. The pressure gauge and all accessories are compatible with both *Aqua-Check* and Speedy-brand Moisture Testers.

MAA-45 *Aqua-Check* 0—20% Replacement Pressure Gauge includes a certificate of calibration, and is also compatible with Speedy-brand MA-21A and MA-25 Moisture Testers. Due to shipping restrictions, additional reagent is sold in 10lb (4.5kg) cans. Material from these larger cans can be used to replenish smaller containers for field use. **Product Dimensions:** 20x17x9in (508x431x228mm), WxDxH.

GILSON *AQUA-CHECK* MOISTURE TESTER	
Gilson *Aqua-Check* Moisture Tester, without Reagent	MA-26X
Accessories	
Calcium Carbide Reagent, 10lb can	MAA-44
Empty 1lb Metal Can for Reagent	MAA-43
Aqua-Check 0—20% Pressure Gauge	MAA-45
Recalibration of MAA-45 Pressure Gauge	MAA-53
Electronic Balance, 200 x 0.1g	OB-205
1.25in (32mm) Steel Balls, pkg. 2	MAA-47
Sample Cup	MAA-52
Long-Handle Reagent Scoop	MAA-48
Large, Coarse Clean-Out Brush	MAA-51
Small, Fine-Bristle Brush	MAA-50
Heavy-Duty Waterproof Plastic Case	MAA-46

technote

Gilson Company, Inc. now offers a repair service for the MA-26X *Aqua-Check* Moisture Tester. Please call **800.444.1508** for pricing or to schedule repairs.

AUTOMATIC AGGRA-WASHERS

Gilson Aggra-Washers allow users to efficiently determine the amount of material finer than a No. 200 (75-µm) sieve in aggregate. Both Aggra-Washer models incorporate vinyl tubing for connection to a standard water line or faucet with user supplied adapter to provide sufficient water supply for the aggregate washing process. The water continuously flows into the revolving wash drum and washes the aggregate sample. The constant washing creates an aggregate and water mixture that overflows from the wash drum and into a No. 200 (75-µm) sieve.

HM-57R

HM-52

AUTOMATIC AGGRA-WASHERS
ASTM C117, D1140; AASHTO T 11

Two Aggra-Wash models automatically wash soil and aggregate samples to remove fines passing the No.200 sieve. Inconsistencies and high cost of manual methods are eliminated. Water is continuously fed into the revolving, inclined stainless steel drum via a permanent regulated connection and the sample is gently agitated until overflow is clear. Overflow is directed to sieves to prevent loss of oversize material in decanted wash water. Select appropriate sizes from our extensive line of Wet-Washing Sieves. Both models are equipped with totally enclosed gear motors for drum rotation and 6ft (1.8M) power cords with GFCI plugs.

HM-57R Full-Size Aggra-Washer allows processing of large aggregate samples up to 15lb (7kg). Drum size is 11in diameter x 13in high (279x330mm), extra drums can be ordered as HMA-261 to improve sample processing efficiency. **Product Dimensions:** 24x20x27in (610x508x686mm), LxWxH.

HM-52 Table Top Aggra-Washer is portable and convenient for placement on a counter top adjacent to a sink. This model is useful for washing geotechnical or small aggregate samples of up to 6—8lb (2.7—3.6kg). The fixed-angle removable drum can be used as a weighing container. Gooseneck water tube swivels aside to allow drum removal. Order extra drums as HMA-260 to improve sample processing efficiency. Stainless steel drum is 9in diameter x 10.75in high (229x273mm). **Product Dimensions:** 19x16x22in (482x406x559mm), LxWxH.

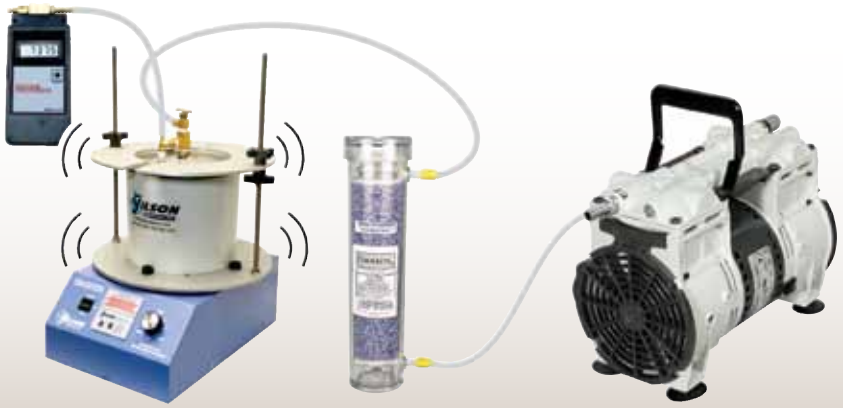
Recommended accessories for both models include 8in (203mm) and 12in (305mm) brass pans with drains. Vinyl tubing may be used to connect pan to drain, if desired.

AUTOMATIC AGGRA-WASHERS	
Full-Size Aggra-Washer, 115V/60Hz	HM-57R
230V/50Hz	HM-57RF
Table Top Aggra-Washer, 115V/60Hz	HM-52
230V/50Hz	HM-52F

Accessories	
Wash Drum for HM-52	HMA-260
Wash Drum for HM-57R	HMA-261
8in Pan with Drain	WT-3
12in Pan with Drain	WT-10
Vinyl Tubing, 1/4in ID, per foot	WT-8
Hose Clamp	MA-198

VIBRO-DEAIRATOR RICE TEST SET-UP

To perform a Rice test its necessary to remove free and entrapped air from the asphalt mixture sample. In the typical set-up shown, the vacuum pump is required to remove the free air, while the SGA-5R provides the agitation of the pycnometer necessary to remove the entrapped air from the mixture. The MA-170 assures that adequate vacuum is applied to the sample and the SG-70 Air/Gas Dryer Tube with indicating drierite protects water from entering and affecting the vacuum pumps performance.



SGA-5R shown with SG-16A

SGA-5R shown with GW-76 & SGA-8

VIBRO-DEAIRATOR

ASTM C128, D854, D2041, D4867; AASHTO T 209; TxDOT Tex-227-F

- **Consistent, repeatable agitation for Asphalt Rice Test and other specific gravity determinations.**
- **Variable vibration control allows for setting optimum agitation.**
- **Automatic operation minimizes operator error and frees technician from hand agitation.**

The Gilson Vibro-Deairator performs consistent, automatic agitation of Asphalt Rice Test vacuum pycnometers, freeing lab technicians for other duties. It is also a useful deairing device for specific gravity tests of fine aggregates (ASTM C128) and soils (ASTM D854), as well as sample preconditioning per ASTM D4867 and AASHTO T 283.

The Vibro-Deairator features built-in 0—99 min., 59 sec. digital timer with ±0.25 second accuracy, a vibration speed controller, and a three position switch for manual or timed operation—all front panel mounted for easy use. Variable speed settings closely control agitation to avoid stripping of asphalt. Special "speed knobs" quickly secure pycnometer vessels to the vibration platform. After a few loosening turns, they tilt and slide up and down the clamping rods for fast removal. The painted steel case has non-slip rubber feet so no mounting is required.

The SGA-5R includes fitted top and bottom plates for exact fit with SG-16A or SG-17 Aluminum Pycnometers. Order SGA-7 Adapter Set for use with high-capacity plastic SG-15 Pycnometer. Use SGA-8 Adapter Set with GW-75 or GW-76 filter Flasks, SG-500 Volumetric Flasks, SG-24 LeChatelier Flask, or SG-2 Mason Jar Pycnometer. Inquire for fitting other containers. Model SGA-5RT version has modified vibration characteristics to meet Texas DOT requirements. **Product Dimensions:** 13x14x19in (330x356x483mm), WxDxH.

VIBRO-DEAIRATOR	
Vibro-Deairator, 115V, 50/60Hz	SGA-5R
Vibro-Deairator, Texas, 115V, 50/60Hz	SGA-5RT
Accessories	
Adapter Set for SG-15	SGA-7
Adapter Set for GW-75 or GW-76	SGA-8

SG-15

SG-16A

MA-170

MA-166

VACUUM PYCNOMETERS
ASTM D2041; AASHTO T 209

Gilson offers three types of vacuum pycnometers to determine maximum specific gravity.

SG-16A 2,000g Pycnometer meets both ASTM D2041 and AASHTO T 209. Aluminum volumetric canister is 7.5in dia. x 6in D (191x152mm) and tests a maximum 2,000g (4.4lb) sample, sufficient for mixes with up to 3/4in (19.1mm) aggregates. A transparent vacuum lid and a second tapered aluminum lid with capillary bore are included to allow canister to be used as volumeter for determining specific gravity of compacted bituminous mixtures. Vacuum hose, quick-disconnect, and a 3/8in (9.5mm) threaded aspirator vacuum source are included.

SG-15 6,000g Pycnometer meets ASTM D2041 and AASHTO T 209. The large, 10L capacity pycnometer is suited for mixes with aggregates up to 2in (51mm). High-strength plastic vessel with 9.38in (238mm) I.D. has an O-Ring seal to prevent leakage. An adjustable valve controls water level, and a perforated plastic shelf is included. The shelf supports three 4in (102mm) dia. specimens. Vacuum hose, quick-disconnect, and a 3/8in (9.5mm) threaded aspirator vacuum source are included. **Product Dimensions:** 10.75x13.3in (273x338mm), Dia.xH.

GW-76 Heavy Wall Filter Flask meets ASTM and AASHTO requirements for use as a vacuum pycnometer for weighing in air only. The 4L Flask must be fitted with GWA-3 stopper with a 3/8in (9.5mm) hole for vacuum use. GWA-3 purchased separately.

VACUUM PYCNOMETERS	
2,000g Pycnometer	SG-16A
6,000g Pycnometer	SG-15
Accessories	
3/8in Reinforced Vinyl Tubing, per foot	WT-4B
Hose Clamp	MA-198
4L Vacuum Filter Flask	GW-76
#12 Stopper for GW-76	GWA-3

RESIDUAL PRESSURE MANOMETERS
ASTM D2041; AASHTO T 209

MA-170 Digital Manometer is a safe, accurate and environmentally friendly alternative for measuring vacuum levels. The gauge is mercury-free and uses an absolute pressure transducer to give instant digital display of applied vacuum from 0—1,000mm Hg. Resolution is 0.1mm. A 0.25in hose barb connection with a needle valve is supplied for vacuum tubing. Powered by a 9V battery, or included AC adapter. Adapter for MA-170F is 230V/50Hz. Automatic shut-off saves power in battery mode. **Product Dimensions:** 3.1x6.5x1.18in (78.7x165.1x30mm), WxDxH.

MA-170C Digital Manometer NIST Calibrated meets requirements of AASHTO T 209, and undergoes multi-point calibration at 25, 30 and 35mm Hg. on NIST traceable equipment. MA-170C is supplied with a calibration certificate. **Product Dimensions:** 3.1x6.5x1.18in (78.7x165.1x30mm), WxDxH.

MA-166 Mercury Manometer has sliding scale graduated above and below zero to 130mm by 1mm. The U-tube is mounted on a wooden stand and comes complete with mercury. **Product Dimensions:** 8.85x5x16in (225x127x406mm), WxDxH.

RESIDUAL PRESSURE MANOMETERS	
Digital Manometer, 110V/60Hz Adapter	MA-170
230V/50Hz Adapter	MA-170F
Digital Manometer, NIST Calibrated	MA-170C
Mercury Manometer	MA-166

VACUUM PUMPS
ASTM D2041, D2172; AASHTO T 164, T 209

These quality vacuum pumps are the accepted standards for specific gravity testing and other high-vacuum laboratory applications.

MA-23

MA-24

MA-23 Vacuum Pump is a large oilless pump that allows multiple specific gravity tests to be performed simultaneously. This heavy-duty unit combines large capacity with maintenance free operation. The 1/3hp motor pulls 29.6in Hg (759.46mm), with free air displacement up to 99L/min (3.5cfm), and ultimate pressure of 5.0Torr, and includes a NEMA guarded switch and grounded electric cord. **Product Dimensions:** 11.1x9.2x11.0in (282x234x279mm).

MA-24 Vacuum Pump offers the same vacuum capacity as some oil systems in an economical oilless pump package. The 1/3hp motor pulls a vacuum to 29.6in Hg (759.46mm), with free-air displacement up to 45L/min (1.6cfm) and ultimate pressure of 5.0Torr, and includes a NEMA guarded switch and grounded electric cord. **Product Dimensions:** 11.7x7.2x9.5in (296x183x240mm).

MA-27A Vacuum Pump has a two-stage, direct drive, rotary vane pump that provides good performance to cost ratio. This lightweight 1/2hp pump features 0.001Torr ultimate vacuum pressure and 3.0cfm free air capacity. The compact design reduces space requirements and a 2.5in (64mm) diameter Bourdon-style 0—30in (0—762mm) vacuum gauge is mounted on the intake side. A gas ballast valve permits purging of water vapor. The handy plastic grip handle allows easy portability. **Product Dimensions:** 14x5.25x11in (355x133x279mm), WxDxH.

MA-27A

MA-28 Vacuum Pump has a two-stage, belt drive, rotary vane pump that has fast recovery time and good durability. This quiet, reliable pump has standard 3/8in intake fittings for quick connection or adaptation to other equipment. It also features a drain cock and sight glass for easy maintenance and monitoring of oil levels, an approved belt guard and On/Off switch. A one-year manufacturer parts and labor guarantee is standard. The exhaust dome and baffle condense oil spray for cleaner operation. **Product Dimensions:** 18.5x10x10.75in (470x254x273mm), WxDxH.

MA-28

MA-29 Vacuum Pump has a two-stage, belt drive, rotary vane pump that has high vacuum capacity and good free air capacity for higher volume applications. The heavy-duty unit features cast-iron construction, quiet operation and long service life. Pump is supplied with motor, pulley and belt with guard mounted on a sturdy steel base. An oil sight gauge, drain cock, and standard 7/8in intake fitting are also included. The initial fill and an extra quart of oil are provided. A gas ballast valve is fitted for purging water vapor and other condensates. Pump recovers from atmospheric exposure to guaranteed 0.0001Torr in one to three minutes. **Product Dimensions:** 17.3x11.5x13in (438x292x330mm), WxDxH.

MA -31 Economy Chemical Resistant Vacuum Pump is a smaller, affordable, oiless pump optimized for ultimate protection against corrosive solvents. This quiet model exhibits noise levels as low as 54dB and is optimized for vacuum filtration and degassing applications. The low-maintenance MA-31 is equipped with a 1/7hp motor that pulls a vacuum to 22in Hg (559mm), with free air displacement up to 20L/min (0.7cfm) and ultimate pressure of 203.2Torr. The pump includes a regulator gauge to adjust and monitor vacuum levels, and the inlet catch-pot protects from accidental intake of fluids and particulates. **Product Dimensions:** 6.8x7.3x8.3in (173x185x211mm), LxWxH.

MA-31

MA-33

MA-32 Vacuum Pump is a budget oil-less diaphragm pump that is ideal for use with light-to-medium duty lab applications. This popular unit comes complete with gauges, connections, and relief valves for vacuum and pressure applications and has built-in On/Off switch and carrying handle. Pump has free air capacity of 1.1cfm (31.2L/min), and can produce vacuum to 25.5in Hg (648mm), or up to 60psi (414kPa) pressure as a compressor. It is quiet, portable, and maintenance free. The pump has 1/8hp, 115V, 60Hz shaded pole motor with thermal protection and is UL listed and CSA approved. **Product Dimensions:** 5.3x7.6x10.5in (133x194x267mm), WxDxH.

MA-33 Chemical Resistant Vacuum Pump is a durable, corrosion and bleach-resistant pump ideal for mid-range vacuum applications, and safe for use with cell culture contamination protocols. The included liquid inlet trap and vacuum regulator are suitable for organic aqueous solvents and light acid/base solutions. The 1/5hp motor pulls a 24in Hg (607mm) vacuum, with free air displacement up to 37L/min (1.3cfm), and ultimate pressure of 152.4Torr. The unit is supplied with an electrical line cord, plug and power switch. **Product Dimensions:** 8.75x5x8.75in (222x147x222mm), LxWxH.

MA-29

MA-32

VACUUM PUMPS

Model	Electrical	hp (kW)	Ultimate Vacuum Torr	Free Air Capacity cfm (L/min)	Intake Nipple OD in (mm)
MA-23	115V/60Hz	1/3 (0.25)	5.0	3.5 (99)	3/8 (9.5)
MA-23F	230V/50Hz	1/3 (0.25)	5.0	3.5 (99)	3/8 (9.5)
MA-24	115V/60Hz	1/3 (0.25)	5.0	1.6 (45)	3/8 (9.5)
MA-24F	230V/50Hz	1/3 (0.25)	5.0	1.6 (45)	3/8 (9.5)
MA-27A	115V/60Hz	1/2 (0.37)	0.001	3.0 (85)	3/8 (9.5)
MA-27AF	230V/50Hz	1/2 (0.37)	0.001	3.0 (85)	3/8 (9.5)
MA-28	115V/60Hz	1/3 (0.25)	0.0003	0.35 (10)	3/8 (9.5)
MA-28F	230V/50Hz	1/3 (0.25)	0.0003	0.35 (10)	3/8 (9.5)
MA-29	115V/60Hz	1/2 (0.37)	0.0001	2.79 (79)	7/8 (22)
MA-29F	230V/50Hz	1/2 (0.37)	0.0001	2.79 (79)	7/8 (22)
MA-31	115V/60Hz	1/7 (0.14)	203.2	0.7 (20)	1/4 (6.3)
MA-32	115V/60Hz	1/8 (0.10)	152	1.1 (32)	1/4 (6.3)
MA-33	115V/60Hz	1/5 (0.20)	152.4	1.3 (37)	1/4 (6.3)
MA-33F	230V/50Hz	1/5 (0.20)	152.4	1.3 (37)	1/4 (6.3)

SG-20 shown with SGA-120, OBX-512 & SG-7A

NEW! Ship Weight Index
The Estimated Ship Weight for every product is easy to find in the NEW Ship Weight Index!

HM-649

SPECIFIC GRAVITY BENCH
ASTM C20, C127, C642, C830, D1188, D2041, D2726; AASHTO T 85, T 166, T 209, T 275

The SG-20 Specific Gravity Bench allows easy weighing of suspended samples in water for specific gravity determinations of aggregates, hardened concrete, bituminous mixtures, refractory brick, and similar materials. Bench is sturdy painted steel and features three 2in (51mm) diameter holes in the top for suspension of samples and thermometer. The lower support doubles as a shelf that can be adjusted to fit Gilson 30gal (114L) or 44gal (170L) Plastic Water Tanks. Requires assembly. **Product Dimensions:** 31x25x46in (787x635x1,168mm).

Heavy-duty polyethylene water tanks are ordered separately. Both 1/4in (6.4mm) thick molded tanks are seamless and translucent for water level visibility, and equipped with drain and overflow outlets. Maximum operating temperature is 140°F (60°C). SGA-120 has 30gal (114L) capacity with dimensions of 24x18x18in (610x457x457mm) LxWxD. SGA-122 has 44gal (170L) capacity and 24x18x24in (610x457x610mm) LxWxD, and is preferred for ASTM D2041, AASHTO T 209 and similar tests. Check dimensions of vacuum containers prior to ordering.

HM-651 Heater and HM-655 Circulator or alternate HM-649 Portable Heater/Circulator accessories for temperature control are ordered separately. Use SGA-130 Locking Caster Set for portability of the bench. SGA-119 Specific Gravity Cradle, shaped from heavy stainless steel wire, is useful for weighing odd-shaped specimens. Additional accessories and scales are described elsewhere.

SPECIFIC GRAVITY BENCH	
Specific Gravity Bench & Tank Shelf (without Tank), 115V/60Hz	SG-20
Accessories	
Water Tank 30 gallon, 18in deep	SGA-120
Water Tank 44 gallon, 24in deep	SGA-122
Specific Gravity Cradle	SGA-119
Tank Heater	HM-651
Tank Circulator	HM-655
Portable Heater/Circulator	HM-649
Locking Caster Set	SGA-130
Wire Basket for ASTM C127	SG-7A
One-Hook	SGA-125

EZ MOUNT HEATER/CIRCULATOR

This versatile Heater/Circulator combines circulation and temperature functionality into a single compact and portable unit. The device mounts easily and securely to straight or curved tank and bath walls with an adjustable clamp, and can quickly be dismounted for use on another tank. Streamlined design maximizes available tank space. Design features include push-button controls and easy to read 3.25"LCD backlit display with on-screen prompts. A convenient sliding control adjusts flow rate. Tough plastic protective housing guards the pump and heater, and is easy to keep clean. Over-temperature and low-liquid level shut-offs are set by user to assure safe operation.

With 1,100 Watt heat output and adjustable pump flow up to 3.4gpm (12.8Lpm), the HM-649 heats and maintains tap water in SGA-120 and SGA-122 tanks to the required temperature range for specific gravity applications. For smaller tanks up to 7.4gal (28L), temperatures are controlled to ±0.13° from ambient + 20° to 275°F (±0.07° from ambient + 10° to 135°C). Maximum flow rate for model HM-649F is 2.8gpm (10.6Lpm). Suitable for tanks with a working depth of 7.25" (18.4 cm) or more, using tap or distilled water only. Two-year manufacturer's warranty. Supplied with a 5ft power cord with grounded plug.

EZ MOUNT HEATER/CIRCULATOR	
EZ Mount Heater Circulator, 120V/60Hz	HM-649
240V/50Hz	HM-649F

SG-1

SG-6

SG-450 SG-24 SG-250

SG-30 SG-62 SG-63

SPECIFIC GRAVITY ACCESSORIES

SPECIFIC GRAVITY ACCESSORIES

Description	Model	Test Method
Specific Gravity & Absorption of Fine Aggregate set includes pycnometer with conical mold and tamper. Pycnometer is 1qt (0.95L) threaded glass jar with a rubber gasketed brass top tapered to 1/8in (10mm) hole at top. Mold is 40mm ID at top, 90mm at bottom, 75mm H. The 340g tamper has 25mm diameter face.		ASTM C128 AASHTO T 84
Complete Set	SG-1	
Jar & Top	SG-2	
Mold & Tamper	SG-3	
Mold Only	SGA-15	
Tamper Only	SGA-16	
Specific Gravity & Absorption of Coarse Aggregate set includes Stainless Steel Wire Mesh Basket with handle and polyethylene 24qt Water Container for weighing coarse aggregate samples while suspended in water. Wire Basket is No.8 stainless steel mesh, 8x8in (203x203mm), Dia.xH. Inquire for baskets with No.4, No.6, No.12 or No.16 mesh sizes. 14qt Galvanized Pail is available as a container.		ASTM C127 AASHTO T 85
#8 Wire Mesh Basket and Polyethylene Container Set	SG-6	
#8 Wire Mesh Basket	SG-7A	
Polyethylene Container	SG-8	
14qt Galvanized Pail	MA-950	
Chapman Specific Gravity Flask is used to determine approximate percentage of surface moisture and voids in fine aggregates. Upper and lower bulbs contain 175ml and 200ml, respectively. Stem is graduated above the bulbs from 375 to 450ml.		ASTM C70
Chapman Specific Gravity Flask	SG-450	
LeChatelier Specific Gravity Flask is used to obtain specific gravity of hydraulic cement, dust, sand, and other fine materials. Body holds about 250ml, bulb in neck holds 17ml. Below the bulb are graduations from 0 to 1ml. Above the bulb, the neck is graduated from 18 to 24ml. Complete with stopper. Inquire for Gay-Lussac type SG bottles.		ASTM C188 AASHTO T 133
LeChatelier Specific Gravity Flask	SG-24	
Volumetric Flasks are calibrated to contain indicated capacity at 20°C when filled to mark. Supplied with plastic snap cap.		
Volumetric Flask 100ml	SG-100	ASTM D854
Volumetric Flask 250ml	SG-250	AASHTO T 100
Volumetric Flask 500ml	SG-500	
Volumetric Flask, 1,000ml	SG-1000	
Volumeters are precision machined cast aluminum and meet Pennsylvania PTM 715 and 716 for determining specific gravity of compacted bituminous mixtures. Treated for corrosion resistance and available in three sizes. Each has matching volumetric lid and is guaranteed for weight repeatability of ±0.2g at 77°F (25°C). Dimensions shown are inside dia. x depth, in inches (mm).		
Volumeter, 7.5x6 (191x152)	SG-30	PTM 715,
Volumeter, 7.5x4 (191x102)	SG-32	716
Volumeter, 5-3/8x3.5 (137x89)	SG-33	
Hubbard & Hubbard-Carmick Specific Gravity Bottles determine specific gravity of semi-solid bituminous materials, asphalt cements and soft tar pitches. Included stopper is concave on lower surface and has 1.6mm center hole for air evacuation. Hubbard bottle is 1.06x2.75in (27x70mm) Dia.xH with 24ml capacity. Conical Hubbard-Carmick bottle is 1.54x1.7in (39x43mm), Dia. (at bottom) xH (without stopper) with 25ml capacity.		ASTM D70 AASHTO T 43
Hubbard Specific Gravity Bottle	SG-62	
Hubbard-Carmick Specific Gravity Bottle	SG-63	

also available

The SGA-5R Vibro-Deairator automates the de-airing process. See our separate listing in this section.

SS-28 shown with SG-2

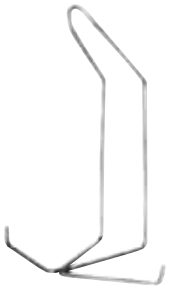
SG-70

GW-76, GW-75 & GW-74 shown with Stopper Fittings

SGA-105

WT-4B

MA-198



SGA-125

SGA-119

SPECIFIC GRAVITY ACCESSORIES

SPECIFIC GRAVITY ACCESSORIES		
Description	**Model**	**Test Method**
Vibra Pad can be used to assist with agitation of specific gravity specimens during deairing operations. It is specified by the Kentucky Transportation Cabinet for fine aggregate specific gravity testing. The plastic coated 5-1/4in (133mm) square platform has two wing nut fasteners and corner pillars with springs for holding flasks and pycnometers up to 6in (152mm) diameter in place.		KM 64-605
Vibra Pad, 115V, 50/60Hz	SS-28	
Vibra Pad, 230V, 50/60Hz	SS-28F	
Laboratory Air/Gas Dryer protects vacuum pumps from harmful moisture while deairing asphalt specific gravity (Rice test) specimens. Works for either vacuum or pressure applications. Water capacity is up to 50 grams. Molded polycarbonate column is sealed with a threaded cap, and stainless steel springs hold the included Drierite compound between two felt filters. Hose barbs accept 1/4in (6.4mm) or 3/8in (9.5mm) ID tubing. Recommended Flow Rate: 0.1scfm (200lph) at 90psi (6.2bar). Product Dimensions: 2.6x11.4in (67x289mm) Dia.xL.		-
Laboratory Air/Gas Dryer	SG-70	
Filter Flasks are thick-walled and have side tubulation for 3/8in (9.5mm) ID vacuum tubing. The 2 and 4L sizes are often used as pycnometers, and GW-76 4L Flask meets ASTM and AASHTO specifications for use as a vacuum container for weighing in air only. 1L flasks can be used in line with SGA-105 #4 Drierite granules as a moisture trap for vacuum pump protection. Neoprene stoppers have 3/8in (9.5mm) hole.		ASTM D2041 AASHTO T 209, T 283
1L Heavy Wall Flask	GW-74	
2L Heavy Wall Flask	GW-75	
4L Heavy Wall Flask	GW-76	
#8 Stopper for GW-74 Flask	GWA-1	
#9 Stopper for GW-75 Flask	GWA-2	
#12 Stopper for GW-76 Flask	GWA-3	
Indicating Drierite Granules rapidly absorb water vapor from air and gases. Blue desiccant crystals turn pink when exhausted and can be regenerated in an oven for longer life, or replaced as needed. Use #8 size for SG-70 Laboratory Air/Gas Dryer, and #4 size in GW-74 Filter Flasks.		-
#4 Indicating Drierite Granules, 5lb (2.3kg) Jar	SGA-105	
#8 Indicating Drierite Granules, 5lb (2.3kg) Jar	SGA-106	
Reinforced Vinyl Tubing has 3/8in (9.5mm) ID and will not collapse under vacuum. Priced per foot from bulk rolls.		-
Reinforced Vinyl Tubing, per foot	WT-4B	
Adjustable Hose Clamp has adjustment screw for accurate vacuum regulation in flexible tubing. Nickle-plated brass with pivoting lower jaw.		-
Adjustable Hose Clamp	MA-198	
Density Weighing Cradle holds standard Vacuum Pycnometer Canisters, Aggregate Density Baskets, Marshall or Gyratory Compaction Specimens, cores up to 6in (152mm) and other over-size specimens for suspension weighing. Fabricated of stainless steel, the *1-Hook* Cradle tilts back when an object is placed on it, and prevents loss of specimens when weighing. The SGA-125 weighs 308-grams. Product Dimensions: 10x6x12in (254x152x305mm).		ASTM C20, C127, C830, D1188, D2041, D2726 AASHTO T 85, T 166, T 209, T 275
Specific Gravity Cradle is formed from heavy stainless steel wire to hold various Marshall, Gyratory, or other material specimens for suspension weighing. Product Dimensions: 4x4x6.5in (102x102x655mm), WxDxH.		
1-Hook Density Weighing Cradle	SGA-125	
Specific Gravity Cradle	SGA-119	

MARSHALL STABILITY SYSTEMS
ASTM D4867, D5581, D6927;
AASHTO T 245, T 283

Outfit the Pro-Loader II and Marshall Stability Load Frames with selected components to design a custom system for your application. A complete selection of components is available to install on the motorized load frames for measuring, displaying, and recording load and flow of asphalt specimens. Systems can be configured for Marshall or Lottman testing of 4in (102mm) or 6in (152mm) samples. Data collection options range from manual recording using load rings and mechanical dial gauges to automatic recording from load cells, displacement transducers and a digital readout box connected to a user-supplied computer for load and flow data acquisition.

Both heavy-duty load frames have 10,000lbf (44.5kN) capacities and are housed in 14-gauge steel cabinets with a durable enamel finish. A 6-3/4in (171.5mm) diameter lower platen is included. Cross-head heights are quickly and accurately changed using the self-centering adjusting nuts. The 1-1/4in (31.8mm) diameter vertical threaded rods are plated for corrosion resistance. Flexible boots protect the precision loading screws from dust and dirt. Component sets for load and flow measurements are ordered separately.

MS-398 Pro-Loader II Load Frame is designed for versatility in multi-disciplined labs. Variable speed ranges from 0.02—2.0in (0.508—50.8mm) per minute allow running Marshall, Lottman, CBR, unconfined compression, soil-cement, and basic triaxial tests, all on a single unit. The 3/4hp DC motor and controller precisely control strain rates to ±1% of set point. Strain rates or loading rates are easily selected from the push button control panel with digital displays. Travel limit switches with indicating lights protect the unit from damage due to platen travel outside of its 3in (76mm) range. Daylight Opening: 11.9x17.3in (302x439mm), WxH. **Product Dimensions:** 18x29x54.5in (457x737x1,384mm), WxDxH.

MS-86 Marshall Stability Load Frame has similar design and construction features, but loading rate is fixed at the 2in (50.8mm) per minute, as specified for Marshall testing. The loading rate is maintained at ±1% by the 3/4hp DC motor and controller. Daylight Opening: 11.9x37.3in (302x947mm), WxH. **Product Dimensions:** 18x29x54.5in (457x737x1,384mm), WxDxH.

MSA-860 Marshall Stability Standard Component Set includes HM-430 10,000lbf Load Ring, MA-334 1x0.001in Dial Indicator, and HMA-339 Bracket for Dial Indicator or Displacement Transducer.

MSA-860D Marshall Stability Digital Component Set includes HM-430D 10,000lbf Load Cell, HM-740 2in Digital Displacement Transducer, HM-418 Two-Channel Digital Readout to display both load and flow measurements, and HMA-401 Bracket for Dial Indicator or Displacement Transducer. The Digital Component Set can be connected to a user-supplied computer, and transfers ASCE file formatted data.

GILSON COMPANY, INC.
Manufactured in cooperation with
KAROL•WARNER

MS-398 shown with MSA-860

MS-86 shown with MSA-860D, MS-26 and HMA-94

HMA-757 Marshall Test Data Acquisition Software can be used with the MSA-860D Component Set to collect, calculate, and report test results.

HMA-94 Rolling Load Frame Cart is sturdy bolted steel construction and positions load frames at the proper working height. Rugged casters allow convenient placement.

A complete selection of 4in and 6in Marshall and Lottman Breaking Heads, and a Tack Bond Shear Apparatus compatible with these load frames and stability component sets are available and ordered separately. Complete descriptions appear elsewhere in the Asphalt section.

alsoavailable

Components for CBR, Soil-Cement, Unconfined and Triaxial testing are available to increase the versatility of your MS-398 Pro-Loader II Load Frame. See listings in our Soils section.

PRO-LOADER & MARSHALL STABILITY SYSTEMS

Pro-Loader II Load Frame, 115V/60Hz	MS-398
230V/50Hz	MS-398F
Marshall Stability Load Frame, 115V/60Hz	MS-86
230V/50Hz	MS-86F

Accessories

Marshall Stability Standard Component Set	MSA-860
Marshall Stability Digital Component Set	MSA-860D
4in Marshall Breaking Head	MS-26
6in Marshall Breaking Head	MS-29
4in Lottman Breaking Head	MS-35
6in Lottman Breaking Head	MS-36
4in/6in Asphalt Tack Bond Shear Apparatus	MS-43
100mm/150mm Asphalt Tack Bond Shear Apparatus	MS-43F
Marshall Test Data Acquisition Software	HMA-757
Rolling Load Frame Cart	HMA-94

MARSHALL STABILITY TESTING ACCESSORIES


MSA-100


MSA-106


MSA-100M


MSA-106M


MSA-101B


MS-26


MS-29


MS-35

MARSHALL STABILITY TESTING ACCESSORIES			
Description	**Model**	**Size, in (mm)**	**ASTM/ AASHTO**
Compaction Mold Assemblies Complete Marshall Stability Compaction Molds are three-part assemblies consisting of mold, base plate, and collar constructed of sturdy, rust-resistant plated steel. 4in (102mm) or 6in (152mm) I.D. diameter molds are available for stationary or indexing Marshall Compactors as noted. Stationary molds are used with the MS-1 and MS-10 Marshall Compaction Hammers. Indexing molds are used with the MS-2, MS-3, MS-5 and MS-6 Marshall Compaction Hammers.			D5581 D6926/ T 245
4in Stationary Mold Assembly, Complete	MSA-100	4 (102)	
4in Indexing Mold Assembly, Complete	MSA-101	4 (102)	
6in Indexing Mold Assembly, Complete	MSA-106	6 (152)	
Compaction Mold Components Individual components for Marshall Stability Molds are available separately for more efficient sample processing or as economical replacements. Sturdy, rust-resistant plated steel. Mold, Collar, and Base components of 4in (102mm) diameter molds fit stationary or indexing Marshall Compactors as noted.			D5581 D6926/ T 245
4in Stationary Mold Only	MSA-100M	4 (102)	
4in Stationary Base Only	MSA-100B	4 (102)	
4in Indexing Mold Only	MSA-101M	4 (102)	
4in Indexing Base Only	MSA-101B	4 (102)	
4in Collar only, fits Stationary or Indexing Molds	MSA-100C	4 (102)	
6in Indexing Mold Only	MSA-106M	6 (152)	
6in Indexing Base Only	MSA-106B	6 (152)	
6in Collar only	MSA-106C	6 (152)	
Marshall Breaking Heads Fixtures have upper/lower segments to fit asphalt specimens. Segments are connected by two vertical guide rods. Sleeves on upper segment provide nonbinding movement.	MS-26 MS-29	4 (102) 6 (152)	D5581 D6927/ T 245
Lottman Breaking Head (Indirect Tensile IDT) These fixtures are used with conventional Marshall load frames to determine Indirect Tensile (IDT), (also known as Lottman) values of asphalt mixes. Each fixture consists of a base with upright guide rods and top with mating guide sleeves. The upper and lower stainless steel loading strips have concave contact surfaces. Available for 4in (102mm) or 6in (152mm) specimens.	MS-35 MS-36	4 (102) 6 (152)	D4867 D6931/ T 283
Semi-Circular Bend Test Fixture This fixture is used in a Marshall Stability Load Frame to determine the low-temperature fracture energy and toughness of asphalt mixtures with a maximum aggregate size of 19mm. The semicircular asphalt specimens are easily cut from SuperpaveTM Gyratory compacted cylinders or field cores with a diameter of 150 mm. The MS-45 SCB Test Fixture consists of a 1/2in (12.7mm) thick steel base plate, two L-shaped roller support steel blocks, two steel rollers, and a U-shaped frame. The test fixture is mounted in a Marshall Load Frame such as the MS-86 or MS-398 for loading. A specimen is positioned with the flat side on two rollers and a load is applied along the vertical diameter of the specimen. The load and displacement are measured to calculate test results. The loading fixture has Polytetrafluoroethylene strips to minimize friction. Initial roller position is maintained by soft springs and backstops, which establish the test span dimension. Product Dimensions: 7x7x7in (178x178x178mm).	MS-45	5 (150)	-

MARSHALL STABILITY TESTING ACCESSORIES

MSA-120

MS-25

MS-43

HM-514

MS-27

MARSHALL STABILITY TESTING ACCESSORIES			
Description	**Model**	**Size, in (mm)**	**ASTM/ AASHTO**
Circular Paper Discs Gilson Paper Discs are strong and tear-resistant, with smooth edges. Choose between the MSA-120 designed for both 4in and 100mm or the MSA-121 for 6in and 150mm Marshall and Gyratory Molds. The Discs are 0.0007-0.008in thick and made of 100lb paper stock.			D5581 D6926/ T 245
pkg. 1,000 pkg. 500	MSA-120 MSA-121	4 (102) 6 (152)	
Dial Flow Meters For manual measurement of flow in Marshall machines. Dial indicator with maximum position brake is attached to a sleeve for hand holding over guide rod of the Breaking Head during testing.			D5581 D6927/ T 245
Graduated 1in x 0.001in Graduated 25mm x 0.01mm	MS-25 MS-25F	— —	
Asphalt Tack Bond Shear Strength Apparatus This fixture is used in a Marshall Test Load Frame to measure shear strength of tack coat material between two asphalt layers. The heavy steel frame holds a fixed and a moveable shear plate. The moveable plate is centered over the shear plane, and features roller bearings to minimize drag. Lateral load on the specimen is controlled by a calibrated spring, and a dial indicator displays force. The shear plane gap is 0.5 inches (12.5mm), and maximum shear travel is also 0.5 inches (12.5 mm). Adapters are included for testing either 4in (102mm) or 6in (152mm) diameter cores. A version for 100mm or 150mm specimens is available as MS-43F. The Tack Coat Shear Strength Apparatus is compatible with Gilson load frames and most Marshall Load Frames with daylight openings of at least 10in (254mm). Product Dimensions: 9x22x9.5in (229x559x241mm).			—
Tack Bond Shear Strength Apparatus, 4in and 6in Tack Bond Shear Strength Apparatus, 100 and 150mm	MS-43 MS-43F	4/6 (102/152) 100/150	
Sample Ejectors HM-514 Ejector extracts specimens from 4in (102mm) asphalt or soil molds. HM-516 Combination Ejector extrudes either 4in or 6in (102 and 152mm) asphalt or soil samples. Accessories are available for 2, 2.5 or 3in (51, 64, or 76mm) diameter molds. These ejectors are 12,000lbf (53.4kN) manually-operated hydraulic jack frames.			D5581 D6926/ T 245
Sample Ejector, 4in Sample Ejector, Combination 4in & 6in	HM-514 HM-516	— —	
Budget Sample Ejector The MS-27 is a 3.95in (100mm) dia. x 0.5in (12.7mm) thick disc with a pedestal for specimen removal using a separate laboratory load frame.			D5581 D6926/ T 245
Budget Ejector, 4in	MS-27	—	

helpfulhint

For accuracy, reliability and convenience, the new generation of digital dial indicators, displacement transducers, load cells, and displays are hard to beat. They are easy to set-up and use, and their data output options simplify documentation in the lab.

MS-10 MS-1

MS-2 MS-6

MARSHALL COMPACTORS
ASTM D5581, D6926; AASHTO T 245; PTM 705

The Marshall System is widely used for design and control of asphalt paving mixtures. The resistance to plastic flow of compacted Marshall specimens is measured in terms of maximum load before failure. Normally, 4in (102mm) diameter specimens are suitable for mixes containing aggregates up to 1in (25.4mm), and 6in (152mm) diameter specimens are preferred for maximum aggregate sizes up to 1-1/2in (38.1mm). All automatic models operate on 115V/60Hz power supplies. Add "F" suffix to specify models for 230V/50Hz operation.

MARSHALL COMPACTORS	
Manual Marshall Compactor, allows manual compaction of a single 4in Marshall asphalt specimen in a stationary mold. Included is an oak pedestal, hammer support and guide rod, 10lb (4.5kg), diameter flat-face hammer, a MSA-100 4in mold, base and collar assembly, and a mold holder. **Product Dimensions:** 12x12x64in (305x305x1,626mm).	
Manual Marshall Compactor 4in Mold, Base & Collar Assembly	MS-10 MSA-100
Automatic Standard-Duty 4in Compactor compacts Marshall specimens in a stationary 4in (102mm) mold. Automatic counter is set to the specified number of blows and stops at completion. The unit includes an oak pedestal with steel plate, a 10lb (4.5kg) flat-face hammer, and a MSA-100 4in mold, base and collar assembly. **Product Dimensions:** 20x66x12in (508x1676x305mm), LxHxW.	
Automatic Standard Duty 4in Compactor Additional Hammer Assembly 4in Mold, Base & Collar Assembly	MS-1 MSA-111 MSA-100
Double or Triple Automatic Standard-Duty 4in Indexing Compactors compact two or three Marshall asphalt specimens simultaneously in indexing molds. The bevel-face hammers and indexing base plates produce a consistent kneading action during compaction. Larger oak pedestals with steel plates accommodate compacting of multiple specimens. A single motor and counter controls the number of blows on multiple specimens and shuts off at completion. 10lb (4.54kg) bevel-face hammers and MSA-101 4in mold, base, and collar assemblies are included. Product Dimensions for MS-2: 20x66x17in (508x1676x432mm), LxHxW. MS-3 is 20x66x20in (508x1676x508mm), LxHxW.	
Double Automatic Standard-Duty 4in Indexing Compactor Triple Automatic Standard-Duty 4in Indexing Compactor Additional Hammer Assembly 4in Mold, Base & Collar Assembly	MS-2 MS-3 MSA-112 MSA-101
Automatic Heavy-Duty Indexing 4in Compactor compacts one 4in Marshall specimen in an indexing mold. Heavy-duty frames reduce structural and mechanical wear and tear during operation. The bevel-face hammer and indexing base plate produce a consistent kneading action during compaction. Molds are secured with a cam-action lever assembly. An automatic counter shuts off the unit at completion of the compaction process. Oak pedestal with steel plate, 10lb (4.5kg) bevel-face hammer, and MSA-101 4in mold, base and collar assembly are included. The MS-5 Automatic Compactor converts to compact 6in Marshall specimens by adding the MSA-113 22.5lb (10.2kg) bevel-face hammer and MSA-106 6in mold. Product Dimensions: 20x66x12in (508x1,676x305mm), LxHxW.	
Automatic Heavy-Duty Indexing 4in Compactor Additional 4in Hammer Assembly 4in Mold, Base & Collar Assembly Hammer Assembly for 6in Conversion 6in Mold, Base & Collar Assembly	MS-5 MSA-114 MSA-101 MSA-113 MSA-106
Automatic Heavy-Duty Indexing 6in Compactor compacts one 6in Marshall specimen in an indexing mold. Heavy-duty frame reduces structural and mechanical wear and tear during operation. The bevel-face hammer and indexing base plate produce a consistent kneading action during compaction. Molds are secured with a cam-action lever assembly. An automatic counter shuts off the unit at completion of the compaction process. Oak pedestal with steel plate, 22.5lb (10.2kg) bevel-face hammer, and MSA-106 6in mold, base and collar assembly are included. The MS-6 Automatic Compactor converts to compact 4in specimens by adding the MSA-114 10lb (4.54 kg) bevel-face hammer and MSA-101 4in mold. Product Dimensions: 20x66x12in (508x1,676x305mm), LxHxW.	
Automatic Heavy-Duty Indexing 6in Compactor Additional 6in Hammer Assembly 6in Mold, Base & Collar Assembly Hammer Assembly for 4in Conversion 4in Mold, Base & Collar Assembly	MS-6 MSA-113 MSA-106 MSA-114 MSA-101

MARSHALL WATER BATHS
ASTM D5581, D6927; AASHTO T 245, T 283

MSA-130

MSA-131

MSA-125

MARSHALL STABILITY TESTING ACCESSORIES			
Description	**Model**	**Capacity**	**Tank Dimensions, in (mm), LxWxD**
Marshall Water Baths accept five 6in (152mm) or twelve 4in (102mm) diameter specimens. Precision electronic temperature controls regulate fluid temperatures from ambient to 350°F (177°C) to within ±1% of set point using Type K thermocouples. Digital display shows temperatures in °F or °C. Built-in variable speed magnetic stirrer assures even heat distribution and uniformity. The fully insulated baths include a perforated 14-gauge bottom support shelf to maintain 2in (51mm) water below specimens. An external drain valve. Sturdy, all-stainless steel construction with 14-gauge tanks and covers with 20-gauge cases. MSA-130S version is fitted with a gas strut-assisted cover and drip shield. Product Dimensions: 24.5x16.5x15in (622x419x381mm) WxDxH.		8.3gal (31.4L)	20x12x8in (508x305x203mm)
Marshall Water Bath, 120V/60Hz	MSA-130		
Marshall Water Bath, 220V/50-60Hz	MSA-130F		
Marshall Water Bath, 120V/60Hz	MSA-130S		
Marshall Water Bath, 220V/50-60Hz	MSA-130SF		
Large Marshall Water Bath holds nine 6in (152mm) or sixteen 4in (102mm) diameter specimens. Digital display shows temperatures in °F or °C, and precision electronic temperature controls regulate fluid temperatures from ambient to 350°F (177°C) to ±1% of set point. A built-in variable speed magnetic stirrer assures even heat distribution and uniformity. Long-lasting all-stainless steel construction features 14-gauge tank and cover and fully insulated 20-gauge cases with external drain valve. The perforated 14-gauge bottom support shelf assures 2in (51mm) water level below specimens. The cover has a built-in drip shield and operates on gas-assist struts for easy lifting. Product Dimensions: 24.5x24.5x17in (622x622x432mm), WxDxH.		17.3gal (65.5L)	20x20x10in (508x508x254mm)
Large Marshall Water Bath, 120V/60Hz	MSA-131		
Large Marshall Water Bath, 220V/50-60Hz	MSA-131F		
Budget Water Bath is an efficient, economical 1,440 Watt unit with 4.5gal (17L) capacity. An automatic thermostat controls temperature from 200°—500°F (93°—260°C). Specimens are supported above the bottom on a perforated stainless steel bottom shelf to permit circulation. This model does not strictly meet ASTM/AASHTO guidelines, but is often used in this application for non-specification testing. Product Dimensions: 23.5x15.5x13in (597x394x330mm), WxDxH.		4.5gal (17L)	17x12x4.8in (432x305x122mm)
Budget Water Bath, 115V/60Hz	MSA-125		
Budget Water Bath, 230V/50Hz	MSA-125F		

MA-66

MA-67

PORTABLE MIXERS

The portable Asphalt/Concrete Mixers are ideal for sample or small batch mixing in just about any setting. The enameled-steel mixer holds a utility bucket securely in place. As the bucket rotates at 60rpm, a stationary Mixing Paddle scrapes sides and bottom of the bucket to ensure thorough mixing. All 115V/60Hz mixers are supplied with a 1/2hp motor, On/Off switch, fuse protection, and an 8ft cord with three-prong plug. For 230V/50Hz mixer, add "F" to model number suffix. The 10 gallon "F" model is supplied with a 1hp motor.

MA-66 Light-Duty Stationary Mixer includes a removable 5gal Utility Bucket and Standard Mixing Paddle. A Deluxe Mixing Paddle with extra fins is available for heavy loads. MA-66 is powered by a constant speed motor and belt pulley. Other heavy-duty models are recommended for asphalt mixes. **Product Dimensions:** 12x18x24in (305x457x610mm), WxDxH.

MA-67 and MA-68 Heavy-Duty Portable Mixers use 5gal and 10gal Utility Buckets, respectively, and are equipped with 8in wheels for maximum mobility. By using a direct drive motor more power is generated for mixing. Mixing paddles not included. Gilson recommends MA-67 Mixer with either MAA-146 Paddle for asphalt or MAA-148 Paddle for concrete applications. The 5gal bucket can be preheated in ovens if necessary. Inquire for other available paddles. **Product Dimensions:** 24x21x35in (610x533x889mm), WxDxH.

PORTABLE MIXERS	
Light-Duty Stationary Mixer, 5gal	MA-66
Heavy-Duty Portable Mixer, 5gal	MA-67
Heavy-Duty Portable Mixer, 10gal	MA-68
Accessories	
Bucket & Cover	MAA-141
Replacement Paddle	MAA-142
Deluxe Paddle	MAA-143
Utility Bucket for MA-67, 5gal	MAA-144
Utility Bucket for MA-68, 10gal	MAA-145
Asphalt Paddle for MA-67, 5gal	MAA-146
Asphalt Paddle for MA-68, 10gal	MAA-147
Concrete Paddle for MA-67, 5gal	MAA-148
Concrete Paddle for MA-68, 10gal	MAA-149

MA-52

LABORATORY MIXERS
ASTM C109, C227, C305; AASHTO T 106, T 162

Industrial-grade Laboratory Mixers have planetary action for thorough mixing, and blending of materials. Direct gear drives and heavy-duty motors assure constant mixing speeds under load. Locking hand-lever raises and lowers bowl. All mixers are supplied with stainless steel bowl, wire whip, dough hook, and aluminum flat beater. MA-52 and MA-52X include an additional stainless steel flat beater and other modifications to meet ASTM and AASHTO specifications. Add “F” suffix to any mixer or heating adapter model number for similar unit that operates on 230V/50Hz power supply.

MA-52 Laboratory Mixer has 5qt (4.7L) capacity and a 1/6hp motor with selectable operating speeds of 139, 285 and 591rpm. Additional heavy-duty Stainless Steel Flat Beater is included, as well as a 6ft (1.8m) power cord. The MAA-30A Clearance Adjustment Bracket can be purchased separately to meet requirements of ASTM C305, C227 and C109. MAA-31 Acrylic Bowl Lid is also available for all 5qt (4.7L) bowls.

MA-52X Laboratory Mixer has the same specifications as MA-52, but has been modified with a MAA-30A Clearance Bracket to meet the requirements of ASTM C305, C227 and C109 (AASHTO T 162 and T 106) and certain other tests for mortar and cement. **Product Dimensions:** 10.5x15x17in (267x381x432mm).

MA-54A Laboratory Mixer is a 12qt (11.4L) capacity benchtop mixer for larger batch requirements. This unit is supplied with a 1/2hp motor for selectable mixing speeds of 107, 198 and 365rpm. A 6ft (1.8m) power cord is included. **Product Dimensions:** 19x23x29in (483x580x750mm), WxDxH.

Heating Adapter Kits maintain elevated temperatures when preparing hot-mix asphalt specimens in Laboratory Mixers. Heating mantles mount under mixing bowls with hook and loop fasteners. Electronic proportional controller with built-in circuit breaker attaches with a twist-lock connector on 4ft (1.2m) cable.

LABORATORY MIXERS	
5qt Laboratory Mixer, 115V/60Hz	MA-52
5qt Laboratory Mixer for ASTM C 305 and C 109, 115V/60Hz	MA-52X
12qt Laboratory Mixer, 115V/60Hz	MA-54A
Accessories	
Wire Whip for MA-52	MAA-260
Heavy-Duty Stainless Steel Flat Beater for MA-52	MAA-266
Bowl for MA-52	MAA-32
Bowl for MA-54A	MAA-34A
Clearance Adjustment Bracket for MA-52	MAA-30A
Heating Adapter for MA-52, 250 Watts	MAA-28[1]
Heating Adapter for MA-54A, 600 Watts	MAA-64[1]

[1]Add "F" to model number to order Mixers or Heating Adapters to operate on 230V/50Hz electrical supplies.

HM-807

HM-750R

GILSON CENTRIFUGE EXTRACTORS
ASTM D2172; AASHTO T 164

- **Electrical braking system.**
- **1,500 or 3,000g sample capacities.**
- **Explosion-Proof motors available.**

Gilson's popular Centrifuge Extractors provide efficient and reliable quantitative determinations of bitumen content in hot-mix asphalt specimens. Models conforming to explosion-proof requirements are available with 1,500 or 3,000g capacities. A standard version with 1,500g capacity is also offered. All models offer safe, simple operation and long service life.

For each model, the precision machined and balanced inner aluminum bowl assembly quickly lifts out of the sealed housing for efficient specimen handling. Rotation speeds up to 3,600rpm are easily set using the speed control knob. The built-in electric brake stops the centrifuge in seconds when extraction is complete. The heavy cast aluminum outer cover latches securely in place and features an integral solvent dispensing cup. Paper filter rings prevent loss of fines during processing.

All models are powered by a reliable 1/8hp DC motor equipped with an electrical braking system. Extra centrifuge bowl assemblies may be ordered for faster sample processing. HMA-263 1,500g capacity Bowls may also be used on HM-807 3,000g Extractors. Twenty-five paper Filter Rings are included. 1,500g models use rings 9.75in diameter with 2.5in center holes. 3,000g model rings are 11.63in diameter with 2.5in diameter holes. **Product Dimensions for 1,500g units:** 12x20x22in (305x508x559mm), WxDxH. **Product Dimensions for 3,000g units:** 14x20x22in (356x508x559mm).

GILSON CENTRIFUGE EXTRACTORS	
1,500g Standard Extractor, 120V/60Hz	HM-808
230V/50Hz	HM-808F
1,500g Explosion-Proof Extractor, 120V/60Hz	HM-806
230V/50Hz	HM-806F
3,000g Explosion-Proof Extractor, 120V/60Hz	HM-807
230V/50Hz	HM-807F
Accessories	
Bowl for 1,500g Models	HMA-263
Bowl for 3,000g Models	HMA-264
Filter Rings for 1,500g Models, pkg. 100, 9.75 x 2.5in	HMA-265
Filter Rings for 3,000g Models, pkg. 100, 11.63 x 2.5in	HMA-266

FILTERLESS CENTRIFUGE
ASTM D1856; AASHTO T 164, T 170

The American-made Continuous-Flow Filterless Centrifuge is effective for recovery of mineral filler fines from bitumen-laden nonflammable solvents from asphalt mix extraction tests. Analysis is simplified and accuracy is improved by eliminating the filter. Solvent suspension is fed through a top funnel into a special 526ml, 7x2.5in (178x64mm) HxI.D. aluminum beaker (included) rotating at 11,000rpm. Under high centrifugal force, the liquid moves up the beaker wall and out through the overflow tubing while solids remain for easy removal. Continuous feeding is possible until the solids-retaining capacity of the beaker is reached.

No.18 (1mm) and No.200 (75µm) sieves are included for fitting to the top of the inlet funnel if desired. A No.230 (63µm) sieve may be substituted for the No.200; please specify. When using the sieves, the extraction process can be run by pre-dissolving the mix sample with solvent, then pouring into the sieves.

Rotating spindle and electric motor of the centrifuge are enclosed in a sturdy cast aluminum case. Two aluminum beakers are included with each unit. **Product Dimensions:** 20x15x33in (508x380x840mm), WxDxH.

FILTERLESS CENTRIFUGE	
Filterless Centrifuge, 115V/60Hz	HM-750R
230V/50Hz	HM-750RF
Accessories	
Aluminum Beaker	HMA-308R

HM-8

HMA-54

HMA-56

HM-15

VACUUM EXTRACTOR
ASTM D2172; AASHTO T 164

- **Includes fitted vacuum gauge.**
- **Extractor tank has two sight-glass gauges and drain valve.**
- **Aluminum funnel ring.**
- **Quick-action wing fasteners between funnel and base.**

Gilson HM-8 Vacuum Extractor with 3,000g capacity has superior design features for quantitative determination of bitumen in hot-mixed paving mixtures using the vacuum method. Extractor base is a 16in (407mm) dia. x 8in (203mm) high painted aluminum extract collection tank with carrying handles, a gauge-fitted vacuum source connection, and an extract drain valve. Two sight-glass gauges are provided to monitor solvent level and color of extract during extraction. A 12.25x4.5in (311x114mm), IDxH removable funnel ring clamps filter paper and a perforated aluminum support plate to base with a Viton O-Ring seal. Sample and solvent are placed on paper inside the ring.

Improved design features anodized aluminum funnel ring for protection from corrosive solvents. Quick-action wing bolt fasteners between ring and base have no exposed threads to damage. Filter paper support plate has disk spacers to prevent collapse under vacuum.

HM-8 Vacuum Extractor includes Vacuum Gauge, 25 Filter Papers, Filter Support, O-Ring Seal, 4ft (1.2m) Vacuum Hose Connection, and instructions. For best results Gilson recommends using biodegradable terpene-based solvents and HMA-54-2 filter papers. Both the HMA-54 and HMA-54-2 are sold in packages of 100. Vacuum source is required; order vacuum pumps separately. The HMA-56, 4lb carton of Diatomaceous Silica Filtering Aid for slow filtering samples is sufficient for 36 tests.

VACUUM EXTRACTOR	
Vacuum Extractor	HM-8
Accessories	
Filter Paper, Grade 613	HMA-54
Filter Paper Terpene Solvents, Grade 627	HMA-54-2
Viton O-Ring Seal	HMA-55V
Diatomaceous Silica Filter, 4lb carton	HMA-56
Diatomaceous Silica Filter, 50lb bag	HMA-56B

BASIC VACUUM EXTRACTOR
ASTM D2172; AASHTO T 164

- **Uses GW-76 Filter Flask for solvent collection.**
- **Aluminum funnel ring.**
- **Vacuum Hoses and Stoppers available separately.**

Basic Vacuum Extractor has a 12.25x4.5in (311x114mm), IDxH aluminum funnel ring, perforated stainless steel filter support, and an O-Ring seal, supported by three legs. Instead of a solvent collection tank, the assembly uses a vacuum filter flask such as GW-76. The Hose and Stopper Assembly has a 6ft (1.8m) rubber vacuum hose to fit to the 3/8in (9.5mm) OD drain connection, and a No.12 neoprene stopper with glass tubing to fit GW-76. Order Filter Flask, Hose and Stopper Assembly, Diatomaceous Silica Filter Aid, Filter Paper, and Vacuum Pump separately. Side tubulation on GW-76 flask is 3/8in (10mm), OD.

BASIC VACCUM EXTRACTOR	
Basic Vacuum Extractor	HM-15
Accessories	
4L Filter Flask	GW-76
Hose & Stopper Assembly	HMA-58
Filter Paper, Grade 613	HMA-54
Filter Paper Terpene Solvents, Grade 627	HMA-54-2
Viton O-Ring Seal	HMA-55V
Diatomaceous Silica Filter, 4lb carton	HMA-56
Diatomaceous Silica Filter, 50lb bag	HMA-56B

technote

FILTER PAPER SELECTION GUIDE

Model	Outside Dia. in (cm)	Hole Dia. in (cm)	Grade	Flow Rate ml/min	Filter Speed	Micron Retention
HMA-265	9.75 (24.8)	2.5 (6.4)	923	200	Fast	20
HMA-266	11.75 (29.8)	2.5 (6.4)	923	200	Fast	20
HMA-34	10 (25.4)	5 (12.7)	627	85	Medium	4
HMA-44	12.25 (31.1)	5 (12.7)	627	85	Medium	4
HMA-44B	12.25 (31.1)	5 (12.7)	904	70	Medium	2
HMA-54-2	13 (33)	_	627	85	Medium	4
HMA-54-5	13 (33)	_	633	435	Fast	31
HMA-64-1	15.7 (40)	_	617	360	Fast	6
HMA-54	13 (33)	_	613	60	Medium	6

HM-124E

HM-6 HM-5

HM-56

ASPHALT EXTRACTION SOLVENTS

Gilson asphalt extraction solvents are available in 5gal (18.9L) Pails with Est. Ship Wt. of 40lb (18kg), or 55gal (208L) Drums with Est. Ship Wt. of 440lb (200kg).

Excel Clean HD and Hisol Plus both contain 100% natural orange and citrus terpenes. They are nontoxic, biodegradable, ozone-friendly, and rinse freely with no clumping. Not for use with reflux or other heated methods, but ideal for use in vacuum extractors or centrifuges for gradations. Flash point is 125°F for Excel Clean HD and 145°F for Hisol Plus.

Power-Solv contains citrus terpenes and petroleum solvent, is non-rinsable, and can be used in vacuum extractors or centrifuges for gradations only. Flash point is 115°F.

ASPHALT EXTRACTION SOLVENTS

Description	Flash Point	Model
Excel Clean HD, 5gal Pail	125°F	HM-124E
Excel Clean HD, 55gal Drum	125°F	HM-125E
Hisol Plus, 5gal Pail	145°F	HM-124H
Hisol Plus, 55gal Drum	145°F	HM-125H
Power-Solv, 5gal Pail	115°F	HM-124P
Power-Solv, 55gal Drum	115°F	HM-125P

REFLUX EXTRACTORS
ASTM D2172; AASHTO T 164

Reflux extraction is the least expensive method for determining asphalt content in bituminous concrete mixtures. Solvent vapor generated by hot plate passes around and through sample contained in two wire mesh cones lined with filter paper. Reflux solvent from the water-cooled condenser percolates through the sample repeatedly until the bitumen is extracted.

Extractors are offered in nominal capacities of 1,000g and 2,000g. Models HM-5 and HM-6 include Hot Plate, Extraction Jar, two interlocking wire mesh Cones with bail handles, copper Condenser with water inlet/outlet tubes, Filter Paper, and instructions. Model HM-5 has 6in (152mm) diameter jar and 6in (152mm) hot plate; Model HM-6 has 8-3/4in (222mm) diameter jar and 9in (228mm) hot plate. Both jars are 18in (457mm) high with ground tops for tight condenser fit. Included insulating pad is used for protection next to hot plate surface. HMA-54 and HMA-64 Grade 613 Filter Papers are supplied in packages of 100. See Hot Plates listed elsewhere.

REFLUX EXTRACTORS

1,000g Reflux Extractor, 115V, 50/60Hz . . HM-5
230V, 50/60Hz . . HM-5F
2,000g Reflux Extractor, 115V, 50/60Hz . . HM-6
230V, 50/60Hz . . HM-6F

Accessories

Extraction Jar for HM-5 . . . . . HMA-51
Extraction Jar for HM-6 . . . . . HMA-61
Wire Mesh Cone Set for HM-5 . . . . . HMA-52
Wire Mesh Cone Set for HM-6 . . . . . HMA-62
Condenser for HM-5 . . . . . HMA-53
Condenser for HM-6 . . . . . HMA-63
1,000g Filter Paper for HM-5, pkg 100 . . . HMA-54
2,000g Filter Paper for HM-6, pkg 50 . . . . HMA-64-1
Insulating Pad HM-5-1

DRAINDOWN BASKETS
ASTM D6390; AASHTO T 305

The draindown test for uncompacted bituminous mixes measures the amount of asphalt binder that separates from a sample held at the elevated temperatures encountered in production, transport and placement. The test is particularly applicable to stone matrix asphalt (SMA) or open-graded porous asphalt mixtures. The sample is placed in the special Draindown Basket in a forced-air oven on a pre-weighed paper plate for one hour. The amount of draindown is measured as that portion that separates itself from the sample and is deposited onto the plate outside the basket. Paper plates should be obtained locally.

ASTM E11 quality stainless steel mesh is used for HM-56 1/4in (6.3mm), HM-56A No.8 (2.36mm), and No.16 (1.18mm) baskets. Each measure 4.25x5.5in (108x140mm), Dia.xH and have a 1in (25mm) bottom skirt. A convenient bail-type handle is provided.

DRAINDOWN BASKETS

Draindown Basket, 1/4in Mesh..... HM-56
Draindown Basket, No.8 Mesh..... HM-56A
Draindown Basket, No.16 Mesh..... HM-56B


SP-55


SPA-22 shown with SPA-23 and SPA-24


SPA-21


HMA-68

GILSON QUARTERMASTER® ASPHALT SAMPLE DIVIDER
ASTM PENDING; AASHTO R 47

- **Quickly and safely divides bulk asphalt samples for testing.**
- **Rugged construction designed for use in the field.**
- **Streamline sample handling with Bucket-Liner sample bags.**
- **Proven history of accurate performance.**

Gilson's patented SP-55 Quartermaster® quickly and accurately divides the large bulk samples required in Superpave® specifications for quality control analysis. Hot-mix asphalt samples of 120lb (55kg) or more are easily reduced, ensuring representative samples for consistent laboratory results. The large hopper reduces handling of hot material during preparation of laboratory specimens. Quartermaster® has a proven history of significantly reducing bias in sample reduction.

Once a bulk hot-mix asphalt sample is loaded evenly into the hopper, the handle is released and the sample falls through the divider, to be distributed equally into the four included galvanized steel containers. SPA-22 Bucket-Liner Sample Bags simplify collection and handling of divided specimens and eliminate cleaning of the sample containers. One person can easily collect and secure samples. Fabric and thread of the sturdy cotton Bucket-Liner bags are temperature-rated to 400°F (204°C). Double loop Wire Ties and Wire Tie Twister allows bag openings to be quickly and securely closed. Only occasional clean-up is required to prevent buildup on the exposed splitting surfaces.

Rugged two-part steel construction stands up to field conditions and allows portability between jobsites. The SPA-21 Quick-Funnel Hopper Insert (purchased separately), drops into the top of the Quartermaster to significantly reduce hopper volume and allow accurate reduction of smaller samples. Four Galvanized Steel Sample Containers are included. Extras can be ordered to increase sample handling efficiency. Four Bucket-Liner Sample Bags are also included. Order extras as SPA-22 in quantities of ten. SPA-23 8in Double-Loop 16 gauge Wire Ties securely close bag openings when used with the SPA-24 Wire Twister. HMA-68 Material Handling Chute allows fast loading of hopper. **Product Dimensions:** 14x17x48in (356x432x1,219mm), WxDxH.

GILSON QUARTERMASTER® ASPHALT SAMPLE DIVIDER	
Gilson Quartermaster® Asphalt Sample Divider	SP-55
Accessories	
Quick-Funnel Insert	SPA-21
Bucket-Liner Sample Bags, qty. of 10	SPA-22
Bucket-Liner Sample Bags, qty. of 100	SPA-22C
Bucket-Liner Sample Bags, qty. of 1,000	SPA-22K
8in Double-Loop Wire Ties, qty. of 50	SPA-23
Wire Tie Twister w/Plastic Grip	SPA-24
Galvanized Steel Sample Containers	MA-950
Material Handling Chute	HMA-68

MATERIAL HANDLING CHUTE

- **Fills large Gyratory compaction molds in a single lift.**
- **Makes handling of hot-mix asphalt samples safe and efficient.**
- **Works equally well for aggregate and soil samples.**
- **Stable for use as a weighing scoop.**

HMA-68 Material Handling Chute is an all-purpose chute that allows loading, filling, and handling of any bulk material, including Asphalt, Aggregates, and Soils. It quickly and uniformly fills Gyratory, Marshall, Proctor, CBR, Relative Density molds, Quartermaster® or Universal splitters. The Handling Chute conforms to mold loading procedures in ASTM D4013 and AASHTO T 312.

The flat bottom and integral feet make weighing convenient. The two sturdy aluminum bar handles reinforce the unit and enable balanced handling for easy and accurate placment of sample materials. Material Handling Chute is constructed of 24-gauge stainless steel with rolled edges. The open end is formed with a 2in (51mm) radius to fit most mold openings. The unit stands horizontally or vertically. **Product Dimensions:** 22x11.5x10.5 (559x292x267mm).

MATERIAL HANDLING CHUTE	
Material Handling Chute	HMA-68

helpfulhint

Gilson's Material Handling Chute is the easiest way to handle bulk samples of aggregate, asphalt or soils.

HM-378

HMA-69

HMA-813

GILSON BINDER IGNITION SYSTEM
ASTM D6307; AASHTO T 308

Gilson's Binder Ignition System meets applicable ASTM and AASHTO standards, and offers true simplicity in a manually operated unit. Process times are comparable to automatic-weighing units, and extensive testing has proven that results equal or exceed the accuracy of automated systems. Standard 1,200—1,800g samples are processed in as little as 30—45 minutes. Larger samples up to 3,000g or more require longer times.

During a binder ignition test, an asphalt sample is heated until the binder portion ignites. Temperature in the main chamber rises substantially above setpoint, peaks, then gradually returns to setpoint as coke-type residual products are burned off. This decoking period is based on user experience with similar mixes or specification requirements. When determining the decoking period to program for a new mix, the sample is merely returned to the furnace for additional 5—10 minute periods until completion is confirmed by stable total weight.

As the asphalt ignites and burns, volatilized components of the binder are carried by the exhaust stream into the high-temperature afterburner chamber, where they are completely oxidized. Large amounts of room air are drawn in to quickly cool the exhaust for safe discharge to the outside. Any remaining particulate matter is captured in the disposable in-line filter. The Furnace remains locked during operation until a safe temperature is reached during the cool-down period.

The easy to operate controller features large, bright display and a sturdy membrane keypad. Operating temperatures, times, setpoints, and menu functions are displayed. The controller has memory capacity for up to ten timed programs with selected chamber and afterburner time and temperature setpoints. A pre-set function allows starting of the furnace at a specific time of day, so there is no lost time waiting for warm-up. The controller is dual-purpose and can also be used for custom ramp-hold programs with multiple ramps and dwells for glassware cleaning or other applications. The stainless steel case has a drop door to serve as a shelf for ease of sample tray handling. Heating elements are quality Kanthal A-1 and easily accessible for inexpensive replacement as necessary.

The Binder Ignition System includes two Sample Baskets, a Basket Cover, Sample Tray and Tray-Handling fork, two ceramic Hearth Plates, Exhaust Filter and Filter Holder for more efficient sample processing. Extra sets of sample tray, basket and cover may be ordered as HMA-69. SE-31 Heat Resistant Gloves are purchased separately and are highly recommended safety items. The HMA-810 all-steel Furnace Support Stand allows safe positioning of the furnace in the lab. Available HMA-813 Sample Cooling Cage protects personnel from hot surfaces as sample is cooling. HMA-814 Exhaust Vent Kit is easy to install for routing warm exhaust gases to the outside. A reliable bench scale of 12kg capacity or more, readable to 0.1g is required; Gilson recommends our AD-12KA, listed separately.

The furnace ships configured to operate on 240V/60Hz, single phase power supplies, and a NEMA 6-50 Cord Set is supplied. It is easily converted during installation to operate on a number of different single or three phase electrical supplies, from 208—380V at 50 or 60Hz, with current draw ranging from 16—45 amps. Sample Chamber Dimensions: 21x21x9in (533x533x229mm). **Product Dimensions:** 43x30x43in (1,092x762x1,092mm), WxDxH.

GILSON BINDER IGNITION SYSTEM	
Gilson Binder Ignition System	HM-378
Accessories	
Replacement Filters, box of 12	HMA-812
Sample Tray, Screen & Lid Set	HMA-69
Furnace Support Stand	HMA-810
Sample Cooling Cage	HMA-813
Exhaust Vent Kit	HMA-814
Heat Resistant Gloves	SE-31
Recommended Scale (12kg x 0.1g)	AD-12KA

: PRODUCT SPOTLIGHT :::::::::::::

GILSON BINDER IGNITION SYSTEM

Optional Wiring Configurations:

Electrical	kW	(amps)
240V, 1 phase, 50/60Hz	10.8	(45)
208V, 1 phase, 50/60Hz	8.1	(39)
240V, 3 phase, 50/60Hz	10.8	(34.6)
208V, 3 phase, 50/60Hz	8.1	(29.9)
380V, 3 phase, 50/60Hz	7.5	(16)

THERMOLYNE® NCAT ASPHALT CONTENT FURNACE
ASTM D6307; AASHTO T 308

Asphalt binder ignition testing is an environmentally friendly and cost effective test method to determine asphalt content of paving mixtures and ensure high quality asphalt product. The ignition method reduces testing time when compared to solvent extraction. A 1,200—1,800g sample of asphalt can be tested in 30—45 minutes with the NCAT Furnace. The unit can accommodate samples up to 5,000g at extended testing times. The method also eliminates the cost of solvent, the secondary cost of solvent disposal and safety concerns when handling solvent in the lab.

The NCAT Asphalt Furnace has an internal electronic balance automatically monitoring the sample weight throughout the ignition process, saving valuable technician time and increasing productivity in the lab. Simply enter the sample weight and calibration factor for your particular mix design, place the sample in the furnace chamber and press "start." When the test cycle is complete, the system automatically ends the test and prints the results. A periodic "beep" alerts the technician that the test has ended. Pressing "stop" unlocks the chamber door and the sample can be removed and allowed to cool for gradation analysis.

NCAT Furnace software allows selection of automatic or manual test modes. In the automatic mode, the software ends the test when the endpoint is detected, prints out the results and "beeps." It continues to beep until "stop" is pressed to unlock the door. In the manual mode, the unit "beeps" when the endpoint is detected, but continues to test until "stop" is pressed, unlocking the door and printing the results. Positive or negative correction factors can be entered to correct for unique mix characteristics. Weight change due to sample and basket assembly temperature change is automatically compensated for each sample tested. The automatically detected endpoint of the test cycle is reached when weight loss from the sample is less than a user-established setpoint between 0.01% and 0.5% for three consecutive readings. Test results are computed as asphalt content per total weight of HMA sample or bitumen ratio per weight of dry aggregate to an accuracy of ±0.11%.

The furnace is pre-heated to a setpoint temperature within the range of 450°—650°C (842°—1,202°F). The default setting is 538°C (1,000°F). The hot-mix asphalt sample is weighed and divided into two screened baskets on a tray assembly. This complete assembly is placed in the chamber on the furnace hearth tray. Once the door is closed and the test initiated, the door remains locked until completion. During ignition and burn-out, released volatiles are further oxidized in a high-temperature afterburner with a patented ceramic filter heated to 750°C (1,382°F). This system has been shown to reduce process emissions by up to 95%.

AP-20 shown with APA-31

The furnace controller 24 hour/7 day timing function can be programmed to preheat the furnace to any time set by the operator. A secure, automatic door-locking system provides operator safety and insures test integrity during critical burn-off times. The modular, refractory embedded heating elements provide extended service life and easy, inexpensive replacement. An RS-232 port provides data interface with a personal computer for graphical data analysis.

Included with the NCAT furnace are the Electronic Balance, Hearth Tray, six replacement Fuses and an operation manual. The APA-25 Starter Kit is required and includes two Sample Basket Assemblies, Transport Handle, Aluminum Cool Down Plate, Cool Down Safety Cage, four rolls of Printer Paper, Basket Brush, and Motor Lubricant. For increased safety, the kit includes Head Gear with Face Shield, and Heat Resistant Gloves. Order additional APA-31 Sample Basket Assemblies, for quicker sample preparation and more sample throughput.

Chamber Dimensions for all units: 14x14x14in (35.5x35.5x35.5mm), WxDxH. NCAT Furnaces are not supplied with power cords and must be hard-wired directly to a suitable electrical supply or supplied with a cord and plug by the user. **Product Dimensions:** 21.75x26.63x40.5in (54.3x65.1x102.9mm), WxDxH.

THERMOLYNE® NCAT ASPHALT CONTENT FURNACE	
NCAT Asphalt Content Furnace, 240V/60Hz, 1 phase, 20/27 amp	AP-20
NCAT Asphalt Content Furnace, 208V/60Hz, 1 phase, 28 amp	AP-20L
NCAT Asphalt Content Furnace CE-Marked, 220-240V/50-60Hz, 1 phase, 20/27 amp	AP-20F
Accessories	
NCAT Furnace Starter Kit (Required)	APA-25
Sample Basket Assemblies	APA-31
Transport Handle	APA-32
Cooldown Plate	APA-33
Cooldown Safety Cage	APA-34
Printer Paper	APA-35
Stainless Steel Exhaust Tubing, 3in x 10ft (76mm x 3m)	APA-36
Heat Resistant Gloves	SE-31

MCA-4

HMA-118

MC-60

HVEEM-N-BEAM TESTER

ASTM C78, C109, C293, D1560, D1561, D2844; AASHTO T 97, T 106, T 177, T 190, T 246, T 247; CALIFORNIA 301, 366

- **Designed for Hveem testing of asphalt samples, R-Value testing of soil samples, and flexural testing of concrete beams.**
- **Useful for a variety of mid-range compression testing.**
- **Digital controller has memory for 1,000 tests and downloads to printer or PC.**
- **60,000lbf capacity.**

Gilson's versatile mid-range 60,000lbf (267kN) digital compression tester is suited for a variety of tests, but it is specially designed for Hveem asphalt stability testing, R-Value testing of soil samples, or (with attachments) recorded flexural testing of 6x6in (152x152mm) concrete beams. A test set for 2in (51mm) cube testing is also available, and sets for other applications can be offered on request.

The display shows live load, peak load, peak stress, and load rate with 0.5% accuracy from 1%—100% of capacity in 0.44in digits. Load may be displayed in lbf, N, or kgf, and memory is provided for up to 1,000 tests. RS-232 interface allows transfer of data to PC, or direct print-outs can be made using the MCA-26 Printer Accessory. The 2.5in (64mm) working stroke hydraulic ram has control positions for rapid advance, metered advance at constant loading rate, hold, and retract. The two-stage hydraulic system is powered by a 1/2hp motor, and safety features limit pressure within load frame capacity, protect against piston overextension, and guard against flying specimen fragments. The rigid one-piece solid steel load frame is supplied with an 8in (203mm) diameter 1in (25mm) thick hardened steel lower platen and a 6.5in (165mm) diameter spherically-seated upper platen. Both are plated and scribed with concentric circles. A support stand is included.

The MC-60 is set up for Hveem and R-Value testing as supplied. Upper platen shim locks are included to eliminate swivel for mold compaction. The unit has a special Hveem valve that is manually activated to drop to 1,000lbf and automatically hold there within ±20lbf as necessary in the test procedure. The 14in (356mm) wide and 21.5in (546mm) high (16in high with platens) daylight openings and included support stand are designed to permit easy placement and use of the Hveem stabilometer. HMA-118 R-Value Molds are plated steel and meet specification requirements with prescribed inside finish. Inquire regarding Stabilometer, HMA-891 Moisture Exudiation Indicator, and other Hveem testing accessories. A Digital Travel Rate Indicator is available, please inquire.

The MCA-4 Flexural Attachment and MCA-15 Spacer are required for testing 6x6in (152x152mm) beams of 12—30in (305—762mm) span in either center or third-point loading. A special included software provision allows instantaneous direct plotting of Modulus of Rupture (MOR) in lbf/in^2 vs. time when the MCA-26 Printer Accessory is attached. The plot is automatically scaled to fit 8.5x11in plain paper, and the peak MOR is printed on the plot to ±0.5% machine accuracy along with specimen and operator IDs, test date, and time.

The versatile MC-60 can be adapted to suit a variety of other mid-range test procedures. A 2in (51mm) Cube Test Set is available as MCA-6. Inquire for other possible applications including compressive strength of 6x12in soil cement cylinders, 3x6in grout or concrete cylinders, and for molding and strength of 2in, 3in, or 4in diameter bituminous concrete specimens. **Product Dimensions:** 31.8x17x61in (806x432x1549mm), WxDxH.

HVEEM-N-BEAM TESTER	
Hveem-N-Beam Tester, 115V, 50/60Hz	MC-60
230V, 50/60Hz	MC-60F
Accessories	
Concrete Beam Flexural Attachment[1]	MCA-4
2in Cube Test Set	MCA-6
Spacer, 4in (102mm) thick	MCA-14
Spacer, 4in (102mm) thick, for use with MCA-4	MCA-15
Printer Accessory	MCA-26
R-Value Mold, 4" D x 5" H	HMA-118

[1] MCA-15 required for use with MC-60.

helpfulhint

Gilson's exclusive Hveem-n-Beam Tester is designed for multiple applications in laboratories that routinely test both asphalt and concrete products.

Accuracy is ±0.5% from 600 _ 60,000lbf. (2.7 _ 267kN), making the MC-60 a versatile machine for many types of tests.

HM-685

technote

In Superpave™ mix design, an asphalt specimen is compacted in the cylindrical mold of a Gyratory Compactor by applying of a load against the end platens. During compaction,The mold is gyrated on its longitudinal axis at a fixed angle while the end platens are held parallel. Sample height is automatically measured, and density and void content continuously calculated during compaction.

SUPERPAVE™ GYRATORY COMPACTOR
ASTM D6925; AASHTO T 312

The Superpave™ Gyratory Compactor is made in the USA by Pine Instruments and meets all Superpave requirements for preparation of hot mix asphalt specimens. User-controlled variable settings for compaction pressure, angle adjustment, gyrations, and adaptability for different size molds make this reliable unit versatile to test a wide range of materials and applications. An integrated computer with two USB ports and an Ethernet jack controls settings through a simple menu interface, and a four-button control panel simplifies machine operation. The computer also controls the angle of gyration and allows the user to switch between internal and external angle settings with little effort. The control system is network compatible for complete data management. Number and angle of gyrations, specimen height, and consolidation pressure can be sent through an Ethernet cable to a network or to a standalone PC, stored on a flash drive, or printed directly with the optional HMA-626 PCL Laser Printer.

Operation modes can be set to a specified number of gyrations, specified sample height, or a locking point, all at a selected internal or external angle. Total gyrations can be selected from 0 to 999 at 30 ±0.5 gyrations per minute and 0° to 1.50° internal or external angle, with compaction pressure selectable from 200 to 999kPa. Final specimen height is user-controlled from 0 to 210mm. A built-in specimen extruder and a completely enclosed compacting chamber are convenience and safety features, minimizing lifting of hot, heavy molds, and shielding moving parts. Molds are available in for 150mm, 100mm, or 4.0in diameter specimens. The HM-685 can also be used for the compaction of soils, emulsion-based mixes, and roller compacted concrete by providing protective covers over sensitive components.

The HM-685 is equipped for 150mm diameter specimen sizes, but can be configured to use 100mm or 4.0in molds with the optional Conversion Kits. Precision machined stainless steel Mold Assemblies are ordered separately in 150mm, 100mm, and 4.0in (101.6mm) inside diameters. Order extra molds for more efficient sample preparation and processing. Overall height is 250mm for all molds and maximum specimen height is 210mm. A bottom platen is supplied with each mold. A Mold Funnel and Specimen Lift handle are optional accessories for each machine. Internal angle of gyration and gyratory shear force measurement are confirmed using the self-contained HMA-621 Rapid Angle Measurement Device, purchased separately. A 5,000lbf (22.2kN) Load Ring and Gage Blocks are available to verify force and spacing requirements. Both are certified and NIST traceable. An optional HMA-629 Cooling Door for the compaction chamber reduces waiting times for specimen cooling and extrusion for asphalt mixtures containing rubber. A specimen squaring function resists specimen expansion issues when testing hot mix asphalt with ground tire rubber content. Power requirements are 115V/50-60Hz, or 230V/50-60Hz for the HM-685F. Inquire for other electrical configurations. Machine weight is approximately 880lb (400kg). **Product Dimensions:** 34.5 x35.5x54in (875x900x1,375mm) WxDxH.

The HM-685S is an identical model, factory-equipped to measure and graph gyratory shear, the force required to gyrate the specimen. The data can be depicted as gyratory shear force vs. gyrations or as shear force vs. percent air-voids. This information provides insight into the workability and compactability of a mix.

SUPERPAVE™ GYRATORY COMPACTOR	
Superpave Gyratory Compactor, 115V/60Hz	HM-685
Superpave Gyratory Compactor, 230V/50-60Hz	HM-685F
Superpave Gyratory Compactor w/Shear Measurement, 115V/60Hz	HM-685S
Superpave Gyratory Compactor w/Shear Measurement, 230V/50-60Hz	HM-685SF
Accessories	
150mm Gyratory Compactor Mold Assembly	HMA-615
100mm Gyratory Compactor Mold Assembly	HMA-616
4.0in Gyratory Compactor Mold Assembly	HMA-617
Gyratory Compaction Mold Funnel, 150mm	HMA-618
Gyratory Compaction Mold Funnel, 4.0in	HMA-620
Conversion Kit for 100mm Molds	HMA-619
Conversion Kit for 4.0in Molds	HMA-627
Specimen Cooling Door	HMA-629
Specimen Lift Handles, 150mm	HMA-624
Specimen Lift Handles, 100mm	HMA-630
External Angle Measurement Jig	HMA-628

HM-687

BROVOLD SUPERPAVE™ GYRATORY COMPACTOR
ASTM D6925; AASHTO T 312

The rugged and proven Brovold Gyratory Compactor is unmatched for portability and ease of use when compacting hot mix asphalt specimens. This reliable self-contained model is built by Pine Instruments and is ideal for both mix design and QC/QA applications. The self-contained unit weighs only 304lb (138kg) and is easily transported to remote sites or mobile labs in the bed of a pickup truck or minivan. An integrated industrial computer controls the entire specimen compaction cycle. After compaction parameters are entered through the simple, menu-driven controller, and the prepared mold is set in place, just secure the gyratory head and press start. The system automatically applies consolidation pressure, induces the angle, and gyrates the mold to the specified settings. At completion, the specimen is extruded with the same hydraulic ram used for compaction, eliminating handling of hot, heavy molds. Rigid tubular frame design and patented gyratory mechanism assure accurate, repeatable results.

The HM-687 Brovold Gyratory includes integrated data logging functionality designed by Pine to save or export data to a portable USB flash drive, or output directly to an optional PCL Laser Printer. Up to ten completed tests are stored in the compactor's internal memory, and data is also output to the two USB ports for flash drive and printer as well as a RS232 serial port. Test data can also be viewed in real time on the four-line digital display. Default settings of the HM-687 control compaction of specimens to the height, number of gyrations, compaction force and speed required by the standard test method. All of these parameters can be reset by the user for special applications and different materials. Default internal angle of gyration is 1.16° and 1.25° external. The angle can also be factory set to 0.82° internal if specified when ordering.

Compaction forces are supplied through a hydraulic/electro-mechanical system. Precision machined stainless steel 150mm Mold Assemblies for the HM-687 are ordered separately. Each is 280mm overall height for maximum specimen heights of 180mm, and include both top and bottom platens. Preparation, processing and handling efficiencies are improved by having extra molds on hand. At least one Mold Funnel Cap is required for proper placement of sample material in the mold. The user can select a specimen squaring function to specify the amount of time pressure is applied to a specimen after squaring, from 0 to 16 seconds in 2-second intervals. A magnet for lifting mold plates, Specimen Lifting Handle for 150mm specimens, Mold Tongs for handling 150mm molds, are important accessories and are purchased separately. Electrical requirements are 115V/60Hz for the HM-687 and 230V/50-60Hz for the HM-687F. **Product Dimensions:** 30x21.3x55.4in (760x540x1,410mm) WxDxH.

BROVOLD SUPERPAVE™ GYRATORY COMPACTOR	
Brovold Superpave™ Gyratory Compactor, 115V/60Hz	HM-687
Brovold Superpave™ Gyratory Compactor, 230V/50-60Hz	HM-687F
Accessories	
150mm Gyratory Compactor Mold Assembly	HMA-694
Specimen Lift Handles, 150mm	HMA-697
Complete Calibration Kit	HMA-696

BROVOLD SUPERPAVE™ GYRATORY COMPACTOR SPECIFICATIONS	
Number of Gyrations	0 to 299
Speed of Gyrations	20-40 gpm (Default is 30±0.5)
Compaction Force	300 to 630kPa (Default is 600±18.0kPa)
Angle of Gyration	1.16° or 0.82° Internal, 1.25° External
Specimen Squaring	0 to 16 seconds, 2 second intervals
Mold Dimensions	150x280mm, ID Dia. x Ht.
Specimen Ht.	10 to 180mm
Dimensions	30x21.3x55.4in (760x540x1,410mm) WxDxH
Power Requirements HM-687 HM-687F	 115V/60Hz, 15 A, 1ph 230V/50-60Hz, 10A, 1ph

SUPERPAVE GYRATORY COMPACTOR ACCESSORIES
ASTM D6925; AASHTO T 312

MSA-120

SUPERPAVE GYRATORY COMPACTOR ACCESSORIES	
The **Rapid Angle Measurement (RAM) Device** is used to verify and calibrate the internal and external angles on the HM-685 and HM-687. The device safely and efficiently measures the internal angle of gyration on Superpave gyratory compactors and can be used in any 150mm diameter gyratory mold meeting Superpave specifications. It takes only a few minutes to complete the measurements required by AASHTO T312. Measurements are taken at room temperature avoiding the handling of hot molds. The instrument is self-contained with push-button controls and an LED display. No computer interface is required, simply operate the compactor with the device inside the mold. Remove it and read the result on the display. No asphalt mix is required and no test data is stored. A NIST traceable certified calibration tube is included with the RAM. Certification is valid for one year. Contact Gilson for Recertification.	
Rapid Angle Measurement (RAM) Device	HMA-621
Gilson **Circular Paper Discs** are strong and tear-resistant, with smooth edges. Choose between the MSA-120 designed for both 4in and 100mm or the MSA-121 for all 6in and 150mm Marshall and Gyratory Molds.	
4in/100mm Paper Discs	MSA-120
6in/150mm Paper Discs	MSA-121
5,000lbf (22.2kN) **Load Ring** with dial gauge and **Gage Blocks** are certified and NIST traceable for verifying applied loads and height measurements for both the HM-635 and HM-637 Gyratory Compactor. Gage Blocks are supplied singly, a total of 4 is required. The Gyratory should be verified semi-annually.	
Certified 5,000lbf Load Ring	HMA-622
Certified Gage Block, 1ea	HMA-623
Laser Printer with USB port is wide format using Printer Command Language (PCL). Data will automatically be printed during a test if a printer is connected and turned on. Data can also be printed from test data files saved on a machine. Type A-B USB cable in 10ft (3M) length is purchased separately.	
PCL Laser Printer	HMA-626

HM-459

ASPHALT PAVEMENT ANALYZER (APA)
AASHTO T324, T340; TEX 242-F

The Asphalt Pavement Analyzer (APA) by Pavement Technology is a three-wheel, multi-function Loaded Wheel Tester (LWT) for evaluating rutting, fatigue cracking and moisture susceptibility of both hot and cold asphalt mixes. Samples can be tested in dry or submerged conditions in the environmentally controlled chamber. An exclusive High Pressure Feature can perform rut testing at high contact pressures of 250psi or more on mix designs for airport runways and taxiways. The APA performs AASHTO methods T 324 Hamburg Test with solid steel wheels, and T 340 APA Rut Test with concave wheels loading high-pressure rubber hoses.

This versatile model has a unique drive system allowing multiple speeds and load rates to be applied simultaneously to separate samples. Samples can be from Gyratory, Marshall, or vibratory beam specimens molded in the laboratory, or from field cores cut from existing pavement. Three rectangular slab or beam specimens or six cylindrical specimens can be tested at the same time. A built-in Chiller for Low Temperature Fatigue Testing on Beam Specimens is included. Optional equipment for studded wheel and fatigue testing at temperatures to -5°C includes Cold Plate, Molds, Studded Wheels and Software and is available as HMA-826. Optional equipment to perform Microsurfacing/Slurry Seal Testing includes Molds, Rubber Wheels and Software, and is available as HMA-828.

Operation is controlled through a PLC-based system with New Gen 5 Software, and data is collected on a PC. Measurements are plotted and data is displayed in numeric and graphical format. In a single pass, five or more measurements can be collected on a beam specimen and three or more on a cylindrical specimen. This extremely accurate system calculates the data to 0.00001mm. The drive system operates the wheel tracking assembly from 0 to 60 cycles (120 passes) per minute. Both speed and stroke are adjustable for Hamburg Testing. Wheel loading is applied with controlled contact pressure on beam or cylindrical samples for rutting, fatigue and moisture damage testing. Independent pneumatic cylinders generate adjustable loads to each of the three wheels applying contact pressure on the specimens.

The Sample Holding Assembly locates the sample molds properly under the loading wheels for testing. A sliding tray makes it easy to load and position the samples and is locked against the frame by two toggle clamps. Temperature control of the main chamber from 5° to 80°C ±1.5°C (41° to 176°F) is accomplished by a series of heating strips and a cooling unit, regulated by a microprocessor-based controller. The 30gal reservoir can be raised with a pneumatic cylinder and flooded to a constant water level over the top of the test specimen for submerged testing. A weir valve allows water to drain back to the 35gal stainless steel storage tank where water temperature is maintained from ambient to 80°C (176°F). Sample Pre-Conditioning Shelves are located in the base of the APA to bring three beam or six cylindrical specimens up to desired test temperature.

The Asphalt Pavement Analyzer is supplied fully equipped to run a variety of loaded wheel tests. Concave wheels to perform rut and moisture testing, solid wheels for fatigue and Hamburg testing are all included in sets of three each. Wheels are stainless steel and comply with requirements for each test. Four sets of High Density Polyethylene Molds, 300x125x75mm LxWxH for rut testing, 150x75mm dia.xH for rut and moisture testing, 300x125x75mm LxWxH for fatigue testing and 300x150x62mm LxWxH for Hamburg tests are also included, each as a set of three. Three 3/4in (19mm) high-pressure rubber hoses are used in conjunction with Concave Wheels for the AASHTO T 340 Rut Test and with the high pressure loading feature for airport runway and taxiway design. A source of clean, dry compressed air at 120psi (8.3bar) and 8CFM (226LPM) is required. Electrical Requirements are 208V/60HZ, 40A Single Phase. Unit weight is approximately 3,000lb (1357kg). **Product Dimensions:** 35x70x80in (889x1778x2032mm) WxDxH.

ASPHALT PAVEMENT ANALYZER (APA)

Asphalt Pavement Analyzer (APA), 208V/1ph/60Hz HM-459

Accessories

Low-Temperature Studded Wheel Testing Kit HMA-826
Microsurfacing/Slurry Seal Testing Kit HMA-828

HM-457

Inside view of HM-457

ASPHALT PAVEMENT ANALYZER JUNIOR (APA JR.)
AASHTO T324, T340; TEX 242-F

The APA Jr. is a multi-functional two-wheel Loaded Wheel Tester (LWT) to determine rutting, fatigue cracking and moisture susceptibility of hot or cold asphalt paving mixes in dry or submerged conditions. This versatile CE Approved model from Pavement Technology has a small footprint and meets all requirements for the AASHTO T324 Hamburg Wheel Tracking Test and AASHTO T340 Rut Test. The HM-457 can also be equipped to perform a variety of other tests including high contact pressure testing for airport runways and taxiways, microsurfacing/slurry seal testing, and low-temperature fatigue and studded wheel tests with the optional Chiller. The unique frequency drive of the APA Jr. allows mixes to be tested at multiple speeds and multiple rates of loading.

A sample holding assembly positions the specimens in molds under the wheels for testing. Heating and cooling of the main chamber is accomplished by a series of heating elements and the optional HMA-820 Chiller. With the Chiller, temperature can be controlled from -9° to 80°C (15° to 176°F). A 15gal (57L) stainless steel water tank circulates temperature controlled water to the reservoir, which maintains water levels about 1/2in over specimens during the test. Temperature can be maintained up to 80°C (176°F) Vertical measurements are determined using linear position transducers and rut depth is monitored with transducers mounted inside the pneumatic cylinders.

The APA Jr. is equipped with a PLC based control system, operated through the user's laptop PC. All calibration and operation is performed through the laptop computer. Data is plotted and displayed in numeric and graphical format. Five or more measurements on a beam and three or more on a cylindrical specimen are collected in each pass and the data is calculated to 0.00001mm. The wheel tracking assembly operates from 0 to 60 cycles (120 passes) per minute, with stroke and speed adjustable for Hamburg Testing. Wheel loading is applied through independent pneumatic cylinders.

Four cylindrical molds of ultra-high molecular weight (UHMW) plastic are provided with the APA Jr., two 150x62mm Dia.xH for Hamburg Tests and two 150x75mm Dia.xH for Rut and Moisture Damage Tests. The molds can accommodate Gyratory, Marshall, Hveem or core specimens. Two Hamburg-type solid wheels and two APA concave wheels with high-pressure hoses are also included. Both are solid stainless steel construction. Additional beam-type molds and wheels for studded wheel, slurry seal and fatigue tests are also available. Equipment for microsurfacing/slurry seal testing is an optional set that includes Molds, Rubber Wheels and Software, and is available as HMA-821. An optional equipment set for studded wheel and fatigue testing at temperatures to -5°C includes Cold Plate, Molds, Studded Wheels and Software and is available as HMA-822. A source of clean, dry compressed air at 120psi (8.3bar) and 8CFM (226LPM) is required. Electrical Requirements are 208 or 230V/50-60HZ, 40A Single Phase. Unit weight is approximately 1,300lb (590kg). **Product Dimensions:** 327x45x61in (69x114x591mm) WxDxH.

ASPHALT PAVEMENT ANALYZER JUNIOR (APA JR.)	
Asphalt Pavement Analyzer Junior (APA Jr.), 208 or 230V/1ph/50-60Hz	HM-457
Accessories	
Low-Temperature Studded Wheel Testing Kit	HMA-822
Microsurfacing/Slurry Seal Testing Kit	HMA-821
Chiller for APA Jr., 208V/50-60Hz	HMA-820

ASPHALT PAVEMENT ANALYZER ACCESSORIES

ASPHALT PAVEMENT ANALYZER ACCESSORIES	
Molds of Ultra-High Molecular Weight (UHMW) Plastic secure asphalt specimens in proper position for loaded wheel tests in Asphalt Pavement Analyzers (APA's). Molds will fit HM-457 APA Jr. or HM-459 APA models.	
APA Beam Mold for Rut Testing, 300x125x75mm LxWxH	HMA-816
APA Cylindrical Mold for Rut and Moisture Testing, 150x75mm Dia.xH	HMA-817
APA Beam Mold for Fatigue Testing, 300x125x75mm LxWxH	HMA-818
APA Cylindrical Mold for Hamburg testing, 150x62mm Dia.xH	HMA-819
Wheels for alternate use or as replacements fit HM-457 APA Jr. or HM-459 APA models. High-Pressure Rubber Hoses are used with Concave Wheels for rut and moisture damage testing.	
Concave Stainless Steel Wheels for Rut or Moisture Testing	HMA-823
APA High-Pressure Rubber Hoses For Rut Or Moisture Testing, Set of 3	HMA-824
APA Jr. High-Pressure Rubber Hoses For Rut Or Moisture Testing, Set of 2	HMA-825
Rubber Wheels for Microsurfacing/Slurry Seal Testing	HMA-830
Rubber Wheels With Metal Studs for Low Temperature Testing	HMA-831
Solid Stainless Steel Wheels for Fatigue Testing	HMA-832
Solid Stainless Steel Wheels for Hamburg Testing	HMA-833

CD-1 shown with CDA-141

CD-6 shown with CDA-141

CDA-50

CDA-142

CDA-243

CORE DRILLING MACHINES
ASTM C42; AASHTO T 24

Gasoline or electric-powered core drilling machines offer easy set up, fast drilling, and low bit wear to give low cost per core. The drills have bit capacities up to 8in (203mm) diameter. Inquire for larger, trailer-mounted rigs for bits up to 16in (406mm). Quick disconnect fittings for water supply are provided. Diamond coring bits are ordered separately.

CD-1 Gasoline-Powered Core Drill is designed for vertical coring of pavements and slabs. Stable platform with leveling screws, a heavy-duty column and smooth, precision-feed system combine to make this model the ideal choice for large projects. Gasoline-powered drill allows the operator to operate independently of power supplies, and have minimal set up time and faster drilling. The unit easily adapts to mount to a pickup truck and has a 6.5hp four-cycle manual start engine. Carriage travel is 24in (610mm).

CD-6 Electric Core Drill adapts to a wide range of drilling jobs in addition to pavement coring. The column rotates 180° horizontally, allowing precise placement of drill bit. The super-duty two-speed (450/900rpm) 3.5hp motor and carriage can be removed or reattached without changing location for ease in snapping cores and adding extension rods. The 10in (254mm) wide wheeled base has a vacuum anchor to solidly grip smooth pavement or floors. Unit includes oilless vacuum pump, filter, hose, and quick connections.

Accessories for the Core Drilling Machines are purchased separately. CDA-20 is a 4gal (15L) manually-pressurized portable water tank, and CDA-22 is a trap-ring and electric pump to recirculate used drilling water. CDA-24 9in (229mm) extension allows drilling to extended depth, and CDA-26 18in (457mm) strap wrench is for attaching and removing coring bits without damage. CDA-32 is a replacement gasket with mastic for the CD-6 vacuum base.

CORE DRILLING MACHINES	
Gasoline-Powered Core Drill	CD-1
Electric Core Drill, 115V/60Hz	CD-6
230V/50-60Hz	CD-6F
Accessories	
Pressurized Water Tank, 4gal (15L)	CDA-20
Water Recirculator	CDA-22
Extension Rod, 9in (229mm)	CDA-24
Strap Wrench, 18in (457mm)	CDA-26
Replacement Vacuum Gasket	CDA-32
Core Retrieval Tongs, for 4in Cores	CDA-15
Core Retrieval Tongs, for 6in Cores	CDA-16

DIAMOND CORING BITS
ASTM C42; AASHTO T 24

Open-Head Coring Bits require Expander Sets listed for attachment to drills. These bits are slightly less expensive, and the expander sets can be reused many times as the core barrels wear out and are replaced. They are an economical choice for high-output and heavy use applications.

Closed-Head Coring Bits are one piece construction for convenience and easy, direct attachment to drills. There are no extra parts to buy or lose. These are best suited for light to medium duty, or for occasional use.

Both bit styles are available in designs optimized for asphalt pavements, or for reinforced concrete and other hard materials. All bits are constructed for wet use, and are fast-cutting when used according to design applications. Standard length is 14in (356mm) for cutting cores up to 12in long. Our most popular bit sizes are listed here. Please inquire for sizes not shown. All bits may be refurbished when worn.

DIAMOND CORING BITS

Nominal Bit Size OD, in (mm)	Open-Head Bits			Closed-Head Bits	
	Concrete	Asphalt	Expander Sets	Concrete	Asphalt
2 (50.8)	CDA-120	CDA-220	CDA-40	CDA-121	CDA-221
2-1/4 (57.2)	CDA-122	CDA-222	CDA-41	CDA-123	CDA-223
3 (76.2)	CDA-130	CDA-230	CDA-43	CDA-131	CDA-231
3-1/4 (82.6)	CDA-132	CDA-232	CDA-55	CDA-133	CDA-233
4 (101.6)	CDA-140	CDA-240	CDA-45	CDA-141	CDA-241
4-1/4 (108)	CDA-142	CDA-242	CDA-46	CDA-143	CDA-243
6 (152.4)	CDA-160	CDA-260	CDA-50	CDA-161	CDA-261
6-1/4 (158.8)	CDA-162	CDA-262	CDA-51	CDA-163	CDA-263

AP-14

LABORATORY ASPHALT PERMEAMETERS
FLORIDA FM 5-565

Laboratory Asphalt Permeameters utilize the falling head method to determine hydraulic conductivity of saturated 4in and 6in diameter asphalt cores or laboratory compacted specimens.

This simple, easy-to-use Permeameter design is based on test procedures developed at Florida DOT. The asphalt sample is placed inside a metal cylinder and held in place by expanding discs. A rubber membrane inside the metal cylinder is pressurized to fill voids and eliminate flow down the outside of the core. Permeability of the prepared specimen is determined by timing flow from the included 500cc Manometer through the sample. Both models include a self-contained hand pump which provides vacuum to hold the membrane out against the metal cylinder during assembly as well as confining pressure to push the membrane against the core during testing. A dial gauge displays pressure applied by the hand pump. Included with each Permeameter are two APA-144 4in (102mm) or two APA-166 6in (152mm) Rubber Membranes. Replacement 500cc Manometers are available as APA-105. 2,000cc capacity Manometers are available as APA-120 for more permeable samples.

LABORATORY ASPHALT PERMEAMETERS

Permeameter for 4in (102mm) dia.	AP-14
Permeameter for 6in (152mm) dia.	AP-16

Accessories

Replacement 500cc Manometer	APA-105
2,000cc Manometer	APA-120
4in (102mm) Rubber Membranes	APA-144
6in (152mm) Rubber Membranes	APA-166

APA-11B

NCAT ASPHALT FIELD PERMEAMETER

The NCAT Field Permeameter is a falling-head permeameter using Darcy's Law to determine rate of water flow through asphalt pavement. This design was selected by the National Center for Asphalt Technology (NCAT) for its close correlation with laboratory test results. Studies show that some Superpave mixes can be permeable to water even when compacted to an acceptable air void ratio. Field testing permits on the spot, accurate estimation of permeability, eliminating the need for coring, patching and laboratory testing. Corrections to mix and placement procedures can be implemented right away. Testing and subsequent calculations can usually be completed in 10—15 minutes by one technician. The simple procedure means no extensive training is required.

The APA-11B Permeameter is a 4-tiered, graduated standpipe supplied in two sections and constructed of rugged plastic. A sealing material is placed on the base plate. The unit is then positioned on the test site and seated against the pavement using gentle foot pressure and included base weights. After filling with water, outflow is observed against the clearly marked graduations and timed. The smallest, uppermost tier allows rapid determinations in low-porosity pavements. The larger diameter tiers permit enough time to accurately read flow on more porous pavements. An alternate top section is included to replace the two top tiers with one larger diameter tier. This allows for extended test times on moderately permeable mats or for rapid filling when testing highly permeable mixes.

The AP-1B Kit includes the 4-tiered graduated Permeameter, Alternate top section, Filling Tube, a package of Moldable Sealant material, Whisk Broom for test site preparation, and four 5lb (2.3kg) Base Weights. Kit is packaged in a convenient carrying case.

NCAT ASPHALT FIELD PERMEAMETER

NCAT Asphalt Field Permeameter Kit	AP-1B

Accessories

Permeameter	APA-11B
Standard Top Tier, Replacement	APA-17
Alternate Top Tier, Replacement	APA-18
Moldable Sealant, 5lb (2.3kg)	APA-22

HM-591

ASPHALT DEPTH GAUGE

The Asphalt Depth Gauge makes accurate thickness determinations quickly and easily. Depth measurements up to 11-3/4in (298mm) in 1/4in increments may be made from back of paver or from curbside with no need to step directly on hot asphalt. Depth rod will not pull on asphalt when retracted and leaves a small hole easily closed by roller. Storage bracket may be mounted directly to paver or pickup truck bed and holds the gauge securely in place with a spring clamp and PVC cup.

Gauge body is all-aluminum construction with 38in (965mm) total length, 1-1/4in (32mm) dia. anodized barrel is 25in (635mm) long. 3in (76mm) diameter foot insures steady, accurate measurements. Depth probe is 1/4in (6mm) steel. Hole for lubricating oil is in barrel. Gauge weight is 2lb (1kg).

ASPHALT DEPTH GAUGE

Asphalt Depth Gauge	HM-591

FLIR® INFRARED THERMAL IMAGING CAMERAS

Thermal Imaging Cameras by FLIR® were selected by Gilson as the best values for instant detection of temperature gradients in many different materials. The color LCD displays highlight problem areas fast, something that can't be done with standard infrared thermometers. Paving operations, bridge deck and floor slab inspections, location of delaminations, cavities, and moisture problems in concrete and masonry prism walls, are just a few of the applications for these sophisticated instruments.

FLIR® Cameras are light and compact, with focus-free lenses and simple navigation for easy one-handed operation, yet are tough enough for rugged field conditions and rated to withstand shock values to 25g. Rechargeable Lithium-Ion batteries yield two to four hours or more of operating time, and are quickly charged on the included AC charger. The unmatched manufacturer's warranty offers 10-year coverage on the detector, and 2 years parts and labor.

Exclusive MSX® thermal image enhancement on most models adds key details from the visible spectrum camera to the entire infrared image on the color LCD display. Text becomes clearly visible, making it easy to read a label or identifier in the image. The all-in-one image shows accurate thermal gradients along with visible details. Higher-end models feature enhanced infrared resolution, selectable measurement modes, and picture-in-picture displays, which superimpose a thermal image over a visible spectrum photo.

MA-771

MA-774

FLIR® INFRARED THERMAL IMAGING CAMERAS

Description	Model	Temperature Range F° (C°)	Accuracy	Thermal Sensitivity C°	IR Sensor Resolution (Pixels)	Field of View
FLIR® C2 Thermal Imaging System This pocket-sized, full-featured thermal camera is the first designed for construction applications. The C2 saves thermal, visible, and MSX®-enhanced JPEG still images, as well as non-radiometric streaming thermal video. Fully radiometric images allow measurement at any point during on-screen analysis and the included FLIR® Tools software for PC or Mac allows easy reporting and analysis down to the pixel level. The large, 3in (76mm) LCD intuitive touch screen display features auto-orientation and wide field of view. Internal memory stores at least 500 images in standard JPEG format. A built-in digital camera captures visible images. Also included are a lanyard, USB Memory Stick, and USB cable with Micro-B connector for data transfer to and from PC, iOS, and Android devices. Product Dimensions: 3.1x1x4.9in (80x24x125mm) WxDxH.		14°—302° (-10°—150°)	±2°C or 2%	<0.10	80x60 (4,800)	41°x31°
FLIR® C2 Thermal Imaging System	MA-771					
E4 Thermal Imaging Camera is economical and features infrared, visual, and MSX image modes on 3in color display. Sensor operates only in center-spot measurement mode. Comes with FLIR Tools software and a sturdy plastic case. Product Dimensions: 3.1x1x4.9in (80x24x125mm) WxDxH.		-4°—482° (20°—250°)	±2°C or 2%	<0.15	80x60 (4,800)	45°x34°
FLIR® E4 Thermal Imaging Camera	MA-774					

FLIR® INFRARED THERMAL IMAGING CAMERAS

MA-775

MA-776

MA-778

MA-769

FLIR® INFRARED THERMAL IMAGING CAMERAS						
Description	**Model**	**Temperature Range F° (C°)**	**Accuracy**	**Thermal Sensitivity C°**	**IR Sensor Resolution (Pixels)**	**Field of View**
E5 Thermal Imaging Camera Measurement modes include center-spot or area box. Automatic hot/cold detection marks maximum and minimum temperatures within the 3in color display. Image modes are infrared, visual, and MSX. A plastic carrying case and FLIR Tools software are included Product Dimensions: 3.1x1x4.9in (80x24x125mm) WxDxH.		-4°—482° (20°—250°)	±2°C or 2%	<0.10	120x90 (10,800)	45°x34°
FLIR® E5 Thermal Imaging Camera	MA-775					
E6 Thermal Imaging Camera with higher Infrared resolution and thermal sensitivity rating of less than 0.06°C. Measurement modes include center-spot or area box. Automatic hot/cold detection marks maximum and minimum temperatures within the display area. Image modes are infrared, visual, MSX, and picture-in-picture mode on the 3in color display. FLIR Tools analytical software and a plastic case are included. Product Dimensions: 3.1x1x4.9in (80x24x125mm) WxDxH.		-4°—482° (20°—250°)	±2°C or 2%	<0.06	160x120 (19,200)	45°x34°
FLIR® E6 Thermal Imaging Camera	MA-776					
E8 Thermal Imaging Camera features full, sharp 76,800 Infrared pixel resolution with thermal sensitivity rating of less than 0.06°C. Measurement modes include center-spot or area box. Automatic hot/cold detection marks maximum and minimum temperatures within the display area. Image modes are infrared, visual, MSX, and picture-in-picture on the 3in color display. A plastic case and FLIR Tools software for analysis are included. Product Dimensions: 3.1x1x4.9in (80x24x125mm) WxDxH.		-4°—482° (20°—250°)	±2°C or 2%	<0.06	320x240 (76,800)	45°x34°
FLIR® E8 Thermal Imaging Camera	MA-778					
FLIR® Imaging IR Thermometer The affordable new Imaging IR Thermometer bridges the gap between ordinary infrared thermometers and FLIR® infrared Thermal Imaging Cameras. The MA-769 lets you easily visualize heat patterns instead of relying on spot temperatures. Accurate surface temperatures and images are saved to an included 8Gb Micro SD card or to a PC over a USB connection. The measurement field is framed by dual-laser pointers and has a 24:1 spot ratio for accurate measurements at a safe distance. The 2in (150mm) display has gray-scale or hot iron color palettes and adjustable auto power-off. A lanyard, USB Cable, and international AC charger are included. Analysis Software is not included. Protective Vinyl Case and a convenient Belt Holster are available as options. Product Dimensions: 2.2x3.7x7.3in (55x94x186mm) WxDxH.		-13°—716° (-25°—380°)	±2°C or 2%	0.15	80x60 (4,800)	50°x39°
FLIR® Imaging IR Thermometer Protective Vinyl Case	MA-769 MAA-14					

SG-4

HM-574

ASPHALT BULK SPECIFIC GRAVITY DEVICE
AASHTO TP 82

Gilson's new SG-4 Asphalt Bulk Specific Gravity Device is the quickest and most accurate method for bulk specific gravity determinations of 4in and 6in (102mm and 151mm) asphalt cores and gyratory specimens. The SG-4 uses a precision computer-controlled system (patent pending) to measure water displacement with superior resolution and accuracy. This improved method uses no consumable products, allows the user to perform more than twice as many tests in the same time, and greatly improves repeatability between operators. The recently published AASHTO TP 82 Provisional Specification provides guidance for operation of the SG-4.

The SG-4 is easy to use, and operator error is significantly reduced from other methods. Enter the sample information and weight of the dry asphalt specimen into the proprietary software program (preloaded in the included computer) and lower the sample into the water-filled measuring chamber. The system is capable of accurately measuring water displacement with 0.5cc resolution and repeatability of ±1cc. Within seconds, the bulk specific gravity is displayed directly on the computer screen, saving time, improving accuracy, and eliminating potential inconsistencies created by the subjective SSD drying process in other methods. Test Data is saved in a format suitable for export to a spreadsheet or printer.

The four primary components of the SG-4 are the Measuring Chamber, Computer, Specimen Holder and Calibration Specimen. **Product Dimensions:** 6.1x9x11in (156x229x279mm), WxDxH.

ASPHALT BULK SPECIFIC GRAVITY DEVICE

Asphalt Bulk Specific Gravity Device, 120-240V, 50/60Hz SG-4

BENKELMAN BEAM
ASTM D4695; AASHTO T 256

The Benkelman Beam is a simple lever arm device which measures deflection of flexible pavements under the action of moving wheel loads. A probe beam is supported by a rigid reference beam such that deflections in its 2.44m (8ft) probe end are measured by a dial indicator 1.22m (4ft) on the other side of the fulcrum. Deflections measured on a dial indicator are therefore doubled to obtain pavement deflection.

The probe beam is placed between the tires of a test vehicle, and deflection is measured as the vehicle passes over the test area to beyond the end of the probe beam. The reference beam has a leveling adjustment to zero the dial indicator. A switchable battery-operated vibrator serves as a personnel alert and assures free movement of beam parts during measurements.

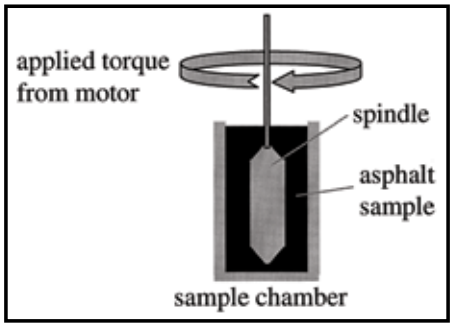
The three-piece, anodized, lightweight aluminum beam is 33lb (15kg) net weight for easy portability, and the longest piece is 6.5ft (1.99m). Mechanical Dial Indicator MA-334 or Digital Dial Indicator MA-366 must be ordered separately.

BENKELMAN BEAM

Benkelman Beam HM-574

Accessories

Mechanical Dial Indicator MA-334
Digital Dial Indicator MA-366



Principle of Operation

LP-22

helpfulhint

Recommended products for ASTM D4402 and AASHTO T 316

Rotational Viscometer	LP-22
Programmable Thermosel	LPA-52
ASTM Thermometers #65C	MA-433C
ASTM Thermometers #66C	MA-434C
ASTM Thermometers #67C	MA-435C
ASTM Thermometers #68C	MA-436C

BROOKFIELD ROTATIONAL VISCOMETER AND RHEOMETER
ASTM D4402; AASHTO T 316

Brookfield Rotational Viscometers and Rheometers provide rapid, reproducible, high-temperature viscosity measurements correlating closely with the time consuming AASHTO T 201 glass capillary method. Asphalt binder products are characterized, and temperature/viscosity charts developed to estimate mixing and compaction temperatures in hot-mix design. Torque required to rotate a spindle immersed in the specimen is measured and yields a dynamic viscosity value.

Gilson offers two Brookfield systems to measure viscosities from 100cP to 40 million cP. Both are accurate to ±1% and reproducible to ±0.2%. The units measure at sample temperatures from 9°—260°C (40°—500°F) and are compatible with a variety of spindles. Viscosity in cP or mPa/s, temperature in °C or °F, shear rate and shear stress in dynes/cm², percent torque, spindle number and speed, and step program status are displayed during operation on the color touch-screen displays. Stand-alone programming of test parameters can be performed directly on the screen, and built-in RTD probes accurately monitor sample temperature. Auto range feature shows maximum viscosity measured with any spindle/speed combination. The new user interface provides enhanced security with customizable user levels, date/time stamp files, and password access. User instructions with multi-step test protocols can be created using the new PG Flash Software and uploaded to the Viscometer through a USB Flash Drive (both included with instrument). USB PC interface provides computer control and automatic data gathering capability using Rheocalc T software, purchased separately. Each instrument can save all test data internally, or to a flash drive in Excel format. Data can then be exported, further analyzed, graphed and reported in Excel. Three USB ports are provided. Standard models operate on 115V, 60Hz power supplies. Other voltage configurations are available, Inquire. Contact Gilson about Brookfield Viscometers and Rheometers for other applications.

LP-22 DV2T Viscometer features a 5-inch touch screen display that supports multiple languages to guide users through test creation and data collection. The LP-22 also offers powerful new programming capabilities and results analysis, including data averaging and QC limits with alarms. Built-In options include timed tests, data averaging, programmable QC limits/alarms, customizable speed/spindle lists, and on screen data comparison. Test Data can be sent directly on a local printer or transferred to Excel on a PC, using the flash drive. A lab stand, RTD temperature probe, spindle guard leg, PG Flash software, flash drive, and a carrying case are included.

LP-23 DV3T Rheometer with a 7-inch touch screen, features real-time graphing of data that can be captured in stand-alone mode, sent to a printer, or saved on the flash drive in Excel format and opened on a PC for further analysis and reporting. The display supports multiple languages and displays all test parameters and measured values for yield stress, viscosity and temperature. Built-in math models provide rapid data analyses for flow index, yield stress, flow curves, leveling, and recovery. Other functions included are yield tests, timed tests, data averaging, programmable limits and alarms, customizable speed and spindle lists, and on screen data comparison. Fast, straight-forward, single-point viscosity is also easily accomplished with the LP-23, making it the ideal "all-in-one" instrument for both busy QC labs and demanding R&D applications modeling comprehensive flow behavior. Inquire for Integrated temperature control with connection to other Brookfield accessories. A lab stand, RTD temperature probe, spindle guard leg, PG Flash software, flash drive, and a carrying case are included.

LPA-52 Programmable Thermosel Set is required with both LP-22 and LP-23 systems for compliance with AASHTO T 316 and ASTM D4402 specifications. The Thermosel set allows measurement of accurate viscosities at elevated temperatures, and consists of a programmable temperature controller, reusable stainless steel sample chamber, five disposable aluminum sample chambers, extracting tools, one SC4-27 stainless steel Spindle and a manual. The LPA-52 can be synchronized with the LP-23 Rheometer to provide viscosity data as a function of temperature over any time interval with up to twenty five temperature set points and hold times.

LPA-62 RHEOCALC T Software automates data collection for both models and allows complete computer control. The user can collect and analyze data, run math models for yield stress calculations and plastic index, and perform time-saving routines. Rheocalc software requires user-supplied Windows® PC or Gilson HMA-354 Computer System.

Thermosel Spindles are designated from SC4-21 (lower viscosity) to SC4-29 (higher viscosity). Order extra Spindles for wider viscosity range. One SC4-27 Spindle is supplied with Thermosel systems. Extra LPA-55 stainless steel Thermosel Chambers are recommended for labs running multiple samples. Cleaning time can be eliminated by using aluminum LPA-56 Disposable Thermosel Sample Chambers and Disposable Thermosel Spindles, both sold in packages of 100. The Chuck Closure Assembly is required for use with disposable spindles, and must be ordered separately. High-temperature Silicone Viscosity Standard Fluids verify performance of Brookfield Thermosel Systems. Inquire for LPA-65 Two-Pen Recorder to provide hard copy records of temperature and torque for each test, essential for most labs.

BROOKFIELD ROTATIONAL VISCOMETER/RHEOMETER

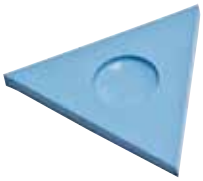
DV2T Viscometer, 115V/60Hz	LP-22
DV3T Rheometer, 115V/60Hz	LP-23
Programmable Thermosel, 115V/60Hz	LPA-52

Accessories

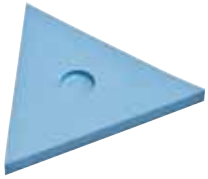
Thermosel Chamber	LPA-55
Disposable Thermosel Chambers	LPA-56
SC4-21 Thermosel Spindle	LPA-121
SC4-27 Thermosel Spindle[1]	LPA-127
SC4-28 Thermosel Spindle	LPA-128
SC4-29 Thermosel Spindle	LPA-129
Disposable SC4-27 Thermosel Spindles	LPA-127D
Replacement Spindle Extension Link	LPA-118
Chuck Closure Assembly[2]	LPA-58
Standard Fluid; 4,500—30,000cP	LPA-10
Standard Fluid; 9,000—60,000cP	LPA-11
Standard Fluid; 15,000—100,000cP	LPA-12
Rheocalc T Software	LPA-62
Computer System[3], 115V/60Hz	HMA-354

[1] One included with Thermosel Set. [2] Required when using Disposable Spindles. [3] Inquire for computer specifications.

HM-86



HMA-356A



HMA-356B

HMA-356

DYNAMIC SHEAR RHEOMETER
ASTM D7175, D7405; AASHTO MP 1, MP 19, R 29, T 315, TP 70

The Dynamic Shear Rheometer (DSR) determines viscoelastic properties of performance-graded asphalt binders at specified temperatures from 5°—85°C (41°—185°F). A disc of asphalt binder is confined between parallel plates, and one of the plates is oscillated at a known torque. Dynamic shear modulus and phase angle properties are measured.

The Bohlin DSR-II Air-Bearing DSR can be operated in strain control or stress control modes. The device includes a torque-measuring drive for determining strain and a circulator system to immerse the sample in constant temperature fluid (usually water). The lower plate holds the specimen, while the upper plate oscillates to produce strain. Stainless steel upper and lower plates for 8mm and 25mm specimens are provided, as well as a RTD temperature device. A special "no-gap" feature, eliminates the need to re-zero the instrument gap when upper or lower plates are removed or replaced, or for temperature changes. The two SHRP testing positions are marked for easy selection. The latest ASTM and AASHTO protocols are built into software and PG Grading determinations are automatic. The DSR requires an air supply of 1 SCFM at 60psi.

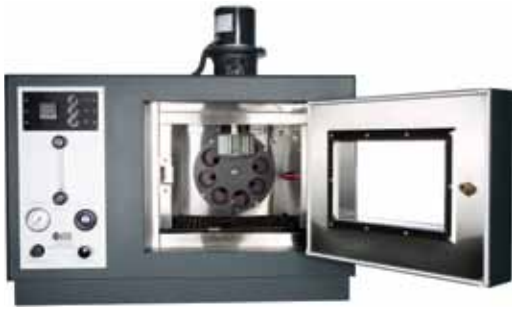
A Windows® compatible PC with printer is required. The HMA-353 Reference Thermal Detector Probe is a thermistor calibrated to 0.1°C and mounted in a silicone wafer. This recommended device allows direct, in-place calibration of the RTD temperature detector. Silicone Rubber Specimen Molds are purchased separately. Molds for 8mm and 25mm diameter specimens have actual dimensions of 9mm and 19mm, respectively, to allow for proper placement and trimming between the plates. Flexible, tear-resistant silicon molds are manufactured by the Asphalt Institute and available individually or as a set containing one of each size. HMA-355 2.7 million centipoise Viscosity Standard fluid in 55ml bottles is NIST traceable and designed specifically for the DSR. System price includes one-year warranty, installation and training in continental U.S.A., one year of software updates, and a technical support hotline.

DYNAMIC SHEAR RHEOMETER

Bohlin DSR-II, 115V/60Hz	HM-86
220V/50Hz	HM-86F

Accessories

Silicon Rubber Specimen Molds	
For 25mm Diameter Specimens	HMA-356A
For 8mm Diameter Specimens	HMA-356B
Set of 1 each for 25 and 8mm Specimens	HMA-356
Viscosity Standard Fluid	HMA-355
Reference Thermal Detector Probe	HMA-353



MO-30

COX AND SONS ROLLING THIN FILM OVENS
ASTM D2872; AASHTO T 240; CALIFORNIA 346; EN 12591

James Cox and Sons Rolling Thin Film Ovens have a PID controller paired with a precision resistance temperature detector (RTD) sensor to provide accurate chamber temperatures with minimal overshoot. Actual and set point temperatures can be viewed simultaneously on the dual four-digit displays.

The MO-30 is supplied with a mechanical flow meter, moisture indicator, and air pressure gauge with regulator. The MO-32 model is a version featuring a digital flowmeter accurate to ±1.0% at a rate of 4,000mL per minute. Both ovens include a solid-state digital temperature controller with built-in over-temperature protection and 200 Watt heating element to control temperature to ±1°F at 325°F (±0.5°C at 163°C). MOA-12 or Data Logging MOA-14 electronic platinum resistance thermometers (PRT) are acceptable alternatives to mercury thermometers and avoid regulatory restrictions. They are not included, but can be specified when ordering a new oven, or ordered separately. These precision digital thermometers are accurate to ±0.05°C (±0.09°F).

The RTFO features a baked enameled steel exterior, and double-wall construction. The circular test rack holds eight serial-numbered RTFO Bottles (included). Special stainless steel tongs with synthetic gripper pads are included for easy handling of hot bottles. Additional RTFO specimen bottles are ordered as MOA-6. Other accessories include the stainless steel MOA-10 Cooling Rack, designed to ASTM requirements to hold nine specimen bottles, and the MOA-5 Bottle Scraper, shaped to exactly fit RTFO bottles for removing the interior film. RTFO units are supplied without a power cord. Connection to a suitable power supply must be performed by a qualified electrician. A supply of clean, dry compressed air, not exceeding 125psi (8.6bar), is also required. Older MO-30 units can be upgraded with a Digital Flowmeter. Inquire for details. **Product Dimensions:** 40x26x36in (1016x660x915mm) WxDxH.

COX AND SONS ROLLING THIN FILM OVEN

Rolling Thin Film Oven, 230V/60Hz	MO-30
230V/50Hz	MO-30F

Accessories

ASTM 13C Thermometer	MA-223C
RTFO Specimen Bottle, Serial-Numbered	MOA-6
RTFO Bottle Cooling Rack	MOA-10
RTFO Bottle Scraper	MOA-5
RTFO Oven Tongs	MOA-3

technote

MA-523C ASTM Equivalent S13C Thermometer is glass with identical range and graduations to the ASTM 13C Mercury Thermometer. Blue spirit indicating liquid is non-toxic with similar performance characteristics. Total immersion thermometer is 7in (178mm) long.

MO-36

Inside of MO-36

MOA-6

GILSON ROLLING THIN FILM OVEN
ASTM D2872; AASHTO T 240; CALIFORNIA 346

- **Quick 8 minute temperature time to recovery after loading samples, meets ASTM and AASHTO requirements**
- **Easy to remove bottom tray allows for quick change of elements or spill clean-up**
- **High-temperature silicone compression fit gaskets securely grip RTFO Bottles**
- **Double-walled stainless steel oven maintains temperature to 215^{0}C ± 1^{0}C (419^{0}F ± 1.8^{0}F)**
- **Platinum Resistance Temperature Detector (RTD) ± 0.1^{0}C from 0^0-215^{0}C, (± 0.18^{0}F from 0^0-419^{0}F)**

The new Gilson Rolling Thin Film Oven by ATS features advanced design, solid construction and reliable accuracy. Precision components are paired with basic controls to insure accurate, repeatable results and straightforward operation. Set-up and operational procedures are fast and easy with minimal training required. A built-in timer controls test times. Precision temperature control is easily programmed for test temperature of 163°C (325°F), with maximum temperature rated up to 215°C (419°F). The exclusive Gilson MO-36 is CE marked and Made in the USA, meeting all test method specifications and exceeding requirements for recovery time, a requirement other manufacturers have been unable to meet.

Temperature is precisely controlled to ±0.1°C with a built-in NIST Traceable Platinum RTD temperature sensor, assuring an overall temperature uniformity of ±1°C, and safe, mercury-free operation. Time from ambient to 163°C (325°F) set point is 20 minutes, and full heat recovery is 5 to 8 minutes after loading of specimens. A thermal shutdown switch provides over-temperature protection at 250°C. Operating airflow of 0-5,000 mL/m is indicated on the included flow meter with a range of 200 to 14,000 ml per minute. A source of clean, dry compressed air is required for operation. Soft, high-temperature silicone compression gaskets in the rotating carousel grip RTFO Bottles securely, yet allow quick and easy insertion and removal with no scratching. Cleaning and access for maintenance of the elements is easy with the removable tray at the bottom of the case.

The rugged double-wall stainless steel case is features leveling legs for convenient bench-top operation. A set of eight serial numbered RTFO Sample Bottles is included. Additional Gilson serial-numbered bottles are ordered as MOA-6. The MOA-5 Bottle Scraper is optionally available, and is shaped to fit RTFO bottles for quickly removing testing residue. Other optional accessories include special stainless steel MOA-3 Oven Tongs with synthetic gripper pads for easy handling of hot bottles, and the stainless steel MOA-10 Cooling Rack, meeting ASTM requirements to hold nine specimen bottles. Electrical requirements: 230V-50/60 Hz, single phase, 15 amps, 3500 watts. **Product Dimensions:** 37.25x28.75x36in (946x730x914mm) WxDxH.

GILSON ROLLING THIN FILM OVEN	
Gilson Rolling Thin Film Oven, 230V-50/60Hz	MO-36
Accessories	
RTFO Sample Bottle, Serial-Numbered	MOA-6
RTFO Bottle Cooling Rack	MOA-10
RTFO Bottle Scraper	MOA-5
RTFO Oven Tongs	MOA-3

MO-38

Close-up of touch screen

MOA-6

ATS ROLLING THIN FILM OVEN
ASTM D2872; AASHTO T 240; CALIFORNIA 346

The RTFO Touch Rolling Thin Film Oven by ATS is a new benchmark in the simulation of short-term aging of asphalt binder materials. A 6in (152mm) full color touch-screen controller and built-in computer precisely control customizable parameters and collect temperature and airflow data during operation. Guided menus with intuitive user interface allow quick set up of all test and performance parameters without the need for extensive training and a built-in timer allows time and date settings for automatic preheat. The MO-38 meets or exceeds ASTM, AASHTO, and California test methods, and its unique design allows custom-setting of parameters by the user for special applications.

The Platinum RTD temperature sensor is NIST traceable and precisely controls temperatures to ±0.1°C and oven uniformity to ±1°C. Heating time to set-point is 20 minutes, and full temperature recovery is 8 minutes or less after specimens are loaded. The thermal shutdown switch offers 250°C over-temperature protection. Maximum rated temperature is 215°C (419°F). An NIST traceable digital flow meter displays air flow from 0-5,000 ml/m to accuracy of ±0.8%. An analog air meter displays air pressure from 0 to 100psi (6.9bar). A source of clean, dry compressed air is required for operation. Set up to an available internet connection allows remote monitoring and control off-site. The completely redesigned carousel system quickly secures bottles with a gentle push; no scratching or fragile hardware to break. Soft, high-temperature silicone compression gaskets grip RTFO Bottles securely while allowing easy insertion and removal. Cleaning and access for maintenance of the elements is easy with the removable tray at the bottom of the case. The bench top MO-38 features double-wall stainless steel case construction equipped with leveling legs.

Special stainless steel tongs with synthetic gripper pads are available for easy handling of hot bottles. Eight RTFO bottles are included with the MO-38. Additional Gilson RTFO serial numbered specimen bottles are ordered as MOA-6. Other accessories include the stainless steel MOA-10 Cooling Rack, designed to ASTM requirements to hold nine specimen bottles, and the MOA-5 Bottle Scraper, shaped to exactly fit RTFO bottles for removing the interior film. Electrical requirements: 230v AC 50/60 Hz, single phase, 15 amps, 3500 watts. **Product Dimensions:** 37.25x28.75x36in (946x730x914mm) WxDxH.

ATS ROLLING THIN FILM OVEN

ATS Rolling Thin Film Oven, 230V, 50/60Hz MO-38

Accessories

RTFO Sample Bottle, Serial-Numbered..... MOA-6
RTFO Bottle Cooling Rack..... MOA-10
RTFO Bottle Scraper..... MOA-5
RTFO Oven Tongs..... MOA-3

GILSON RTFO SAMPLE BOTTLE
ASTM D2872; AASHTO T 240; CALIFORNIA 346

Glass Sample Bottles for asphalt Rolling Thin Film Ovens (RTFO's) are made in the USA exclusively for Gilson to meet test method specifications. Each MOA-6 bottle is individually hand-blown using Pyrex® brand borosilicate glass and has a unique serial number etched in for traceability. Having additional bottles on hand increases sample preparation efficiency and reduces clean-up time. Order eight bottles for a complete set.

GILSON ROLLING THIN FILM OVEN

RTFO Sample Bottle, Serial-Numbered..... MOA-6

technote

Rolling Thin Film Ovens (RTFO's) measure the effect of heat and air on a moving film of hotmix asphalt binder to simulate short-term aging during production, handling, and paving operations. A controlled flow of heated air is directed into the openings of horizontal glass bottles as they rotate on a carousel rack. Specimen characteristics are measured before and after conditioning to determine values.

HM-923

VDO TOUCH VACUUM DEGASSING OVEN
ASTM D6521; AASHTO R 28; EN 14769

After aging in a Pressure Aging Vessel, asphalt specimens are processed in a Vacuum Degassing Oven (VDO) to remove entrapped air bubbles. The VDO Touch by ATS is a completely automated tabletop degassing oven with a self-contained vacuum system to rapidly evacuate the chamber to the required 15 ±1.0kPa (25.5Hg). The network-ready 7in (178mm) touch-screen controller features easy menu-driven operation in multiple language options for fast programming of vacuum, temperature values and soak times. When connected to a network via the Ethernet connection, the VDO Touch can be operated remotely using widely available remote access applications on smart phones, tablets, or PC's. USB Ports allow easy software upgrades. The controller display indicates time, temperature, and current process stage. Audible and visual alarms alert the user at end of each process.

Temperatures in the VDO Touch vacuum chamber are measured by a platinum RTD probe and the range is from ambient to 200°C with accuracy to ±5°C. Soak time and degass times are both programmable up to 4,320 minutes. The rugged stainless steel cabinet, chamber and cover are easy to maintain, and the removable cover features a heat-resistant glass viewing window for observation during the vacuum degassing process. The chamber accommodates eight 4oz (118ml) or four 8oz (236ml) sample containers. The HM-923 includes four 236ml (8oz) sample tins, and a specimen removal tool for easy loading and unloading of samples. Additional Sample Tins are available. The VDO Verification Kit is purchased separately and used periodically to confirm that the oven is producing specified temperature and vacuum values. The kit includes a 201° to 1,210°C digital thermometer with accuracy of ± 0.03°C, an insulated vessel cap and temperature calibration block for temperature verification, and a 0 to 30in Hg digital vacuum gage with 0.01 resolution. The kit is also available with NIST Certification. HM-923 Electrical Requirements: 115V/60Hz, 10A, or 230V/50-60Hz. **Product Dimensions:** 24x16x12in (610x406x304mm), WxDxH.

VDO TOUCH VACUUM DEGASSING OVEN	
VDO Touch Vacuum Degassing Oven, 115V/60Hz	HM-923
VDO Touch Vacuum Degassing Oven, 230V/50-60Hz	HM-923F
Accessories	
VDO Verification Kit	HMA-674
VDO Verification Kit w/NIST Certification	HMA-674C
Sample Tins, 4oz, pkg of 12	SC-502
Sample Tins, 8oz, pkg of 12	SC-506

HM-74

ATS PRESSURE AGING VESSEL (PAV3)
ASTM D6521; AASHTO R 28; EN 14769

Pressure Aging Vessels (PAV's) use heated, pressurized air to simulate long-term oxidative aging of asphalt binders. The PAV's consist of an ASME-Code and CE certified stainless steel pressure vessel, stainless steel cabinet with encased band heaters, and integral pressure measurement control.

The state of the art PAV3 meets ASTM, AASHTO, and EN 14769 requirements and includes a platinum RTD device to insure accurate temperature resolution and uniformity. A pressure relief valve and high-temperature thermal shut-down are included as standard safety features. A USB port located on the front of the unit allows the user to easily store test data and upgrade software if necessary. The system now includes remote operation capabilities, and allows the user to completely control the PAV3 system using an app compatible with most smart phones and tablets.

The HM-74 ATS Pressure Aging Vessel (PAV3) uses a Touch-Screen Controller with front panel user interface for complete control and monitoring of all test processes. The system has an operating pressure range of 2.1 ±0.1mPa, and temperature range programmable from 50°—150°C, with resolution of 0.1°C. This easy-to-use system completes a test in three easy steps: press the heat button, insert specimens when prompted, and press the age button. The stainless steel cabinet measures 28x18x30in (710x460x760mm), WxDxH. The ATS PAV includes a set of ten stainless steel Specimen Pans, an anodized aluminum sample holder with lifting handle, and a Specimen Handling Tool. The included MOA-2 Specimen Pans are the type formerly used in the Thin Film Oven Test (TFOT) procedure. Additional Pans can be ordered as single units or complete sets as required. Bottled compressed air with a pressure of at least 325psi (2.24mPa) and a regulator must be user provided.

ATS PRESSURE AGING VESSEL (PAV3)	
ATS Pressure Aging Vessel (PAV3), 230V, 50/60Hz	HM-74
Accessories	
Stainless Steel Specimen Pan	MOA-2
Stainless Steel Specimen Pans, pkg. 10	MOA-2C

HM-59

HM-73

ATS BENDING BEAM RHEOMETERS
ASTM D6648; AASHTO T 313

Bending Beam Rheometers measure the flexural creep stiffness of asphalt binder at cold temperatures (ambient to -40°C) to predict low-temperature thermal cracking of asphalt pavements. Special molds are used to form small asphalt beam samples for testing. The three point bend apparatus is easily removed and reinstalled in the base unit for convenient sample preparation and loading. Deflection of the beam specimen is measured and recorded as a constant load is applied. Load, displacement, and bath temperature are displayed in tabular and graphic form in real time. The stiffness value is calculated at the lowest temperature anticipated for the region. A fluid bath controls the temperature of the Ethylene Glycol/Water/Methanol mixture down to -40°C (-40°F). Process temperature is controlled and monitored by two independent platinum RTD temperature transducers to maintain temperature stability. Both BBR models fully comply with ASTM/AASHTO requirements. A source of clean, dry, compressed air at 50 PSIG minimum must be provided by the user.

HM-59 ATS Bending Beam Rheometer is a proven and reliable model constructed of stainless steel and durable, high-strength polymer components. The unit uses an air bearing system to assure reliable loading with accurate and repeatable results. A linear variable displacement transducer (LVDT) with a range of 6.35mm and accuracy to ±2µm measures deflection. The temperature-compensating 500g load cell with mechanical overload protection ensures accurate load results. Safe, rapid cooling of the test fluid is provided by the mechanical refrigeration system.

The HM-59 includes a Computer with pre-loaded control, acquisition, and analysis software, five aluminum specimen Molds with mylar strips, a Calibration Kit with required weights, and Confidence Beam. Calibrated test weights and a certified LVDT NIST-traceable standard are provided with each system. The easy-to-use software allows daily verification and periodic calibration of load cell, LVDT, and RTD transducers. **Product Dimensions:** 49x49x41in (1,245x1,245x1,040mm), LxWxH.

HM-73 ATS Touch Screen Bending Beam Rheometer is a new design incorporating state of the art design features but retaining all of the accuracy, quality, and performance characteristics of the HM-59. Its built-in computer makes test set up and operation easier than ever. The touch-screen controller also has intuitive step through menus for guidance. This model can also be started, stopped and monitored remotely using an App installed on a smartphone, iPad, or tablet.

The HM-73 is ruggedly built with integral stainless steel construction. The unit uses an air bearing system to assure reliable loading with accurate and repeatable results. A linear variable displacement transducer (LVDT) with a range of 6.35mm and accuracy to ±2µm measures deflection. The temperature-compensating 500g load cell with mechanical overload protection ensures accurate load results. The fluid bath is chilled by a thermoelectric cooling system. The complete system consists of a fluid bath base unit with removable three-point bend test apparatus, a cooling unit with temperature controller, five aluminum specimen Molds with mylar strips, a Calibration Kit with required weights, and Confidence Beam. Calibrated test weights and a certified LVDT NIST-traceable standard. The easy-to-use control, acquisition, and analysis software is preloaded on the internal computer, and allows daily verification and periodic calibration of load cell, LVDT, and RTD transducers. A USB port is located on the front of the unit for software upgrades and data storage.

ATS BENDING BEAM RHEOMETER	
Bending Beam Rheometer, 115V/60Hz	HM-59
230V/50Hz	HM-59F
Touch Screen Bending Beam Rheometer, 115V/60Hz	HM-73
230V/50Hz	HM-73F
Accessories	
Aluminum Beam Molds, set of 5	HMA-348R

PT-12

PTA-90

ROTAVAPOR® APPARATUS SYSTEM
ASTM D5404; AASHTO T 319

The PT-12 Rotavapor® Apparatus System recovers asphalt from extraction solvents with minimal changes to asphalt properties, allowing further testing. The distillation flask containing the solvent/asphalt mix adjusts to rotate at the specified 15° angle while immersed in the heated oil bath. The heated vapors are drawn under partial vacuum over the cooling condenser, separating out the solvent into a recovery flask. A feed inlet tube permits continuous or intermittent sample additions to the distillation flask.

The Rotavapor® integrates the control and monitoring of specified temperature, rotational motor speed, and vacuum generation into a single system. The precision motor permits flask rotation speeds from 20—280rpm, and a built-in quick-action jack raises or immerses the flask in the oil bath. The oil bath has 180 ±2°C (356°F) temperature capability, and features a large display showing both actual and set-point temperatures. Vapor temperature and rotation speed of the flask are displayed continuously during operation. Vacuum is supplied by a four-head, PTFE diaphragm pump with a flow rate of 109ft³ (3.1m³) per hour with ultimate vacuum below 0.06in Hg (2 mbar). The vacuum controller has a USB interface for transfer of vapor and bath temperature, as well as pressure to a user-supplied PC.

The PT-12 System consists of the Rotavapor® evaporator equipped with a diagonal condenser assembly, 1L distillation and solvent recovery flasks, high-temperature oil bath, and vacuum pump with precision electronic regulator. PTA-85 Distillation Flask, and PTA-86 Recovery Flasks, both with 2L capacities, can be purchased to follow ASTM D5404 suggestions. PTA-59 Silicone Bath Oil is purchased separately, and is rated SWS-101 with flash point above 215°C (420°F). The complete extraction and recovery process described in AASTO T 319 also requires the HM-750R Filterless Centrifuge, listed and purchased separately.

PTA-90 Recirculating Chiller circulates coolant to condenser for more efficient operation. Recovery is accelerated, often allowing two to three times more samples to be processed in the same time period. PTA-90 Temperature range is 14°—104°F (-10°—40°C) ±0.2°F (0.1°C). Reservoir capacity is 1.1gal (4.2L). 3/4hp compressor operates on 230V/60Hz or 240V/50Hz, drawing 12 amps. Models are CSA/CE approved.

ROTAVAPOR® APPARATUS SYSTEM	
Rotavapor® Apparatus System, 115V/60Hz	PT-12
230V/50Hz	PT-12F
Accessories	
Recirculating Chiller, 230V/60Hz/12A	PTA-90
240V/50Hz/12A	PTA-90F
Evaporation Flask, 2L	PTA-85
Recovery Flask, 2L	PTA-86
Silicone Bath Oil, 2gal	PTA-59

PT-82

SAYBOLT VISCOMETER
ASTM D88; AASHTO T 72

The Saybolt Viscometer determines viscosity of petroleum liquids at temperatures from ambient to 464°F (240°C). PID controller maintains ±0.05°F (±0.03°C) temperature uniformity throughout operating range and provides quick temperature stabilization with protection of an over-temperature control. Set-point temperatures are displayed in °F/°C. Circulate tap water or refrigerated coolant through the built-in cooling coil for operation at near-ambient temperatures.

The enameled steel cabinet has specimen-area backlighting, leveling feet and sliding draft shields. Insulated stainless steel bath with 5gal (19L) capacity has overflow pipe and drain valve to simplify filling to required level. Flasks for the 60ml samples are easily centered on the removable, chemical-resistant alignment plate. The unit comes with four thermometer supports, four chained corks, withdrawal tube, tube nut and orifice wrenches, two port closures and four port covers, and oil strainer.

Order Regular Bath Oil separately for use up to 275°F (135°C), or Hi-Temperature Silicone Fluid with 620°F (327°C) flash point. **Product Dimensions:** 29x25x34in (737x635x864mm), WxDxH.

SAYBOLT VISCOMETER	
Saybolt Viscometer, 115V, 50/60Hz	PT-82
220/240V, 50/60Hz	PT-82F
Accessories	
Brass Saybolt Tube	PTA-176
Stainless Steel Saybolt Tube	PTA-177
Universal Orifice	PTA-178
Furol Orifice	PTA-179
Road Oil Orifice	PTA-180
Wrench for Universal & Furol Orifices	PTA-162
Wrench for Road Oil Orifices	PTA-163
Socket Wrench	PTA-166
Bath Oil, Regular, 1gal	PTA-164
Bath Oil Hi-Temperature Silicone, 1gal	PTA-165
Saybolt 60ml Receiving Flask	PTA-168
Saybolt 60ml Withdrawal Pipette	PTA-169

PT-103

PT-114

ZEITFUCHS® CROSS-ARM VISCOMETERS
ASTM D445, D446, D2170; AASHTO T 201; ISO 3104, 3105

These viscometers measure kinematic viscosity of bitumens and road oils at 140°F (60°C) and asphalt cements at 275°F (135°C). Precision is ±0.2%. Using only a 1—3ml charge, the viscometer can be filled and cleaned while immersed in a constant temperature bath. Instrument requires a liquid depth of 9in (230mm). Each unit is supplied with permanently attached 2in (51mm) round metal holder and certificate of calibration. Viscometers with rectangular metal holders or without holder are also available.

ZEITFUCHS® CROSS-ARM VISCOMETERS

Size	Viscosity Range Centistokes	Approx. Constant, cSt/s	Model
1	0.6—3	0.003	PT-101
2	2—10	0.01	PT-102
3	6—30	0.03	PT-103
4	20—100	0.1	PT-104
5	60—300	0.3	PT-105
6	200—1,000	1.0	PT-106
7	600—3,000	3.0	PT-107
8	2,000—10,000	10	PT-108
9	6,000—30,000	30	PT-109
10	20,000—100,000	100	PT-110

ASPHALT INSTITUTE VACUUM VISCOMETERS
ASTM D2171; AASHTO T 202

Gilson offers five sizes of Asphalt Institute Viscometers to determine viscosity of highly viscous materials such as bitumen at 140°F (60°C). The user measures elapsed time for a fixed volume of liquid to be drawn by vacuum through the graduated capillary tube. Time is multiplied by the viscometer constant to obtain absolute viscosity. Measurement requires a minimum sample size of 3ml and a bath depth of 7in (180mm). Certificate of calibration is supplied with each viscometer. Neoprene rubber holders to fit a 2in (51mm) diameter hole are ordered separately as PTA-100. Inquire if fixed metal holders preferred. Also see stopwatches and thermometers listed elsewhere.

ASPHALT INSTITUTE VACUUM VISCOMETERS

Size	Viscosity Range, Poise	Model
25	42—800	PT-111
50	180—3,200	PT-112
100	600—12,800	PT-113
200	2,400—52,000	PT-114
400	9,600—200,000	PT-115

PT-61

VACUUM REGULATORS
ASTM D 2171; AASHTO T 202

Solid state mercury-free digital regulators are designed for precise measurement and control for a range of laboratory vacuum applications. They are preset to control at 300mm below atmospheric pressure as needed for viscous asphalt testing with Asphalt Institute, Cannon-Manning, and Modified Koppers vacuum viscometers, but may also be user reset to control anywhere in the range from 1—410mm below atmospheric pressure. An LCD screen displays vacuum in mm Hg or any of nine other units. The vertical configuration is designed for convenient display and keypad access while minimal counter space is used.

Two models are available. Model PT-61 100 Watt is for regulation of user's existing vacuum system. Model PT-62 175 Watt is equipped with an internal vacuum pump and requires no external vacuum source. Both have housings of enameled steel supported with rubber feet. **Product Dimensions:** 6.75x18x18.5in (172x458x470mm), WxDxH.

VACUUM REGULATORS

Vacuum Regulator, 115V, 50/60Hz. PT-61
230V, 50/60Hz PT-61F
Vacuum Regulator, 115V, 50/60Hz. PT-62
230V, 50/60Hz PT-62F

PT-53

CONSTANT TEMPERATURE VISCOSITY BATH
ASTM D445, D2170, D2171; AASHTO T 201, T 202

The Constant Temperature Viscosity Bath is designed for use with capillary viscometers, but is well-suited for general laboratory work requiring precise temperature control. The Bath uses 12x12in (305x305mm), DxH Pyrex bath jars for easy visibility.

The PT-53 Viscosity Bath conforms to ASTM D445 temperature stability requirements and has selectable temperature presets and a variable control to set temperature at any point within their ranges. Temperature can be adjusted precisely within hundredths of a degree. A stainless steel encased thermistor in the baths senses temperature. Bath Covers have seven 2in (51mm) diameter holes for viscometers and two 3/8in (10mm) holes for ASTM thermometers. A white-coated stainless steel baffle plate aids viewing of viscometers. Lighting is by fluorescent lamps. The circuitry is in base platform drawer on ball-bearing glides for easy access. Temperature range is 20°—100°C. Control is proportional ±0.01°C. Mixing features a motor-driven stirrer. Unit has several over-temperature protection standards, two heating elements and is 900 Watts. PT-53 also boasts a baffle background for viewing.

The Viscosity Bath includes three safety features: A second thermistor provides fault protection for over-temperature condition, and shuts off until user resets limit circuit. Heater power is shut off if control thermistor is disconnected. Power is shut off if bath liquid falls below safe operating level. PTA-70 Drawer fits under unit for storing viscometers and accessories.

PTA-61 Bath Oil is recommended when testing to 100°C (212°F). Use PTA-59 Silicone Bath Fluid for higher temperatures to 150°C (300°F). Bath jars hold about 5gal (19L).

Order viscometers and thermometers separately. See separate listing for Pressure Regulators. ASTM 9C Pensky Martens and Tag Closed High Thermometer has range of -5° to 110°C with 0.5°C divisions, and is ordered separately.

CONSTANT TEMPERATURE VISCOSITY BATHS

Viscosity Bath, 115V, 50/60Hz.....PT-53
230V, 50/60Hz.....PT-53F

Accessories

Drawer Unit.....PTA-70
Bath Oil, 5gal.....PTA-61
Silicone Fluid, 2gal.....PTA-59
ASTM 9C Thermometer.....MA-210C

PT-6A

CLEVELAND FLASH TESTER
ASTM D92; AASHTO T 48

The Cleveland open cup method measures flash and fire points for all petroleum products except fuel oils and materials igniting below 175°F (79°C).

The PT-6A Tester has a rheostat controlled 600 Watt electric heater. The open flash cup rests on an asbestos-insulated platform. A pivot-mounted gas test flame burner and a thermometer holder are attached. Order ASTM 11C thermometer (MA-212C) separately.

CLEVELAND FLASH TESTER

Cleveland Flash Tester, 115V/60Hz PT-6A
230V/50Hz PT-6AF

LP-9 shown with LPA-35

DUCTILITY TESTER
ASTM D113, D6084; AASHTO T 51, T 300, T 301

Ductility tests of bituminous materials measure elongation of a specimen before failure. The ends of a molded specimen are pulled apart in a liquid-filled trough at specified speed and temperature. The Ductility Tester features a heating and cooling circulator for complete temperature control. Tensile strength and ductility of specimens can be measured concurrently with addition of the Force Ductility Kits.

DUCTILITY TESTER	
Temperature Controlled Ductility Tester is mounted in a water bath trough equipped with stainless steel thermal transfer tubes. A heating/cooling circulator with an LED digital controller is included for fluid circulation through the trough, maintaining temperatures to ±0.1°C. Operation is vibration-free with constant speeds maintained via a synchronous direct-drive motor and gear box with selectable speeds of 2.5, 10, and 50mm per minute. A traveling pointer indicates exact position of the carriage on a fixed scale. Travel is stopped automatically at 1,400mm. The LP-9 also accommodates components to conduct force ductility testing. A Clear Plexiglass Insulating Cover prevents excessive temperature fluctuations during test cycles while allowing specimen observation. The machine can test three standard ductility specimens, or one to two force ductility specimens. Gears are bronze, other parts brass. Interior walls are stainless steel, and the outer case is baked enamel. Fittings are ready for connection to user-supplied temperature control equipment. Product Dimensions: 85x14x17in (2,160x356x432mm), LxWxH.	
Temperature-Controlled Ductility Tester, 115V/60Hz	LP-9
Temperature-Controlled Ductility Tester, 230V/50Hz	LP-9F
Clear Insulating Cover	LPA-35
Three **Standard Ductility Molds** and three **Base Plates** are provided with each ductility machine. Each four-piece machined brass mold consists of two end clips with mounting holes and two sides. The brass Base Plates are 5.5x2x0.1in (140x51x3mm). LPA-26 Large Base Plate is 5x8x0.1in (127x203x3mm), and allows placing three molds on same base. LPA-21 Force Ductility Molds are purchased separately, and meet AASHTO T 300 Force Ductility, ASTM D6084, and AASHTO T 301 Elastic Recovery requirements. Order additional molds and base plates to save set-up time with high-volume testing.	
Standard Ductility Mold (3 included with Ductility Machines)	LPA-20
Force Ductility Mold	LPA-21
Standard Base Plate (3 included with Ductility Machines)	LPA-24
Large Base Plate	LPA-26
Force Ductility Kit adapts most standard ductility machines for single-specimen force measurement. Components fit easily without tools or modifications. The kit consists of a load measuring adapter, 0.01lbf two-channel digital display, RS-232 interface, cables, and software. Three pairs of straight-side mold pieces are also provided to convert standard ductility molds to force ductility molds. A calibration stand, weight hanger assembly, and six weights (30lb total) for calibration in English or metric units are also included. For testing two force measurement specimens simultaneously, order an additional LPA-31 Load Measuring Adapter. Single-channel Chart Recorder is a multiple-range flatbed unit for 200mm (7.9in) paper that accepts analog data input.	
Force Ductility Kit	LPA-30
Load Measuring Adapter	LPA-31
Chart Recorder	LPA-182

LPA-21

LPA-20

LPA-30

HM-320

HM-322

HM-322D

HMA-180

HMA-183

HMA-188

UNIVERSAL PENETROMETERS

ASTM D5, D217, D937, D1168, D1321, D1403, D1831, D2884, D5329; AASHTO T 49

Universal Penetrometers test a wide variety of materials by penetration of weighted needles or cones. Main applications are for bituminous materials, but waxes, greases, foods, and pharmaceuticals are among other products tested. Penetration is read from a 5in (127mm) diameter indicator dial of 400 divisions, each representing 0.1mm of penetration, or digital display. Gilson offers heavy-duty units for manual and automatic use, and a lighter portable model for field work or users with a limited work load or budget. All meet ASTM and AASHTO standards when fitted with proper needle or cone.

HM-320 Manual Penetrometer is ruggedly constructed for accurate, sensitive measurements. The aluminum base has a machined, grooved table with leveling screws and rubber inserts to protect tips of needles and cones. Two stainless steel rods act as support guides for a cast aluminum head with coarse/fine adjustments and a calibrated friction-free plunger mechanism. Indicator dial has instant zero reset. Any needle or cone with standard 1/8in (3mm) diameter stem may be mounted to the 47.5g plunger assembly. A standard 2.5g ASTM D5 Needle (HMA-180) and two additional loading Weights (50g and 100g) are included. Order needles or cones for other tests separately as needed. **Product Dimensions:** 10.5x13x22in (267x330x559), WxDxH.

HM-322 Automatic Penetrometer is the same as the HM-320, but has a button release mechanism with digital timer to automatically stop the plunger when the preset time from 0.1—9.9 seconds expires. **Product Dimensions:** 10.5x13x22in (267x330x559), WxDxH.

HM-322D Digital Automatic Penetrometer is based on the HM-320 and HM-322 Penetrometers but uses a digital penetration gauge for precise readings. This model will also start the test with a single button push and stop it after a preset duration.

HM-325 Light Duty Penetrometer has features like the HM-320 manual model but is smaller and easy to disassemble. One Model HMA-180 Needle and an additional Loading Weight (50g) are provided. **Product Dimensions:** 7x7x16in (178x178x406mm), WxDxH.

HMA-180 Penetration Needle for bituminous materials is smooth, hardened, tempered stainless steel with brass ferrule and weighs 2.5g to give 50g total when mounted with plunger assembly. Stainless steel wax penetration needle HMA-181 is also 2.5g but has truncated cone-shaped tip with approximately 4mm maximum diameter tapered to 0.15mm diameter end. Several types of grease cones detailed in ASTM D217 have polished 90° cone with 30° removable hardened steel tip. Other types of Needles and Cones are available. Transfer Dish HMA-188 is clear plastic, 3.75in diameter x 3.25in deep (95x82mm), suitable for holding 3oz or 6oz sample boxes for transferring samples from bath to penetration testing. Flat bottom of dish has metal centering lugs and a magnet cemented to the bottom to secure sample boxes.

UNIVERSAL PENETROMETERS	
Manual Universal Penetrometer	HM-320
Automatic Universal Penetrometer, 110V/60Hz	HM-322
220V/50-60Hz	HM-322F
Digital Automatic Universal Penetrometer, 110V/60Hz	HM-322D
220V/50-60Hz	HM-322DF
Light Duty Penetrometer	HM-325
Accessories	
Bituminous Materials Needle[1]	HMA-180
Bituminous Materials Needle with Certification	HMA-180C
Wax Penetration Needle	HMA-181
Wax Penetration Needle with NIST Certifications	HMA-181C
Standard Grease Penetration Cone, Solid Magnesium	HMA-182
Grease Penetration Cone, Hollow Brass	HMA-183
Grease Penetration Cone, Hollow Stainless	HMA-183S
Transfer Dish	HMA-188
Tinned Sample Boxes, 3oz, 55 x 35mm dia. x ht., carton of 12	SC-500
Tinned Sample Boxes, 6oz, 70 x 45mm dia. x ht., carton of 12	SC-504

[1] Inquire for other needles and cones.

LP-16

MS-66

MS-62

SOFTENING POINT RING & BALL APPARATUS
ASTM D36; AASHTO T 53

Ring and Ball Apparatus is used for determining the softening point of asphalt, coal tar pitch, and other viscoelastic bitumens in the range of 30°—157°C (86°—315°F). Steel balls are placed on top of bitumen specimen disks in test rings in a bath. Temperature of the bath is increased gradually until the specimens soften and fall under the ball weight to the shelf 1in (25.4mm) below. The assembly provides for simultaneous testing of two specimens as suggested in standard test procedures, and includes two square-shouldered brass test rings, two 3/8in (9.5mm) steel balls, two brass ball-centering guide rings, an 800ml heat-resistant beaker (bath), and a brass ring holder suspension assembly with cover and shelf to fit beaker. ASTM Softening Point Thermometers, and a Beaker Stand Assembly should also be purchased. The Beaker Stand Assembly includes metal support stand, ring clamp, wire gauze, and thermometer clamp.

SOFTENING POINT RING & BALL APPARATUS	
Softening Point Assembly	LP-16
Accessories	
Beaker Stand Assembly	LP-18
800ml Beaker	LPA-43
Steel Balls, set of 15	SSA-44

also available

For ASTM Bituminous Softening Point Thermometers, see our Thermometers and Timers section.

STAINLESS STEEL MELTING POTS

Stainless Steel Melting Pots feature long-lasting stainless steel construction and precision digital controllers. Popular in asphalt labs, these units can also be used for dispensing of other materials like waxes or adhesives. The rugged melting pots are fitted with heated, no-drip ball dispenser valves to aid material flow and prevent clogs. Sturdy powder-coated steel stands are included and have adjustable height. Stands bolt securely to the bench-top, raising the pots up to 16in (406mm) over bench.

The Electronic digital controller regulates independent temperature settings for pot and dispenser valve. The menu-driven controller is easy to set up and has pass code-actuated lockout settings to guard against accidental changes. The controller can be field calibrated by user if needed. Readout is selectable for °F or °C display. The 18-gauge crucible is housed in a 20-gauge stainless steel shell and insulated with 3in (76mm) of fiberglass. The multi-circuit blanket heater assures uniform temperatures. Maximum operating temperature is 350°F (177°C). The loose aluminum cover has a heat resistant knob. The pots are supplied with a 6ft (1.8m) power cord.

MS-66 Stainless Steel Melting Pot has 6qt (5.7L) capacity and is 10.25x14in (260x356mm), Dia.xH. Crucible Dimensions: 6.75x7.25in (171x184mm), Dia.xH. Heating Element is 600 Watts.

MS-67 Stainless Steel Melting Pot has 12qt (11.4L) capacity and is 15x17in (381x482mm), Dia.xH. Crucible Dimensions: 10x9.5in (254x241mm), Dia.xH. Heating Element is 1,200 Watts.

STAINLESS STEEL MELTING POTS	
6qt Melting Pot, 110V/60Hz	MS-66
220V/50Hz	MS-66F
12qt Melting Pot, 110V/60Hz	MS-67
220V/50Hz	MS-67F

DISPENSING MELTING POTS

Timesaving melting pots simplify dispensing of asphalt binder for laboratory testing and mix-design applications. Pots are available in 4qt or 10qt (3.8L or 9.5L) capacities and are also useful for dispensing waxes, adhesives, and other compounds. A heavy pipe single-column support mounts easily to a bench top. Height and angle are quickly adjusted with set screws on the sliding boss attached to the column. A Manual dispensing lever operates a needle valve that is adjusted to obtain desired flow rate. The dial thermostat controls heating range from 150°—550°F (66°—288°C).

The heavy painted-steel housing is insulated from the cast-aluminum inner pot by thick thermal insulation. Blanket-type heating element uniformly heats the pot across the bottom and for 75% of the wall height. An aluminum cover is provided to retain heat and control fumes.

MS-62 Dispensing Melting Pot has 4qt (3.8L) capacity and 880 Watt heating element. Footprint is 10x15in (254x381mm) and maximum height is 18in (457mm). Maximum clearance below dispensing valve is about 7in (178mm).

MS-64 Dispensing Melting Pot has 10qt (9.5L) capacity and 1,540 Watt heating element. Footprint is 14x19in (356x483mm) and maximum height is 19in (483mm). Maximum clearance below dispensing valve is about 7in (178mm).

DISPENSING MELTING POTS	
4qt Melting Pot, 120V/60Hz	MS-62
240V/50Hz	MS-62F
10qt Melting Pot, 120V/60Hz	MS-64
240V/50Hz	MS-64F

HM-40

HM-403

HM-401

SLUMP TEST SETS
ASTM C143/143M; AASHTO T 119; BS 1881

Concrete slump is a measure of workability and indirectly indicates water/cement ratio. It is a basic test of fresh concrete for acceptance or to record characteristics. Gilson Slump Test Sets bring together the most useful slump test components. Individual components are listed separately.

SLUMP TEST SETS	
Slump Cone, Base, and Rod Set includes a heavy-gauge spun steel Slump Cone, cast aluminum Base Plate, and 5/8x24in (16x610mm) steel Tamping Rod. Clamps on the base swivel to hold foot tabs of slump cone securely. The Carrying Handle can be rotated over the specimen as a measuring reference. Test Set components assemble compactly for easy transport.	HM-40
EZ-Clean Slump Cone, Base and Rod Set includes our steel slump cone, a high-density polyethylene base plate, and 5/8x24in (16x610mm) steel tamping rod. Adjustable clamps secure slump cone and spring-loaded rod clamps allow easy transport of set components. Concrete is easily cleaned off of plastic base plate.	HM-403
Deluxe Slump Test Set includes all components from HM-40 Set, plus a 58oz (1,715ml) capacity polished aluminum Round-Bowl Scoop, aluminum Filling Funnel, a 12ft (3.6m) measuring tape and a sturdy, acid-resistant scrub brush with 10in (254mm) handle.	HM-401
Deluxe EZ-Clean Slump Test Set includes all HM-403 components, plus a 58oz (1,715ml) capacity polished aluminum Round-Bowl Scoop, aluminum Filling Funnel, a 12ft (3.6m) measuring tape and a sturdy, acid-resistant scrub brush with 10in (254mm) handle. The plastic base plate is easy to clean-up after use and will not corrode. Components meet specification requirements.	HM-410

HM-410

HM-45

HM-39

HM-68

HM-31

SLUMP CONES, RODS, AND BASES
ASTM C143/143M; AASHTO T 119; BS 1881

Gilson spun steel or molded plastic slump cones meet all specification requirements. Convenient Slump Bases provide a clean, stable testing surface for slump testing anywhere. Tamping Rods are required for manual consolidation for slump, air content, and molding of strength specimens.

SLUMP CONES, RODS, AND BASES	
Steel Slump Cones are seamless, heavy-gauge spun steel, plated for rust resistance with welded foot tabs and handles. Steel Slump Cones are available to meet inch (4x8x12in) or metric (100x200x300mm) dimensional requirements.	
Steel Slump Cone, Inch	HM-45
Steel Slump Cone, Metric	HM-45M
Plastic Slump Cones are constructed of durable, high-density material, and comply with current ASTM and AASHTO specifications. These economical inch or metric models are dimensionally stable, easy to clean, and will not dent or rust.	
Plastic Slump Cone, Inch	HM-39
Plastic Slump Cone, Metric	HM-39F
Cast Aluminum Slump Base has swivel clamps to secure foot tabs and a carrying handle that rotates up to use as a measuring reference. Use with either steel or plastic slump cones. Rod and cone attach to the base for convenient carrying. Product Dimensions: 15x17in (381x432mm).	HM-68
EZ -Clean Slump Base is High-Density Polyethylene, and acceptable for use in the specifications. Adjustable clamps secure slump cone and spring-loaded rod clamps allow easy transport. Base cleans easily and will not corrode. Rod and slump cone purchased separately. Base is 18x18in (457x457mm).	HM-31
Tamping Rods are plated steel with hemispherical tips on both ends. HM-48 has engraved measuring scale in 1/4in increments. HM-48A is plain with no markings. 5/8x24in (610x16mm) dia.xL, size is specified for 6x12in concrete cylinders, air content, and slump tests.	
5/8x24in Tamping Rod, Engraved Measuring Scale	HM-48
5/8x24in (610x16mm) Tamping Rod, Plain	HM-48A
Small Tamping Rod is required for molding of 4x8in concrete cylinder specimens, and is 3/8x12in (10mmx305mm) dia.xL	HM-47
Long Tamping Rod meets both Canadian and ASTM standards for consolidation of 4x8in (102x203mm) concrete cylinders. The rod is 3/8x18in (10x457mm) dia.xL.	HM-63

HM-47, HM-48 & HM-63

TSA-188

TSA-189

TSA-233

TSA-275

HMA-306

HM-53

SLUMP TEST ACCESSORIES
ASTM C143/143M; AASHTO T 119; BS 1881

SLUMP TEST ACCESSORIES	
Round Bowl Scoops are die-cast and polished aluminum with integral handles for filling slump cones, air meters or cylinder molds.	
Round Bowl Scoop, 38oz (1,124ml) Capacity	TSA-188
Round Bowl Scoop, 58oz (1,715ml) Capacity	TSA-189
Scrub Brushes are available in 21.5in (546mm) long-handled, or 10in (254mm) short-handled versions, and stand up to heavy everyday field use. Both feature durable, solid plastic handles and sturdy, acid-resistant synthetic fibers.	
Scrub Brush, 10in (254mm) Handle	TSA-232
Scrub Brush, 21.5in (546mm) Handle	TSA-233
Mortar Trowel has wooden handle and flat steel blade. **Product Dimensions:** 4.5x3in (114x76mm).	HMA-306
Measuring Tapes have retractable blades in sturdy cases, belt clips, and offer a choice of measuring scales in feet and inches or millimeters. Tapes have 3/4in (19mm) blade widths.	
16ft/5m Measuring Tape in Inches and Millimeters	TSA-275
12ft Measuring Tape in Feet and Inches	TSA-279
Slump Cone Filling Funnel is a convenient accessory for fast and easy filling of slump cones, allowing use of larger TSA-187 scoop.	HM-53

HMA-295

HM-80

HM-78

CONCRETE PENETROMETERS

Concrete Penetrometers allow estimates of when concrete mixes are approaching their initial set. Concrete that has reached initial set can no longer be effectively consolidated, and is nearly ready for final finishing operations. ASTM tests define the initial set of concrete mortar as when 500psi (3.4mPa) of force is required to embed a penetration probe to a depth of 1in. Both penetrometer models are equipped with 1/20in² (32.3mm²) penetration plungers, which are simply pushed into fresh concrete at a constant rate to the mark scribed at 1in (25mm). Both can also be used in evaluations of mortars for unit masonry when equipped with the 2.7in (68.58mm) diameter HMA-295 Adaptor Foot.

HM-80 Concrete Pocket Penetrometer is a rugged, lightweight unit using a calibrated reaction spring for resistance. Plated steel construction resists rust and stands up under harsh field conditions. 0 to 700psi scale is etched into barrel of piston. A snug-fitting indicator band slides on the piston to register maximum readings. **Product Dimensions:** 7x0.75in (178x19mm), LxD.

HM-78 Concrete Dial Penetrometer is a compact instrument fitted with an easy to read 2.25in (57mm) diameter dial gauge. Dual scales of 0 to 700psi and 0 to 50kg/cm² indicate resistance. Maximum readings are locked in until released by push button. The instrument can be calibrated using an ordinary platform balance and adding or removing the register plates provided. Plastic case, factory certification and instructions are included. Overall length is 6in (152mm).

CONCRETE PENETROMETERS	
Concrete Pocket Penetrometer	HM-80
Concrete Dial Penetrometer	HM-78
Accessories	
Concrete Penetrometer Adaptor Foot	HMA-295

HM-65

"K-SLUMP" TESTER

Approximate concrete slump and workability readings can be determined prior to or after placement with the "K-SLUMP" Tester in just 60 seconds.

The 12in length x 3/4in diameter (305x19mm) hollow-tube probe has two groups of side openings through which wet concrete enters to raise a floating plunger to give an estimate of concrete slump. Workability is indicated by an additional simple up-and-down motion of the probe. Readings are reliable when 6in (152mm) or more of concrete surrounds the tester. Instructions and correlation chart included.

"K-SLUMP" TESTER	
"K-SLUMP" Tester	HM-65

HM-30

HMA-108

GILSON CONCRETE PRESSURE METER
ASTM C231; AASHTO T 152

- **High quality, accurate, and easy to use.**
- **New *Gorilla Gauge* features rugged plastic housing and safety glass.**
- **Sturdy plastic carrying case is fitted to carry all required components.**

Gilson's high-quality Type B Pressure Meters measure concrete air content and include many value-added improvements. Our standard model HM-30 now features the exclusive Gilson *Gorilla Gauge*, and a new, more affordable model HM-30S offers an American-made stainless steel gauge. Other features of the two units are identical. Long-lasting stainless steel clamps adjust quickly and are less expensive to replace. Pump with large, easy-grip handle builds pressure quickly and is shielded to keep dirt and water out of the piston area. Brass petcocks have stainless steel ball valves for accuracy and durability. Petcock handles are vinyl coated for more comfortable operation.

Dimensions and accuracy of the Gilson meters exceed ASTM requirements. Calibration Vessel, Calibration Tubes, 24in (610mm) Tamping Rod, Aluminum Straightedge, Syringe for water, Carrying Case and operating instructions are all included. Cast aluminum chamber volume is 1/4ft³ and can also be used for unit weight and yield determinations. Sturdy plastic carrying case holds meter with all accessories securely in die-cut foam padding. **Case Dimensions:** 27x14x14in (686x356x356mm), WxDxH.

HM-30 Concrete Pressure Meter features our exclusive *Gorilla Gauge*, a rugged German-engineered gauge with precision jeweled movement and a high-strength Polymid B molded housing that is waterproof and rustproof. Micro-Adjustable calibration screws ensure superior accuracy and save time during calibration and maintenance procedures. The *Gorilla Gauge* is ANSI rated B40 Grade 2A with accuracy ±1/2% of full scale. The dual-layer safety glass lens is sealed behind a threaded bezel with O-ring.

HM-30S Concrete Pressure Meter uses a dependable and accurate American-made gauge with stainless steel housing. The sturdy industrial rack and pinion mechanism is accurate to ±1% of full scale. A threaded bezel with gasket seals the safety glass lens.

GILSON CONCRETE PRESSURE METER	
Gilson Pressure Meter w/*Gorilla Gauge*	HM-30
Gilson Pressure Meter w/Stainless Steel Gauge	HM-30S

CONCRETE AIR METER REPLACEMENT GAUGES

Replacement Gauges from Gilson fit most Type B Concrete Pressure Meters on the market today. Rugged precision gauges are a step up in quality and help restore accuracy and dependability to used Air Meters.

HMA-108 Gilson *Gorilla Gauge* is a durable, accurate, and long-lasting upgrade for most popular Type B Concrete Air Meters. Features not found on lower quality gauges include a wide-profile phosphor bronze Bourdon tube and a rugged German-engineered precision mechanism for dependable accuracy. Fine adjustment screws on the dial face are micro-adjustable for easy "tweaks" during calibration, saving time and making calibration and maintenance easier. Accuracy is ±1/2% of full scale.

The High-strength Polymid B housing is waterproof, rustproof, and resists impact forces. Threaded bezel has O-ring gasket, sealing the gauge from moisture and dust. Durable dual-layer safety glass lens resists scratches and breakage, and is easily replaceable. Total gauge dimensions are 4-1/4 x 2in (108x51mm) Dia. x H, with a 3-1/2in (89mm) dial face. 1/4in NPT brass threads fit most concrete air meters.

HMA-108S Stainless Steel Gauge is a dependable and accurate replacement gauge. This American-made gauge has a stainless steel housing and sturdy industrial grade rack and pinion mechanism. Accuracy is ±1% at full scale. The acrylic lens is break-resistant and sealed behind the gasketed bezel to protect from moisture and dust. Gauge dimensions are 4 x 1.5in (102x38mm) Dia. x H, with a 3-1/2in (89mm) dial face. 1/4in NPT brass threads fit most concrete air meters.

CONCRETE AIR METER REPLACEMENT GAUGES	
Gorilla Gauge Concrete Air Meter Replacement Gauge	HMA-108
Stainless Steel Concrete Air Meter Replacement Gauge	HMA-108S

technote

Calibration and repair services are available from Gilson for the HM-30 Concrete Pressure Meter. Please call **800.444.1508** for pricing and scheduling.

HM-345

SUPER AIR METER
ASTM C231; AASHTO T 152, TP 118

The HM-345 Super Air Meter (SAM) determines both total air content and the spacing of air voids in fresh concrete specimens. The test takes less than 10 minutes to run and the meter provides both the conventional air content as noted in ASTM C231/AASHTO T 152, and a new value called the SAM number that correlates with the air void spacing. Overall quality of the air void system is built on the presence of small and well dispersed bubbles. Spacing of the voids has proven to be a better indicator of freeze-thaw durability than total air content alone, and SAM measurements make resistance to these forces much easier to predict. This rapid test can be performed in the field at the point of placement of the fresh concrete, eliminating the need to wait weeks for results of traditional tests on hardened concrete.

The Super Air Meter is a modified version of a conventional Type B Concrete Pressure Meter as described in ASTM C231. For the SAM procedure, two sequential pressurizations are applied to the concrete sample. For each sequence, increments of 14.5, 30, and 45psi (1, 2.1, and 3.1bar) are applied to the concrete and a deformation value is obtained. The SAM number is the difference between these values and correlates to the average spacing between air voids. A higher SAM number indicates increased susceptibility to freeze-thaw deterioration. Extensive research during development shows that a SAM value of 0.20 indicates 90% certainty that the spacing meets ACI durability recommendations. Optimum spacing of air voids can also reduce the overall air content required for the concrete to resist freeze-thaw damage. The meter is currently being used in twenty-two US States and one Canadian Province. AASHTO TP 118 Provisional Standard for this test has been approved, and the test is specified in Michigan and Oklahoma.

The optional CAPE Tank accessory can be pre-filled with compressed air to simplify pressurizing the SAM during testing, instead of manually pumping to the required pressures. Three attached inflation chucks with regulators are easily attached to the pressurization valve of the SAM. The HM-345 Super Air Meter is constructed of rugged cast aluminum and features a 1/4ft³ (7.1L) chamber and reinforced cover with six stainless steel clamps. The unique electronic digital gauge is highly accurate and pre-programmed to prompt the user through the required steps. Also included are a 5/8x16in (16x400mm) Dia.x L Tamping Rod, Brass Calibration Vessel, 12x12in (305x305mm) chemical resistant Plastic Strike-Off Plate, 16oz (454g) Rubber Mallet, and water syringe. All components are packed in a quality plastic carrying case with fitted rigid foam insert. **Case Dimensions:** 27x14x14in (686x356x356mm) WxDxH.

SUPER AIR METER	
Super Air Meter	HM-345
Accessories	
CAPE Tank	HMA-482

HM-32L

HM-33

LIGHTWEIGHT ROLL-A-METER
ASTM C173; AASHTO T 196

- **This volumetric meter is the only method for lightweight concrete, but may be used for any concrete.**
- **New lightweight alloy model is less than half the weight of original unit.**

The new lightweight version of the popular Roll-A-Meter is a simple and accurate device for measuring air content of concrete mixes. It is often used with lightweight aggregate concrete. The lightweight anodized aluminum version is less than half the weight of earlier bronze models. Hard-anodized aluminum bowl and neck are highly scratch and wear resistant.

The base and top are fastened with quick acting stainless steel clamps after concrete sample is placed in base. Water and isopropyl alcohol are added to zero mark on neck, and meter is inverted, rolled, and rocked until air is removed for concrete. Percent of air is read directly from liquid level on scale.

HM-32L Lightweight Roll-A-Meter may also be used as a pycnometer for determining specific gravity of sand, gravel, and cement. Unit is supplied in foam-lined plastic carrying case with Straight Edge, Tamping Rod, Syringe, Baffle-Bottom Funnel, and instructions. Volume of base is 130in³ (2,130ml). Overall height: 22in (559mm); Maximum diameter: 8in (203mm).

LIGHTWEIGHT ROLL-A-METER	
Lightweight Roll-A-Meter	HM-32L

VOLUMETAIR AIR METER
ASTM C173; AASHTO T 196

- **Meets ASTM and AASHTO specifications.**
- **Lightest Volumetric Air Meter.**
- **Best for occasional use.**

Volumetair Volumetric Air Meter accurately and economically measures air content in any type of concrete, including lightweight mixes. The unit weighs only 5.5lb (2.5kg) and is made of dimensionally stable PVC and fiberglass-reinforced plastic. The Volumetair is much lighter than brass or aluminum units.

Base and top housing fit together with a leak-proof O-Ring seal and stainless steel over-center clamp assembly. Parts clean up easily with water. Base volume is 134in³ (2,200ml), and sight tube is graduated from 0 to 9.5in 0.25% increments. The meter comes complete with Funnel, Syringe, Tamper, Strike-Off Bar, Calibrated Cup, and Mallet in a plastic Case. **Product Dimensions:** 27x7.25in (686x184mm) HxDia.

VOLUMETAIR AIR METER	
Volumetair Air Meter	HM-33

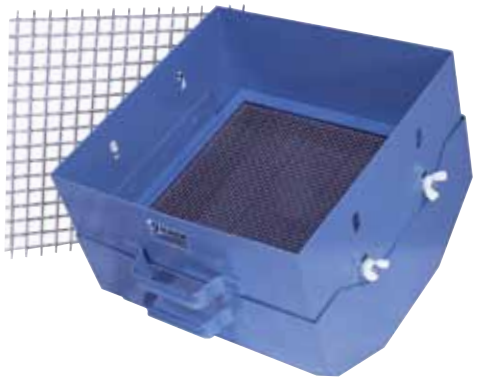
alsoavailable

Compact Field Scales for determining concrete unit weight and yield are listed in this section and our Ovens & Balances section.

HM-24

HM-27

HM-34



SS-35
(Cloth squares sold separately)

HM-25

HMA-1A

PRESSURE METER CALIBRATORS

Calibrators quickly field-check accuracy of concrete pressure meters. With a calibrator in the water-filled base, air meter gauge should read 5% air. Two calibrators are used in a 0.25ft³ meter for a 10% air reading.

HM-24 Brass Calibrator is of precisely machined brass. 7.5x2.125in (191x54mm), HxDia. with 0.5in (13mm) thick base.

HM-25 Plastic Calibrator is rugged plastic with metal weighted ring. 3.75x4in (95x102mm), HxDia.

HM-27 Lightweight Aluminum Calibrator is accurately machined to exact dimensions. They are sturdier than plastic, less expensive than brass models. 5.63x3.25in (143x83mm), HxDia.

PRESSURE METER CALIBRATORS	
Brass Calibrator	HM-24
Plastic Calibrator	HM-25
Lightweight Aluminum Calibrator	HM-27

CHACE AIR INDICATOR KIT
AASHTO T 199

The inexpensive Chace Air Indicator is used for quick estimations of air content in fresh concrete. Method is ideal for rapid field tests or to supplement air meter tests. A sample is placed in the measuring cup, then inserted into the glass tube, and the tube is filled with isopropyl alcohol. Percent air is determined by number of lines the alcohol drops in the stem of the vial after agitation. Kit includes Vial, Rubber Stopper, Cup, cleaning Brush, alcohol Squeeze Bottle, instructions and plastic Case. **Product Dimensions:** 6-1/4inx1-1/8in (159x29mm) LxDia.

CHACE AIR INDICATOR KIT	
Chace Air Indicator Kit	HM-34
Accessories	
Vial & Rubber/Cup	HMA-1A
Vial	HMA-2

ROCKER SCREEN SET
ASTM C172; AASHTO T 141

Wet-sieving or scalping of fresh concrete is often required to remove oversize coarse aggregate particles too large for slump molds, unit weight and air content buckets, or specimen molds. Ordinary test sieves are sometimes used for the task, but it can be easier and more economical to use the SS-35 Rocker Screen Set. The 12in (305mm) square rugged painted steel frame accepts interchangeable squares of woven wire cloth and fits snugly into the pan below. The angled bottom of the pan enhances agitation when using the handles to rock the unit back and forth. ASTM E11 Stainless Steel Wire Cloth squares are held in place by two side clamps with wing nuts. The frame and cloth components disassemble easily for cloth square replacement and fast clean-up. Wire Cloth Squares are ordered separately in specified sizes. The squares can be clamped into the frame for storage. Frame height above cloth is 5in (130mm). Not recommended for use with sizes below No.20 (850µm). **Product Dimensions:** 15x12x10in (390x310x250mm) WxDxH.

ROCKER SCREEN SET	
Rocker Screen Set	SS-35
Accessories	
Wire Cloth Squares, No.7—4in	SSA-351
Wire Cloth Squares, No.8—No.20	SSA-355

CP-75 shown with
HM-30 Air Meter Base (Not Included)

HM-12

HM-28

HMA-491

COMPACT FIELD SCALES
ASTM C29, C138; AASHTO T 19, T 121

The Gilson Compact Field Scale is the portable and affordable solution for weighing concrete, soil and asphalt samples in remote locations. With capacities ranging from 6—200kg (13—440lb), these units enable fast, accurate weight determinations in an easily transportable package. A special hold function feature allows the user to press the hold button and keep weight reading on the display. All models meet ASTM C29, C138 and AASHTO T 19, T 121 concrete specifications when paired with the commonly used unit weight containers purchased seperately.

The large stainless steel platform adds stability when weighing large containers and is easy to keep clean. Base is sturdy steel. Remote mountable indicator comes with a wall bracket and has gross, net, zero and stable functions displayed in 1in (25.4mm) high LCD characters. Weighing units are selectable between lb, kg, oz, lb:oz and all models feature full capacity tare range. Includes a standard RS-232 interface to connect to PC or printer and an aluminum carrying case with fitted foam interior with AC adapter. Scale can also be operated with six AA batteries. Base Dimensions: 11.8x11.8x2in (300x300x50mm), WxDxH. Indicator: 8.7x3.7x1.7in (220x95x43mm), WxDxH. Gross weight is 10.6lb (4.8kg).

COMPACT FIELD SCALES

Model	Range x Readability kg (lb)	Precision (Std. Dev.), g
CP-6	6 x 0.002 (13 x 0.005)	±2.0
CP-15	15 x 0.005 (33 x 0.01)	±5.0
CP-35	35 x 0.01 (75 x 0.02)	±10.0
CP-75	75 x 0.02 (165 x 0.05)	±20.0
CP-150A	150 x 0.05 (330 x 0.1)	±50.0
CP-200	200 x 0.05 (440 x 0.1)	±50.0

UNIT WEIGHT MEASURES

Cylindrical measures are used for determining unit weight of concrete or aggregates. Measures can also be used to determine void content of aggregates. All measures are watertight with top and bottom true and even, and constructed to retain form under rough usage.

Cast Aluminum Measures meet ASTM C29, C138, AASHTO T 19, T 121 specifications, and are machined for superior accuracy. Integral handles are formed into the castings. The measures resist corrosion from cement paste and are preferred in unit weight and yield testing of fresh concrete.

Steel Measures with bail handles are roll-formed, seam-welded, and painted. They are suitable for non-specification checks for unit weight and void content of aggregates when calibrated for volume by end-user.

Aluminum Strike-off Plates are ordered separately. Square plates are 1/4in (6.4mm) thick. Length and width are 2in (50.8mm) greater than diameters of unit weight measures as required by ASTM C138 and AASHTO T 121. 24x5/8in (610x16mm) Tamping Rod can be ordered separately as HM-48.

UNIT WEIGHT MEASURES

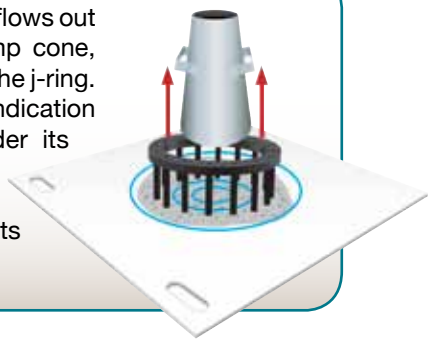
Model	Description	Inside Dimensions Ht. x Dia., in (mm)	Capacity ft³ (L)	Aluminum Strike-Off Plate
HM-10	Cast Aluminum	11.2x14 (284x356)	1 (28.3)	HMA-493
HM-11		11x10 (279x254)	1/2 (14.2)	HMA-492
HM-12		11.5x8 (292x203)	1/3 (9.4)	HMA-491
HM-29		8.8x8 (224x203)	1/4 (7.1)	HMA-491
HM-13		6.1x6 (155x152)	1/10 (2.8)	HMA-490
HM-20	Steel	11.2x14 (284x356)	1 (28.3)	HMA-493
HM-21		11x10 (279x254)	1/2 (14.2)	HMA-492
HM-22		11.5x8 (292x203)	1/3 (9.4)	HMA-491
HM-28		8.8x8 (224x203)	1/4 (7.1)	HMA-491
HM-23		6.1x6 (155x152)	1/10 (2.8)	HMA-490

technote

ASTM C31 now requires a unit weight determination (C138) for each set of concrete strength test specimens.

SCC PASSING ABILITY SET (J-RING)

Self-consolidating concrete (SCC) flows out of the bottom of a modified slump cone, across the baseplate and through the j-ring. Its final measured diameter is an indication of the concrete's flowability under its own weight through obstructions and reinforcing. This provides information necessary to calculate its passing ability.



HM-55

HM-35

SCC PASSING ABILITY SET (J-RING)
ASTM C1611, C1621

Structural elements designed with congested reinforcing steel often require the use of self-consolidating concrete (SCC) mix designs to prevent voids and honeycombing. The J-Ring test, in conjunction with the Slump-Flow test, determines the passing ability of SCC, defined as the ability of the concrete to flow under its own weight.

Depending upon the procedure selected, a modified slump cone is positioned either inverted or upright in the middle of the J-Ring and filled with concrete. The cone is then lifted straight up and the diameter of the resulting circular flow of concrete is measured. A similar test is then run without the J-Ring in place and the difference in the flow diameters is recorded as the passing ability. Additional measurements or visual classifications may also be determined at the conclusion of the test.

Gilson offers this equipment as a set or as individual components. The complete HM-55 set includes the J-Ring assembly, Modified Slump Cone, high-density polyethylene Strike-Off Bar and a plastic Base Plate with convenient cut-out carrying handles. The Base Plate is 36x36x1/2in (914x914x12mm), and is inscribed with concentric circles for use when performing the relative viscosity procedure described in ASTM C1611. J-Ring Dimensions are 5x13.5in (127x343mm), HxDia.

SCC PASSING ABILITY SET (J-RING)	
SCC Passing Ability Set	HM-55
Accessories	
J-Ring	HM-42
Modified Slump Cone	HM-43
Base Plate	HM-54
Strike-Off Bar	HMA-145

L-BOX FOR SELF-CONSOLIDATING CONCRETE

The L-Box offers an alternate method of determining flow and passing ability of self-consolidating concrete (SCC) mixes. This method is in use in Europe, and some DOT's in the United States have adopted the procedure or are examining it. An ASTM procedure is still pending.

The HM-35 is constructed of durable stainless steel with welded joints and consists of a vertical hopper with a sliding gate at the bottom. There are three bars representing reinforcing steel and a horizontal trough in front of the gate. Fresh concrete is placed in the vertical hopper without consolidating. Lifting the slide gate allows the concrete to flow past the bars into the horizontal trough. Final depth of the concrete at the gate and at the end of the trough is measured and the proportional difference expressed as a blocking ratio. Some versions of this procedure require timing the flow with a stopwatch. The HMA-135 11.8x1.6in (300x40mm) Stainless Steel Straightedge is a suggested accessory for striking-off the concrete surface. **Product Dimensions:** 8x24x32.5in (203x610x826mm), WxDxH.

L-BOX FOR SELF-CONSOLIDATING CONCRETE	
L-Box for Self-Consolidating Concrete	HM-35
Accessories	
Stainless Steel Straightedge, 11.8x1.6in	HMA-135

HM-151, HM-152, HM-153 and HM-154

HM-157

HM-142 and HM-143

HM-144

HM-146, HMA-190 and HMA-191

CONCRETE CYLINDER MOLDS

ASTM C31, C192, C1090, C470; AASHTO M 205, T 23, T 126

CONCRETE CYLINDER MOLDS		
Description	**Model**	**Qty. per Case**
Biodegradable Plastic Cylinder Molds for single-use applications are non-absorptive and molded as single piece units for dimensional uniformity. Rugged molds have unlimited shelf life and are weather-resistant, but contain a unique additive that allows microbes present in landfills and composting facilities to break down plastic. Molds are unaffected by heat, light or cement paste. Built-in lip helps retain round specimen shape. Writable surface allows recording of data. Tight-fitting Plastic Lids are purchased separately. For quantities of 25 cases or more of 4x8in or 6x12in molds, add "D" suffix to model number. These models have price savings and lower per-case shipping charges in 25+ case quantities.		
Plastic Cylinder Molds, 6x12in	HM-151	20
Plastic Cylinder Molds, 4x8in	HM-152	36
Plastic Cylinder Molds, 3x6in	HM-153	80
Plastic Cylinder Molds, 2x4in	HM-154	520
Biodegradable Plastic Cylinder Mold Lids are purchased separately to fit Gilson Biodegradable Plastic Cylinder Molds. Slight dome shape with internal ridge snaps tightly over lip of molds. Use of tight-fitting lids assures positive moisture retention.		
Plastic Cylinder Mold Lids, 6in	HM-156	250
Plastic Cylinder Mold Lids, 4in	HM-157	300
Plastic Cylinder Mold Lids, 3in	HM-158	100
Plastic Cylinder Mold Lids, 2in	HM-159	200
Steel Concrete Cylinder Molds are heavy-duty and reusable many times over. 1/4in (6.4mm) thick walls are split longitudinally to allow easy specimen removal. When clamps are released, the mold springs apart slightly. Detachable base plate is tight-fitting. All parts are plated for rust resistance and are non-reactive to cement constituents. Steel molds give uniform results and are dimensionally stable under severe use. HM-144 6x12in Mold has a built-in handle for easier handling of specimens. Available in 6x12in (152x305mm) or 4x8in (102x203mm) sizes.		
Steel Concrete Cylinder Mold with Handle, 6x12in	HM-144	—
Steel Concrete Cylinder Mold, 6x12in	HM-142	—
Steel Concrete Cylinder Mold, 4x8in	HM-143	—
Reusable Cylinder Molds are 1/4in (6.3mm) heavy-wall plastic for extended use and significant cost savings over single-use molds. With proper care, these 4x8in (102x152mm) molds can be used dozens of times. Inexpensive multi-use Cylinder Saver Liners and Disc Inserts allow easy removal of molded cylinders, often by just sliding them out. If necessary, a small, user-supplied hand-held air pump will quickly release specimens. The molds meet the requirements of ASTM C470 and produce exceptionally consistent specimens. Supplied in packages of four, each with a domed plastic lid, Liner, and Insert. Replacement Liners and Disc Inserts are available as accessories.		
Reusable 4in Plastic Cylinder Molds	HM-146	4
Cylinder Saver Liners	HMA-190	36
Disc Inserts	HMA-191	36

alsoavailable

Plastic molds are also available in custom colors instead of standard black. Minimum order is 100 cases per color. Inquire for color price. Custom silk-screened company logos or ID.

HM-290

HM-291

HM-179 & HM-178

HM-141 shown with 6in cylinder mold

HM-161 shown with 6in cylinder mold

HM-188

CONCRETE MOLDS & ACCESSORIES

CONCRETE MOLDS & ACCESSORIES	
Concrete Cube Molds, 6x6in (152x152mm) ASTM C403; AASHTO T 197 Steel molds produce specimens for strength testing, or serve as a container for mortar penetration and set-time tests. Sturdy unit construction with sides hinged to base and ends hinged to sides. Wing-nut fasteners for quick assembly and easy de-molding.	HM-290
Concrete Cube Molds, 150x150mm (5.9x5.9in) ASTM C403; AASHTO T 197, EN 12390-1 Rugged one-piece molded plastic molds for consistent concrete cube specimens. Specimens are removed by injecting compressed air into the base.	HM-291
Cylinder Wraps Canvas-nylon Cylinder Wraps for 4in and 6in diameter concrete test cylinders prevent damage to the cylinder in transit and minimize shattering when a cylinder is broken in compression tests–especially useful with unbonded capping systems. Wraps are secured by velcro strips. 4in Cylinder Wrap 6in Cylinder Wrap	 HM-178 HM-179
Plastic Concrete Cylinder Carrier Fits any 6in (152mm) diameter plastic cylinder mold with a wide lip and can be used with lids in place. Flexible plastic ring slides onto mold from bottom and is held in place by top lip. When ready to transport, carrier handles are turned up and snap together in the middle. Carriers are packaged in cartons of 50. Recommended for single use.	HM-141
Ring Concrete Cylinder Carrier Handy for moving heavy 6x12in (152x305mm) concrete cylinders and loading/unloading curing tanks. Sliding ring lifts to allow easy placement of bottom pad under cylinder, then slides down until locked in position by a locating pin. Fits cylinders in plastic molds with lids or bare cylinders. Constructed of stainless steel with rubber hand grip.	HM-161
Gripper Concrete Cylinder Carrier Concrete cylinder is held securely by a hand-grip pincer action. For 6in (152mm) diameter cylinders. Product Dimensions: 16x8.5in (406x216mm), LxW.	HM-188
Cylinder Stripping Tool Cylinder Stripping Tool is an easy to use and inexpensive device for removing single-use cylinder molds from all sizes of concrete cylinders.	HM-160

HM-160

HM-279

HM-280

HM-331

HM-140

VIBRATING TABLE
ASTM C31, C192; AASHTO T 23, T 126

Vibrating Table consolidates fresh concrete in cylinder and beam molds. Large platform is 20x20x10in (508x508x254mm). Included separate control box has On/Off switch, silicon rectifier, and rheostat knob to adjust amplitude of 3,600 VPM vibration. Power cable supplied by user. Load capacity is up to 300lb (136kg).

VIBRATING TABLE

Vibrating Table, 115V/60Hz.....HM-140
230V/50Hz.....HM-140F

CONCRETE BEAM MOLDS
ASTM C31, C192, C403; AASHTO T 23, T 126

Concrete Beam Molds are available in several configurations, all meeting ASTM and AASHTO standards for molding specimens for flexural strength testing using center or third-point loading.

HM-279 and HM-281 Hinge-Free Steel Molds are lightweight and hinge-free to collapse into individual parts for easy stripping and cleaning. They are compact when broken down and assemble quickly with plated bolts, wing nuts, and stainless steel U-bolt carrying handles.

HM-280, HM-282, HM-284 and HM-286 1-Piece Hinged Steel Molds are fabricated with the side plates hinged to both the base and end plates. Wing nuts fasten sides and ends.

HM-331 Plastic Interlocking Mold is durable copolymer plastic and one-quarter the weight of steel, and easier to strip and clean. Ribbed interlocking parts hold dimensions and shape securely. Parts are held with thumb screws for easy stripping, cleaning and assembly. Inside surfaces are smooth and watertight to eliminate need to grease or seal joints.

CONCRETE BEAM MOLDS

Description	Model	Size in (mm)
Steel, Hinge-Free	HM-279 HM-281	6x6x20 (152x152x508) 6x6x21 (152x152x533)
Steel, 1-Piece Hinged	HM-280 HM-282 HM-284 HM-286	6x6x21 (152x152x533) 6x6x24 (152x152x610) 6x6x30 (152x152x762) 6x6x36 (152x152x914)
Plastic, Interlocking	HM-331	6x6x21 (152x152x533)

HM-133

CONCRETE VIBRATOR
ASTM C31, C138, C 192; AASHTO T 23, T 121, T 126

Concrete Vibrator consolidates freshly molded concrete specimens in the lab or field. The 1-1/4hp, 9 amp AC/DC power unit delivers high-amplitude 10,000+ vibration per minute via a 3ft (0.9m) flexible shaft connected to a 3/4in (19.1mm) diameter x 12in (305mm) long vibrating head. The lightweight aluminum power unit housing and waterproof switch are protected by a wrap-around chrome plated tubular frame. The HM-133 has UL and CSA approval and comes with a heavy-duty grounded cord. **Product Dimensions:** 12x6x6in (305x152x152mm), LxWxH.

CONCRETE VIBRATOR

Concrete Vibrator, 115V, 50/60Hz.....HM-133
230V, 50/60Hz HM-133F

MC-250P

Pro Controller

Pro-Plus Controller

CONCRETE COMPRESSION TESTING MACHINES
ASTM C39, E 4; AASHTO T 22; BS 1610, 1881

Gilson makes it easy to build the machine that best fits your application. Select a load frame from our 250, 300, 400 or 500 Series with capacities from 250,000—500,000lbf (1,112—2,224kN), and equip it with a state-of-the-art electronic controller. Our Pro and Pro-Plus Controllers cover application needs from basic to sophisticated. We will also help you design a custom machine with capacity up to 1,000,000lbf (4,448kN) for testing a wide range of sample types and sizes.

With solid steel cross-heads from 3—6in (76—152mm) thick on our standard frames, Gilson load frames are the stiffest in the industry. The 300 Series frames and above are among the few meeting the stringent ACI 363 rigidity recommendations. Standard frames are equipped for testing 6x12in (152x302mm) cylinders, but may be outfitted with accessories to accommodate testing of many different sized cubes, cores, beams and cylinders. The 400P Series frames accommodate two-block masonry prisms. Load Frame Mounting Stands are included with 400 series and higher frames and for 250 and 300 Series. Mounting stands place the lower platen at the correct height for safe, efficient handling of specimens. All frames include latchable steel Fragment Guard Doors. Controllers are side-mounted, but may be installed in a separate console. Contact us for a quotation on console mounted models.

Bottom mounted hydraulic ram applies compression force upward, except for 250 Series, which are mounted in the top crosshead. Precision ground piston with O-Ring sealing and Teflon back-up ring rests in a polished steel cylinder. Spherically-seated upper platen assemblies are ground, hardened, nickel plated and scribed with concentric circles. Lower platen for 250 Series is 6.5in (165mm) diameter, and other series have oversized rectangular compression tables. Locking stem holds upper platen assembly securely in place, yet allows for quick substitution of accessory components.

Two-stage, oil-immersed pumps drive hydraulic systems on all frames. The first high volume, low-pressure stage rapidly advances the piston. The pump automatically switches at 135psi of pressure to the second stage of low volume, high pressure flow used during testing to maintain a continuous rate of loading from 2,000—200,000lbf per minute with the value set in its Metered Advance Position. Hold feature pauses pressure advance indefinitely and Retract feature releases pressure to allow return of piston to starting position. A high-pressure hydraulic safety valve prevents use beyond maximum machine capacity. A pressure bleed hole in the piston helps avoid overextension of the ram. Our unique 1/2hp system on the 250 and 300 Series runs cooler, offers better load control and is the quietest available. The 400 and 500 Series use a more powerful 3/4hp motor. Both systems operate on 115V/60Hz power supply. Specify 230V/50Hz operation by adding an "F" suffix to the model number.

Pro Controllers have practical designs with high-end features. These units simultaneously display both live load and rate of load during testing. Peak load and average rate of load are displayed automatically at test conclusion and held until reset. Up to 700 tests can be stored in memory with date and time, sample I.D., peak load, and average rate of load data for later downloading to a PC or serial printer.

A high sampling rate and digital filtering result in smooth, uniform control of load pacing. Accuracy is generally better than ±0.5% of indicated load from 1% through full capacity, exceeding ASTM C39 and E 4 requirements. The 5.3in (135mm) wide backlit VGA liquid crystal screen has a 240x64 pixel display area and adjustable contrast settings. Test data is displayed in user-selectable engineering units of lbs, kN, kg, or N, and rate of load is shown in force units per second. MCA-29 Able Cable® allows direct transfer of test data in memory to user's PC through a USB port. The Pro Controller can also be configured to output test data directly to a serial printer.

The Pro Controller is made in the USA, features a two-year manufacturer's warranty, and is housed in a sturdy stainless steel, NEMA-4 rated moisture and dust-proof enclosure to resist the harshest environments. The Pro is UL, CUL, CE, and Measurement Canada listed. Inquire for Pro Controller as a field-installed retrofit package on your existing compression machine. **Product Dimensions:** 30x12x34in (762x305x864mm), WxDxH.

Pro-Plus Controllers offer the most accurate and advanced system available today for the testing and documentation of concrete strengths. Ease of operation and dependability are two important features of this new system. All

MC-300P

helpfulhint

Gilson custom-builds compression machines with capacity up to 1,000,000lbf (4448kN). Machines with multiple load cells, specially-sized frames, and console-mounted controllers and displays are also available.

MC-400PR

information is clearly displayed on the 4.6x3.4in (116x86mm), WxH back-lit VGA graphic panel. The large 320x240 pixel screen with large alphanumeric characters has adjustable contrast to make it easily readable under any lighting conditions.

Soft-key menus allow fast and easy set up. A sample type menu lists six common specimen and test types: cylinder, cube, third-point and center-point beams, cylinder-split and cross-sectional area. Test results are automatically stored for hard-copy documentation. In case of accidental data loss, a calibration restore feature allows the original factory calibration to be uploaded to the controller via a communication port. The original calibration data file is maintained at the factory.

During a test cycle, load, stress and rate of load in the time units selected are displayed simultaneously. At test completion, peak stress, load, and if activated, the average loading rate during the test, are automatically displayed. Selectable engineering units include Force: lb, kN, kg and N; Stress: psi, mPa, kg/cm², and kPa; Size: in, mm, and cm; and Time in seconds or minutes. The Pro-Plus also features live X-Y plotting of load vs. time.

The controller can automatically store test results to memory for downloading to a printer, or to a PC for further recording and reporting options. Up to 500 tests can be stored to memory and printed in a spreadsheet format listing test date and time, sample ID number, sample type, specimen area and length, peak load and peak stress. Data includes average rate of load, C39 cylinder correction factor, break type, cylinder cap type, sample age, weight, and operator ID number. Spanish or English language menus can be toggled in the settings. Inquire for other options to store and download test data.

The Pro-Plus has a two-year warranty and is built for harsh laboratory environments and features a stainless steel NEMA-4 enclosure that is both moisture and dust proof. Heavy-duty tactile keys are tested to over five million actuations. Accuracy is achieved through a five-point linear calibration program to exceed ASTM C39 and E 4 requirements and in general, is better than ±0.5% of indicated load from 1% to machine capacity. The Pro-Plus Controller is also UL, CUL, CE, and Measurement Canada listed. **Product Dimensions:** 10.5x4.5x11.2in (267x114x284mm), WxDxH.

CONCRETE COMPRESSION TESTING MACHINES

Controller	Model[2]	Total Capacity Mlbf (kN)	Maximum psi, 6x12in Cylinder	Overall Size with Stand WxDxH, in	Opening with Platens WxH, in.	Lower Platen Dimensions, in
Pro	MC-250P	250 (1,112)	7,000	27 x 14 x 58	9.3 x 13.4	6.5 dia. x 1.9
	MC-300P	300 (1,335)	8,500	29 x 16 x 60	9.5 x 14.4	9 x 11 x 1.9
	MC-400P	400 (1,780)	11,300	39 x 20 x 61	13.3 x 14.3	12 x 18 x 2
	MC-500P	500 (2,224)	14,100	31 x 24 x 61	14 x 14.3	13 x 18 x 2
Pro-Plus	MC-250PR	250 (1,112)	7,000	27 x 17 x 57	9.3 x 13.4	6.5 dia. x 1.9
	MC-300PR	300 (1,335)	8,500	32 x 17 x 59	9.5 x 14.4	9 x 11 x 1.9
	MC-400PR	400 (1,780)	11,300	39 x 20 x 61	13.3 x 14.3	12 x 18 x 2
	MC-400PRP[1]	400 (1,780)	11,300	39 x 20 x 70	13.3 x 22.3	12 x 18 x 2
	MC-500PR	500 (2,224)	14,100	31 x 24 x 61	14 x 14.3	13 x 18 x 2

[1] Frames configured for 2-Block masonry prisms. [2] Specify 230V/50Hz operation by adding an "F" suffix to the model number.

MCA-4

MCA-7

MCA-11

MCA-13R

MCA-24

HM-130

HM-131D

ATTACHMENTS & ACCESSORIES FOR CONCRETE COMPRESSION MACHINES

Many concrete laboratories test a variety of specimens other than standard 6x12in (152x305mm) cylinders. These attachments are compatible with 500, 400, 300, and 250 concrete compression machine series models. All heads and platens included in sets strictly comply with test standards indicated. Spacers are painted. Upper components are attached to machines by a locking stem system. Additional spacers for special testing are available.

Load Frame Mounting Stands serve to position compression platens at convenient loading height and are included on all 400 Series and above frames. Mounting stands are recommended for all compression machines.

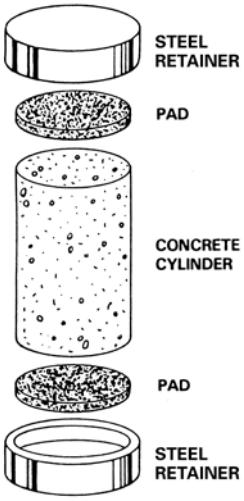
ATTACHMENTS & ACCESSORIES FOR CONCRETE COMPRESSION MACHINES

Item	250 Mlbf Frame	300 Mlbf Frame	400/500 Mlbf Frame	Standards ASTM	Standards AASHTO
Universal Flexural Set for 6x6in beams, 12—30in span for center or third point loading.	MCA-4	MCA-34	MCA-4	C78 C293	T 97 T 177
Cube Test Set 2in includes pedestal and upper platen assembly.[1]	MCA-6	MCA-5	MCA-7	C109	T 106
Cube Test Set 6in includes upper platen and spacer. (Also lower platen for 250/300 series)	MCA-8	MCA-3	MCA-9	—	—
Cylinder Splitting Set includes 2x12in, WxL bearing bar head. (Also lower platen for 250/300 series)	MCA-10	MCA-30	MCA-11	C496	T 198
Masonry Test Set includes upper platen assembly. 400/500 Series tests up to 12in wide block; 250/300 Series includes lower platen and tests 8in block.	MCA-12R	MCA-32	MCA-13R	C140	—
4in Spacer for testing 4x8in cylinders.	MCA-14	MCA-19	MCA-15	C39	T 22
Set for Testing 3x6in Cylinders includes upper platen and spacer.[1]	MCA-16	MCA-18	MCA-17	C39	T 22
Load Frame Mounting Stand	MCA-24	MCA-27	Included	—	—
Printer Accessory	MCA-26	MCA-26	MCA-26	—	—
Load Cell Set of 25 Mlbf fits digital models. Factory installed only.	MCA-20	MCA-20	MCA-20	—	—
Adapter (4in spacer) required to fit MCA-20 to MC-400P only.	N/A	N/A	MCA-15	—	—
Compressometers measure deformation and strain of concrete cylinders during compression for determination of modulus of elasticity. The units consist of two yokes mounted around the specimen. The bottom is rigidly attached, and the upper yoke is hinged to permit pivoting. A fixed rod connects the two. Yokes are aluminum alloy; other parts are cadmium plated steel. A mechanical dial or digital indicator measures specimen deformation Indicators have 0.2in (5.08mm) range and 0.0001in (.0025mm) divisions. Models with either mechanical dial or digital indicators fit standard 4in (102mm) or 6in (152mm) concrete cylinders.				C469	—
6x12in Compressometer with Dial 6x12in Compressometer with Digital 6x12in Compressometer/Extensometer with Dial 6x12in Compressometer/Extensometer with Digital	HM-130 HM-130D HM-131 HM-131D	HM-130 HM-130D HM-131 HM-131D	HM-130 HM-130D HM-131 HM-131D		
Compressometer/Extensometers are similar to compressometers, but a third center yoke attaches to the specimen to measure horizontal extension. This allows a combined determination of both modulus of elasticity and Poisson's ratio. A second indicator between yoke segments measures the transverse deformation simultaneously. Models are available with either mechanical dial or digital indicators to fit standard 4in (102mm) or 6in (152mm) concrete cylinders.				C469	—
4x8in Compressometer with Dial 4x8in Compressometer with Digital 4x8in Compressometer/Extensometer with Dial 4x8in Compressometer/Extensometer with Digital	HM-203 HM-203D HM-207 HM-207D	HM-203 HM-203D HM-207 HM-207D	HM-203 HM-203D HM-207 HM-207D		

[1]The same Upper Platen assembly is used for Cube Test and 3x6in Cylinder sets.

HM-180

Neoprene Pads



Unbonded Capping Set

HM-239

UNBONDED CAPPING SETS & PADS
ASTM C1231; AASHTO T 22

The convenient unbonded pad cap method saves time, labor, and expense compared to sulfur capping of concrete cylinders for compression testing. The need for melting pots, ladles and handling of hot, molten capping compound is eliminated. Systems are available for 6in, 4in, 3in, and 2in diameter cylinders. Retainers and pads for 2in specimens are also suitable for use on 2-1/8in diameter rock cores.

The method employs placement of a steel retainer ring holding a tough 1/2in, (12.7mm) thick neoprene pad at each end of the cylindrical specimen. Retainers are permanent with normal use and care, and Pads are reusable 100 times or more with qualification testing by user. Retainers and Pads are ordered separately.

Steel Retainers are alloy steel, precisely machined to specified dimensions, and plated inside and out to resist corrosion. All bearing surfaces are plane to within 0.002in (0.05mm). The 6in Retainers meet "acceptable configuration" of AASHTO T 22 and do not require acceptance testing as with alternate systems. Steel Retainers are sold in sets of two.

Neoprene pads flow during compression to fill irregularities in cylinder ends and assure load uniformity. Pads comply with the latest version of ASTM C1231. 50 Durometer Pads meet tensile strength and durometer requirements of AASHTO T 22 and are appropriate for ASTM C1231 from 1,500—6,000psi (10—40mPa). 60 Durometer Pads cover common design strengths from 2,500—7,000psi (17—50mPa). 70 Durometer Pads may be used for strengths from 4,000—7,000psi (28—50mPa), and with additional qualification testing by user, up to 12,000psi (80mPa). Neoprene Pads are sold individually. Two are required for compression testing of concrete cylinders. Add "CS" to model numbers of 4in and 6in Neoprene Pads to specify case quantities of 12 pads at reduced per-pad price.

Quick Release Polysaccharide powder is a lubricant and bond breaker that extends pad life, allows more consistent test results, and promotes easier change-out of pads. For quick release of pads from Unbonded Capping Set Caps, HM-277 Kit includes 8oz of powder in a Shaker Dispenser and 48oz of refill powder. Order additional filled Dispensers or Powder Refills in packs of two.

UNBONDED CAPPING SETS & PADS

Diameter	Steel Retainers (Sets of 2)	Neoprene Pads (Sold Individually)		
		50 Durometer	60 Durometer	70 Durometer
6in	HM-180	HM-363	HM-364	HM-365
4in	HM-181	HM-360	HM-361	HM-362
3in	HM-182	HM-366	HM-367	HM-368
2in	HM-183	HM-369	—	HM-370

Accessories

Quick Release Powder Kit HM-277
Quick Release Dispenser, 2 pack HMA-326
Quick Release Refill, 2 pack HMA-327

COMBINATION PORTABLE BEAM TESTER

Combination Portable Beam Tester transports and sets up easily for rapid field checks of 6x6in (152x152mm) concrete beam specimens with minimum length of 20in (508mm). Conversion between third-point and center-point flexural loading configurations is quick and easy. The hydraulically loaded unit does not strictly comply with ASTM/AASHTO requirements, but results compare favorably with more expensive machines meeting the standards.

Upper bearing assemblies are provided for both center-point and third-point loading. Third-point assembly bearing points are 6in (152mm) center-to-center. Elastic bands hold the assemblies in raised position for easier specimen placement. Lower bearing points on the load frame are 18in (457mm) on-center and pivot as the test beam deflects. The manually-operated pump assembly with 6in (152mm) diameter gauge is attached by a 4ft (1.2m) quick-disconnect hose to the hydraulic cylinder and load frame. The high-quality, direct-reading gauge features ±0.25% accuracy, and is graduated from 0-1500 psi. **Product Dimensions:** 22x8x14in (559x203x356mm) WxDxH.

COMBINATION PORTABLE BEAM TESTER

Combination Portable Beam Tester HM-239

HM-186

HM-189

HM-205

HM-166

GILSON GRAY IRON 9000 CAPPING COMPOUND
ASTM C287, C617; AASHTO T 231

Gilson Gray Iron 9000 is a new and improved sulfur mortar capping compound blended especially for concrete strength testing. Ultra-thin flakes are carefully formulated from sulfur and mineral filler for guaranteed consistency and faster melting times. Gray Iron melts quickly at 230° to 240°F (110° to 115°C), with a wide optimum pouring range of 265° to 290°F (129° to 143°C) and low odor. Set time is about one minute, and shrinkage is minimal. If accidental overheating occurs, the compound remains usable after cooling, and solidified material can be remelted with no loss of properties. Compressive strength exceeds 8,000psi at two hours for ASTM C617 tests of 2in cubes, and bond strength is 150psi or more. Strength and bond properties of capped specimens does not degrade over time, even when stored in humid condtions. Special plasticizer additives ensure even load distribution during testing. Gray Iron can be used for testing of much higher strength concretes with additional aging. Gray Iron 9000 is supplied in 50lb moisture-resistant bags. Order 40 or more bags for best pricing at pallet shipping quantity.

GILSON GRAY IRON 9000 CAPPING COMPOUND

Gilson Gray Iron 9000, 1—39 bags HM-186
Gilson Gray Iron 9000, 40—399 bags HM-187

MELTING POTS
ASTM C617; AASHTO T 231

Melting pots are useful for preparing capping compounds, wax, tars, asphalt, and other materials in the lab. Each has precision temperature control for 38°—160°C (100°—320°F) range that holds to set point. A high limit control turns pots off at 182°C (360°F). The cast aluminum inner liner is contacted from top to bottom by a unique helically wound element to give even heat distribution. Durable polished stainless steel outer case assures long, dependable service. Load molten capping compound into capping fixture with 8oz (237ml) stainless steel HM-210 Ladle.

VERTICAL CYLINDER CAPPERS
ASTM C617; AASHTO T 231

Popular vertical design for capping concrete test cylinders assures smooth, right-angle end surfaces. Cylinder is placed into mold against upright guide after filling recess with molten capping compound. Time-saving HM-166 Lever-Matic model has built-in release lever to free capped cylinder.

Capper bottom plate is 1in (25.4mm) thick steel and ground to 0.002in (0.05mm) planeness with separate ring to form recess. Ring and vertical guide are removable to permit regrinding to proper planeness after extended use. Corner mounting holes are provided. HM-166 has a spring-loaded hand cam lever that tilts cylinder forward to release it from capper. HM-164 and HM-163 for smaller cylinders are similar to HM-166, but do not have the lever release.

VERTICAL CYLINDER CAPPERS

6x12in Cylinder Capper HM-166
4x8in Cylinder Capper HM-164
3x6in Cylinder Capper HM-163

Accessories

Replacement Ring for HM-166 ..... HMA-21

MELTING POTS

Model	Capacity qt (L)	Dimensions IDxDepth, in (mm)	Electrical V/Hz	amps
HM-200 HM-200F	4 (3.8)	7.5 x 7 (191 x 178)	115/60 230/50-60	6 3
HM-201 HM-201F	8 (7.6)	10 x 6 (254 x 152)	115/60 230/50-60	10 5
HM-202 HM-202F	12 (11.4)	10 x 9 (254 x 229)	115/60 230/50-60	11 5.5
HM-205 HM-205F	20 (18.9)	14 x 7 (356 x 178)	115/60 230/50-60	13 6.5
HM-206 HM-206F	24 (22.7)	14 x 9 (356 x 229)	115/60 230/50-60	14 7
HM-204 HM-204F	28 (26.5)	14 x 11 (356 x 279)	115/60 230/50-60	15 7.5

Accessories

Ladle, 0.25qt (0.24L) HM-210

HM-716A

HMA-1054

HM-162

CONCRETE CYLINDER END GRINDERS
ASTM C39; CSA A23.1-04, A23.2-04

- **Four to six specimens can be prepared at once; as many as 100 per day.**
- **Eliminates need for qualification testing of capping materials for high-strength concrete.**
- **Reduces health and safety concerns and is much less labor intensive.**

The Concrete Cylinder End Grinder is an essential tool for modern concrete laboratories. This multi-sample preparation unit eliminates the need for qualification testing or documentation of common capping methods, especially when testing design strengths exceeding 7,000psi (48.3mPa). It eliminates time consuming and labor intensive sulfur-capping and reduces health hazards and safety concerns. It can also "save" samples with damaged or poorly finished ends that would otherwise be unusable for testing. Large laboratories with heavy sample volumes will find this machine cost-effective for processing their regular concrete samples on a daily basis. 100 or more cylinders can be processed in a typical workday, and can be tested immediately. No plumbing or drains are required and dust hazards are eliminated. Technicians are free to perform other duties during grinding cycles.

Once the cylinders are mounted in the carousel and the grinding cycle started, operation is entirely automated. The grinder continues to operate until a preset 4mm of material has been removed from each sample. The machine then polishes the cylinder ends and automatically shuts down. The included water tank and pump circulate water to the diamond grinding head for cooling and flushing of cuttings. Replacement Diamond Grinding Heads are available as HMA-1050. Other accessories include HMA-1051 Mobile Cart for Water Tank, HMA-1052 Tool Set for measuring planeness of sample ends, and HMA-1053 Inspection Jig for checking perpendicularity and alignment. The Cylinder End Grinders require 30A power supply at 208-220V/60Hz single phase. Inquire for units wired for 50Hz power supply. **Product Dimensions:** 48x48x60in (1,219x1,219x1,524mm), WxDxH.

HM-714A Concrete Cylinder End Grinder is equipped to handle up to six 4in (102mm) cylinders in each cycle, and is recommended when only 4in diameter specimens are to be tested.

HM-716A Concrete Cylinder End Grinder accommodates four 6in (152mm) diameter test cylinders, and includes adaptors to accept four 4in (102mm) cylinders. The unit may only be operated with one size cylinder at a time, and is recommended in labs where the two specimen sizes are to be tested. The HMA-1054 Carousel can be fitted to this unit to allow grinding of six 4in diameter cylinders only.

CONCRETE CYLINDER END GRINDERS	
Concrete Cylinder End Grinder, for Six 4in Cylinders	HM-714A
Concrete Cylinder End Grinder, for Four 4in or 6in Cylinders	HM-716A
Accessories	
Replacement Grinding Head	HMA-1050
Water Tank Cart with Wheels	HMA-1051
Planeness Tool Set	HMA-1052
Alignment Inspection Jig	HMA-1053
Carousel for Six 4in Cylinders	HMA-1054

DIAMETER MEASURING TAPE

The Pi Tape brand diameter measuring tape quickly gives a direct reading of average diameter with micrometer accuracy simply by placing tape around circumference of the specimen. Use for round or out-of-round specimens of concrete, soils, and asphalt. The 0.10in (2.5mm) thick spring steel tape has graduations and numerals engraved and acid-etched on a ground surface. Vernier scale permits readings to .001in (.025mm) diameter; accuracy to ±.001in, furnished with certificate of calibration traceable to NIST. The tape is graduated in English units, suitable for measuring diameters from 2—12in. Metric Pi Tape reads from 50 to 300mm to 0.01mm accuracy.

DIAMETER MEASURING TAPE	
Diameter Measuring Tape, Inches	HM-162
Diameter Measuring Tape, Metric	HM-162M

HM-678

MASONRY BLOCK CAPS

Masonry Block Caps offer a unique unbonded capping method for the compressive strength testing of masonry units. This cost-effective alternative to sulfur capping reduces time, labor, expense and equipment such as ladles and melting pots. The fibrous composite is laminated to the tough plastic sheeting, providing rigidity, proper load distribution, and protection of the machine platens. Composite material flows during compression to fill the irregularities of the concrete masonry unit, distributing test loads uniformly without damaging the cell stems.

This method is comparable in accuracy to capping with hydrocal gypsum but is not an accepted method in the ASTM C140 method. Block Caps are ideal for internal QC testing applications and eliminate the need for mixing, cutting or measuring. Sizes available for 8x16in and 12x16in masonry block. Each set of caps is designed for a single use. Each carton contains ten sets of caps.

MASONRY BLOCK CAPS	
Masonry Block Caps, 8in x 16in (203 x 406mm)	HM-678
Masonry Block Caps, 12in x 16in (305 x 406mm)	HM-679

HM-630

HM-632

MOISTURE ROOM CONTROL PANEL
ASTM C92, C511; AASHTO M 201, T 23

This wall-mounted Control Panel automatically blends hot and cold water supplies to keep your concrete specimen curing environment at precisely 73.4 ± 3°F (23 ± 1.7°C) and 100% humidity. The system is a stand-alone device to be used with HMA-298 Atomizing Spray Heads. The panel system does not integrate with other foggers, misting devices, compressed air, or HVAC units. A dedicated hot water tank is recommended to assure constant temperatures.

The easy to read digital controller display allows easy input of temperature set points for automated control. A manual bypass system assures continuous maintenance of specified temperature and humidity levels if power is interrupted. The panel has space for a temperature chart recorder or data logger. Quick-connect water line fittings are fast and easy to install. Inquire for custom design of a closed-loop layout with atomizing spray head pattern for your cure room based on room dimensions, and water temperatures and pressures. One-pass water chillers also available as required. **Product Dimensions:** 30x8x20in (762x203x508mm) WxDxH.

MOISTURE ROOM CONTROL PANEL	
Moisture Room Control Panel, 115V/60Hz	HM-630
Accessories	
Atomizing Spray Head	HMA-298

AQUAFOG® TURBO XE FOGGING FANS
ASTM C511; AASHTO M 201

Aquafog® Turbo XE fogging units humidify concrete curing rooms up to 35ft (12m) long. The self-flushing system forces tap water through the fan blades, atomizing as the liquid exits the blades. High-speed centrifugal force and powerful air flow produce a high quality fog with uniform distribution. Turbo XE Foggers operate on ordinary water supplies, even well water, without the risk of clogging. Specialized pumps and filtering equipment are not needed.

The Turbo XE is engineered for extreme conditions of 100% RH in corrosive environments. Units are constructed with stainless steel hardware, polyethylene enclosures, and anodized aluminum. NEMA-4 connections are standard. 1/2hp continuous-duty wash-down motors can be configured to operate on either 115V or 230V/60Hz power supplies. "F" models operate on 230V/50Hz with similar 1/3hp motors. Each unit is equipped with an adjustable bracket, 12ft (3.7m) heavy-duty power cord, 20ft (6m) water line, 16ft (4.9m) drain line, and a 20—300cc/minute Visual Flowmeter Panel. Select model based on room length. Models are the same physical size, but differ in design and performance. A unit with too much capacity may saturate wall surfaces while humidification remains inadequate. Rooms wider than about 24ft (6m) will have more uniform humidification with use of the HM-402 Oscillator, adjustable for up to 360° rotation.

HM-631 Aquafog® Small Turbo XE is for rooms from 400 to 700ft³ (37 to 65m²). Fan is rated at 1,760ft³ per minute with maximum fog output at 5gal per hour. 50Hz "F" model has 1,870ft³ and 7gal per hour output. **Product Dimensions:** 20.5x17x22.5in (521x432x572mm), WxDxH.

HM-632 Aquafog® Large Turbo XE is for larger rooms from 750 to 1,150ft² (70 to 107m²). Fan is rated at 2,160ft³ with maximum fog output of 11gal per hour. 50Hz "F" model has 2,580ft³ output at 14gal per hour. **Product Dimensions:** 20.5x17x22.5in (521x432x572mm), WxDxH.

AQUAFOG® TURBO XE FOGGING FANS	
Aquafog® Small Turbo XE, 115-230V/60Hz	HM-631
230V/50Hz	HM-631F
Aquafog® Large Turbo XE, 115-230V/60Hz	HM-632
230V/50Hz	HM-632F
Accessories	
Oscillator, 115V/50-60Hz	HMA-402
Oscillator, 230V/50-60Hz	HMA-402F

HM-651

HM-655

HM-648

CURING TANK HEATERS & CIRCULATORS
ASTM C192, C511; AASHTO M 201, T 23

Heaters and Circulators maintain curing temperature at required 73.4°F ±3°F (23°C ±1.7°C) in curing tanks. Number needed will depend on tank size, ambient air temperature, and specimen loading. One HM-651 heater will normally supply sufficient heat to control up to 350gal at 53°F (12°C) or higher ambient temperatures. Two or more HM-655 Circulators are recommended for larger tanks.

HM-651 Curing Tank Heater has dial-type thermostat. The 1,000 Watt, 10 amp Incoloy shielded element is attached to a sealed stainless housing. The unit is equipped with a three-prong grounded plug, fuse, run light, and mounting bracket. An instruction decal describes easy operation. **Product Dimensions:** 4.5x7.5x 23in (114x191x584mm).

HM-655 Curing Tank Circulator, is a 1/125hp (36 Watt) silent submersion pump with 3 GPM (11.4L/ min.) rating at 1ft (0.3m) height. The steady but gentle circulation from the 1/4in (6.4mm) MNPT discharge may be aimed by placing the housing on any of four sides. Working parts are epoxy-encapsulated in the glass-filled nylon housing which comes with 6ft (1.8m) grounded cord. 230V "F" suffix model has a 1/60hp with 2/3 of flow of the 1/125hp pump. **Product Dimensions:** 4x4x3in (102x102x76mm).

CURING TANK HEATERS & CIRCULATORS	
Curing Tank Heater, 115V, 50/60Hz[1]	HM-651
Curing Tank Circulator, 115V/60Hz	HM-655
230V, 50/60Hz	HM-655F

[1] For 230V operation of Heater, order TR-3002 transformer.

HEATER/CIRCULATOR
ASTM C192, C511; AASHTO M 201, T 23

The versatile clamp-on Heater/Circulator has 1,100 Watt heating capacity and provides accurate temperature control for water tanks and baths up to 7.4gal (28L) from ambient + 9° to 302° ±0.09°F (ambient + 5° to 150° ±0.05C). Temperature range and stability is dependent upon tank volume, surface area and insulation. Capacity is sufficient to control most tanks to specified temperature levels. The PID microprocessor controller features a digital LED display that reads out in °C or °F, adjustable over-temperature protection and low-liquid level cut-off. The two-speed pump switches from 2.4 to 4gpm per minute (9 to 15L) to adapt to a wide range of tank sizes and types. All contact parts are stainless steel. An adjustable flow director accepts 1/2in ID tubing for external circulation. The long heating element is designed for immersion from 3—7in (76—178mm) and mounting clamp fits tank walls up to 1.2in (30.2mm) thick. Two-year manufacturer's warranty. Supplied with a 6ft power cord with grounded plug. **Product Dimensions:** 5.8x4.6x12.3in (146x12x32mm) WxDxH.

HEATER/CIRCULATOR	
Heater/Circulator, 120V/60Hz	HM-648
240V/50Hz	HM-648F

also available

See Thermometers, Temperature Recorders and Data Loggers listed separately in the Thermometers and Timers section.

HM-621

CURING TANKS
ASTM C192, C511; AASHTO M 201, T 23

Gilson offers a range of 2ft (0.61m) deep tanks for curing cylinders, beams, and other molded specimens. Pipe-reinforced top provides extra-strong, crush-proof rim, and sturdy rolled seam with enclosed sealant prevents leaks. Side panels are 22-gauge, zinc-coated galvanized steel with both diagonal and horizontal corrugations for additional strength. Bottom is 20-gauge, zinc-coated galvanized steel. All tanks have drain plug. Curing Tanks are oversized and must be shipped via motor freight.

CURING TANKS		
Model	Tank WxLxH, ft (m)	Capacity gal (L)
HM-620	2x4x2 (0.6x1.2x0.6)	95 (360)
HM-621	2x6x2 (0.6x1.8x0.6)	142 (538)
HM-622	2.5x8x2 (0.8x2.4x0.6)	252 (954)
HM-626	3x8x2 (0.9x2.4x0.6)	300 (1,136)

HM-112

HM-491

HM-49

HM-116

FIELD CURING CHEST & TRANSPORT RACKS

ASTM C31; AASHTO T 23

HM-112 Field Curing Chest is collapsible and easily fits behind a truck seat or in a car trunk until needed. This unit protects concrete specimens from harsh weather conditions and eliminates the time and expense of fabricating wooden curing boxes at each job site. This lightweight zippered chest holds up to nine 6x12in (152x305mm) concrete cylinders, folds easily for storage and has 1/2in (12.7mm) of polymer foam insulation. The rigid floor is removable for use as a slump test base if desired. **Product Dimensions:** 24x24x14in (610x610x356mm), WxDxH.

HM-116 Cylinder Transport Rack is designed to fit inside the HM-112 Storage Chest and will hold nine 6in (152mm) diameter cylinders for initial curing and transport. This sturdy molded plastic rack is lightweight and waterproof. **Product Dimensions:** 24x24x8in (610x610x203mm), WxDxH.

HM-114 Cylinder Transport Rack will hold eight 4in (102mm) diameter concrete cylinders with or without molds for curing and transport. Plastic rack also allows easier handling of multiple cylinder specimens. Two racks will fit in the HM-112 Field Storage Chest. **Product Dimensions:** 19x9.5x5.4in (483x241x138mm), WxDxH.

FIELD CURING CHEST & TRANSPORT RACKS	
Field Curing Chest	HM-112
Cylinder Transport Rack for 6in cores	HM-116
Cylinder Transport Rack for 4in cores	HM-114

PERFA-CURE CONCRETE CURING BOXES

Lightweight Perfa-Cure Curing Boxes offer storage and protection of concrete test specimens on the jobsite to meet required initial curing temperature conditions. Users can simply plug in the units and turn the thermostat dial to the desired temperature in degrees Fahrenheit. Models are available with heating or with heating and cooling. A heating panel wired to a thermostat uses a safe, aluminum base to radiate heat. Models with cooling functionality feature a blower fan to circulate cool air inside the box, and automatically switch from heating to cooling based on conditions. The green indicator light illuminates when the unit is in operation. Models are compliant with current ASTM C31 and AASHTO T-23 specifications for initial curing of concrete test specimens in the field in most ambient conditions. Sturdy lifting handles on each end make it easy to transport units when not loaded. Drain plugs are readily accessible when curing stage is complete and the Heater Pad and AC Cooling Units on the inner lid are easily replaceable. A max-min registering thermometer is mounted inside the box to monitor curing conditions. Perfa-Cure boxes operate on 110V/60Hz electrical supply.

HM-491 Perfa-Cure provides heat-only and accommodates up to nine 6x12in cylinders or thirty 4x8in cylinders. Empy weight is approximately 40lb (18kg). **Product Dimensions:** 42x18x20in (1067x457x508mm) WxDxH; **Inside Dimensions:** 33x14x15in (838x356x381mm) WxDxH.

HM-493 Perfa-Cure Mini is heat-only and holds four 6x12in cylinders or ten 4x8in cylinders. Weight empty is 30lb (13.6kg). **Product Dimensions:** 30x18x20in (762x457x508mm) WxDxH; **Inside Dimensions:** 24x12x14in (610x305x356mm) WxDxH.

HM-495 Perfa-Cure Plus Curing Box features both heating and cooling functionality and accepts nine 6x12in or thirty-two 4x8in concrete cylinders. Empty weight is approximately 40lb (18kg). **Product Dimensions:** 42x18x20in (1067x457x508mm) WxDxH; **Inside Dimensions:** 33x14x15in (838x356x381mm) WxDxH.

PERFA-CURE CONCRETE CURING BOXES	
Perfa-Cure Concrete Curing Box, 110V/60Hz	HM-491
Perfa-Cure Mini, 110V/60Hz	HM-493
Perfa-Cure Plus, 110V/60Hz	HM-495

THERMOCURE PORTABLE CURING BOXES

ASTM C31, C192, C511; AASHTO M 201, T 23, T 126

For true field portability and on-the-job convenience, lightweight Thermocure models are unbeatable for storing concrete test specimens within standard humidity/temperature conditions. Up to 22 test specimens of 6x12in (152x302mm) cylinders can be stored at 73° ±3°F (23° ±2°C) over an ambient range of -10°—100°F (-23°—37.8°C).

HM-49 Deluxe Curing Box has a recirculating heating and cooling temperature control unit for easy use, especially in high ambient temperature applications. Controls for this model include temperature set buttons, digital water temperature readout (°F or °C) and indicator lights to show when heating or cooling modes are on. **Exterior Dimensions:** 75x25x21in (1,905x635x533mm) WxDxH.

HM-50 Economy Curing Box has a 1,500 Watt heater (cooling is accomplished by fresh water circulation only), an adjustable temperature control, and a 3in (76mm) dial thermometer. **Exterior Dimensions:** 68x25x21in (1,727x635x533mm) WxDxH.

Both models have the same tough, insulated plastic rustproof box with removable galvanized rack. The cover has a gasket, stainless steel hinges and plated buckles with padlock loops. Lifting handles are provided on each end of the box for transport. Shipped via motor freight only. **Interior Dimensions for Both Models:** 18x54x17in (457x1,372x432mm), DxWxH.

THERMOCURE PORTABLE CURING BOXES	
Deluxe Curing Box, 115V/60Hz	HM-49
Economy Curing Box, 115V/60Hz	HM-50

MA-236R

MA-164

MOIST CABINET
ASTM C31, C109, C192, C511; AASHTO M 201, T 23, T 106

Moist Cabinet for curing mortar and concrete test specimens has 11ft³ capacity and heated, triple-pane glass door, minimizing condensation for observation of specimens. Remote temperature and humidity alarms and RS-232 interface allow continuous monitoring and data acquisition with user's PC. A factory-installed 7-day chart recorder is available. Temperature range is from 32°—140°F (0°—60°C), settable in 0.2°F (0.1°C) increments. Humidity controls are settable in 1.0% increments and maintain up to 95% humidity.

Positive horizontal airflow insures temperature uniformity to ±0.6°F at 77°—98.6°F (±0.3°C at 25°—37°C). Chamber temperature and humidity are shown on LED displays. Audible and visible alarms indicate temperature and humidity variations beyond setpoints. Three stainless steel shelves with 50lb (23kg) stationary capacity, adjustable on 2in (50mm) centers are included. Up to eleven shelves are accommodated in the 31x27x24in (78.7x68.6x60.9cm) 20-gauge stainless steel chamber. Extra standard shelves or perforated stainless steel shelves are available. Exterior case is 18-gauge powder-coated steel. Total weight of unit is 575lb (261kg).

Heat is provided by two 600 Watt elements. Cooling is via a 1/4hp, non-CFC compressor. A steam generator provides chamber humidity. User-supplied water source must be rated between 50K-ohm and 1meg-ohm resistance. Electrical requirements: MA-236R is 208-220V/60Hz, single phase, 14 amp. MA-236RF is 220-240V/50Hz, single phase, 13 amp. **Product Dimensions:** 38x32x51.5in (965x813x1308mm), WxDxH.

MOIST CABINET	
Moist Cabinet, 220V/60Hz	MA-236R
240V/50Hz	MA-236RF
Accessories	
Chart Recorder, factory installed	MAA-23

HUMIDITY & WEATHER METERS

HUMIDITY & WEATHER METERS				
Description	**Model**	**Range**	**Division**	**Accuracy**
Sling Psychrometer is spun using the folding swivel handle. The durable plastic case has a protective end cover to prevent breakage. An internal water reservoir feeds the wet bulb wick, so re-wetting before each test is not necessary. Supplied complete with vinyl carrying case and plastic reference chart.	MA-164	Humidity 1%—97%RH	1%	1%

HM-71

HM-75

HM-76B

HM-196

CONCRETE TEST HAMMERS
ASTM C805; BS 1881-202

Concrete Test Hammers are ideal for fast, inexpensive, nondestructive estimations of in-place concrete strength. Hammer tests can help determine where test cores should be taken and locate damage from freezing or fire. Useful range covers concrete strengths from approximately 1,400—8,000psi (10—55mPa). The plunger rod is pressed against a concrete surface until a spring-loaded mass is released, causing an impact on the concrete. Rebound of the mass is registered on the hammer as the "rebound number". Included calibration curves provide estimated strength from rebound number, but accuracy is greatly improved by user-produced laboratory correlations with compression tests on the same type of concrete being evaluated.

HM-71 Gilson Concrete Test Hammer is an economical alternative to the original Schmidt and meets all published specifications for these devices. The quality Made-in-America unit gives consistent results and provides reliable operation. A durable nylon carrying case with loop handle, carborundum stone for surface preparation, instructions and charts are included with the HM-71. **Product Dimensions:** 2.1x14in (53x356mm), Dia.xH.

HM-75 Schmidt Concrete Test Hammer is manufactured by the original producer of these instruments. It is supplied with a plastic carrying case, charts, instructions, and carborundum stone for surface preparation. **Product Dimensions:** 2.1x14in (53x356mm), Dia.xH.

HM-101 Schmidt Recording Concrete Test Hammer automatically records rebound numbers as a bar chart on a paper strip. Each strip chart will log up to 4,000 impacts. HM-101 is supplied with a carrying case, paper charts and grinding stone. **Product Dimensions:** 11.6x12.8x4.1in (295x325x105mm), WxDxH.

HM-76B Concrete Test Hammer Calibration Anvil can be used to check the calibration of concrete test hammers after every 1,000—2,000 impacts. The HM-76B has a solid steel 6in (152mm) diameter anvil with a hammer guide and hardened alloy steel rebound plate. A hardness certification to ASTM E18 requirements is provided. A wire brush for cleaning is included. **Product Dimensions:** 6x8.5in (152x216mm), Dia.xH.

CONCRETE TEST HAMMERS	
Gilson Concrete Test Hammer	HM-71
Schmidt Concrete Test Hammer	HM-75
Schmidt Recording Concrete Test Hammer	HM-101
Accessories	
Concrete Test Hammer Calibration Anvil	HM-76B

technote

Gilson Company, Inc. now offers a calibration and repair service for the HM-71 Concrete Test Hammer. Please call **800.444.1508** for pricing or to schedule calibration or repairs.

PROFOSCOPE REBAR LOCATORS AND COVERMETERS
BS 1881-204

The Profoscope and Profoscope+ by Proceq are versatile, fully-integrated rebar detectors and cover meters with detection capabilities to a maximum depth of 7in (180mm). A single #5 reinforcing bar can be located to a depth of 5.5in (140mm). Both models are designed for one-handed operation and feature rebar-proximity indicators with visual and acoustic locating aids for location and minimum cover alert. The detector can identify the mid-point between bars as well as their orientation. Rebar diameter can also be estimated within the specified testing range. These unique features and Proceq's intuitive user interface make the task of locating reinforcing steel simple and efficient. The Profoscope+ adds the ability to manually or automatically record measurements for up to 500 objects, and upload to a PC with included ProfoLink software for later analysis.

The icon-based menu system on the display shows all setting, detection, and navigation information. A simple crosshair icon shows relative location of strongest signal beneath the meter. All values are easily switched between metric and imperial units of measure. The display itself has a switchable backlight for low-light environments. 30 second sleep mode and 120 second auto shut-down features extend battery life. A start-up test kit consists of two short lengths or rebar in a cardboard box with a lid. The kit allows simple user orientation and training for all functions in a comfortable environment, before use on a job site. A canvas carrying bag, carrying strap, batteries and marking chalk are also included. The Profoscope+ also includes a memory card and the ProfoLink software. The Profoscope units are powered by two AA batteries, and have a battery life of up to 50 hours with the display backlight off. **Product Dimensions:** 8x3.6x1.6in (205x92x41mm) LxWxH.

PROFOSCOPE REBAR LOCATORS AND COVERMETERS	
Profoscope Rebar Locator and Covermeter	HM-196
Profoscope+ Rebar Locator and Covermeter	HM-197

NEW! Ship Weight Index

The Estimated Ship Weight for every product is easy to find in the NEW Ship Weight Index!

HM-148

HM-145

REBAR LOCATORS

Elcometer Rebar Locators determine location of steel reinforcing bars, welded-wire mesh, and metal wall ties. Discovery of exact locations of reinforcing steel and subsurface metalwork is essential to safe and effective recovery of test cores and performance of maintenance. Both models use pulse induction technology for high stability and immunity to false signals, and offer exceptional accuracy and ease of use with field-tested durability.

HM-145 IMP Rebar Locator is an economical meter used to determine rebar location for drilling or coring operations, but does not measure depth of cover. It also determines orientation of rebar and pattern of welded-mesh fabric, and detects metal pipes and metal conduit. A single #5 (16mm) bar can be detected with up to 3.9in (100mm) of cover with the included Standard Search Head. The meter is fast, accurate and simple to use. Readings are unaffected by moisture, temperature changes, or electrical interference. The directional search field distinguishes between horizontal and vertical bars. The speaker emits a loud audible tone when exact location is detected. The analog indicator shows both locator signal strength and battery condition. Large Hi-Depth Search Heads have detection depths of up to 8in (200mm); Short-Handled version has 10in (250mm) handle, and convenient Long Handle model has 25.5in (650mm) reach to eliminate bending over or working from a ladder. Rugged ABS plastic enclosure. Operates on Four included AA batteries. A foam-lined cardboard storage case is provided to hold the 7.2x4.6x3in (183x117x76mm), LxWxD meter, search head, leather carry case, and carrying straps.

HM-148 Rebar Plus is primarily a rebar locator, but is also effective for estimates of cover depth. The Rebar Plus locates and indicates orientation of bars via analog meter or audible tone. The high resolution controlled field search head focuses the strongest signal in the center of the head, so the meter is accurate even when reinforcement bars are on very close centers or near metal objects, such as scaffolding or metal window frames. The highly directional detection field easily distinguishes between horizontal and vertical bars. A 3.5mm headphone jack allows use of standard headphones (not included) for accurate detection, even in noisy environments.

Using the 4in (100mm) search head supplied with the unit, a single No.10 bar is detected at up to 6.3in (160mm) depth. Locations of parallel No.5 bars can be resolved under 2in of cover (50mm) at 3in (76mm) spacing. Cover depth is estimated via two switchable scales on the analog readout. The low scale reads up to 3in (76mm) cover in 1/4in (6.3mm) increments; high scale reads up to 6in (152mm) cover by 1/2in (12.7mm) increments. Cover estimates are calibrated to No.5 bar diameter, and accuracy is within ±5%. Accuracy depends on bar diameter and battery strength. A 6in (150mm) Extra-Depth Search Head is available for detection at extended depths up to 8in (200mm). The Rebar Plus is supplied with the 4in (100mm) Search Head, four AA batteries and a leather carry case. **Product Dimensions:** 6.5x4.7x3.5in (165x120x89mm), WxDxH.

REBAR LOCATORS	
IMP Rebar Locator	HM-145
Rebar Plus	HM-148
Accessories	
Hi-Depth Search Head for HM-145, Long Handle	HMA-247
Hi-Depth Search Head for HM-145, Short Handle	HMA-248
Extra-Depth Search Head for HM-148	HMA-249

HM-117A

HM-85

ELECTRONIC METAL DETECTOR

The HM-117A finds location and approximate depth of rebar, metal pipe, conduit and metal framing through concrete and most nonmetallic construction materials at depths up to 6in (150mm). This economical device is well suited for occasional use or for preliminary scanning of large areas. When compared to precision rebar locators, this unit is less accurate and bar sizes are more difficult to determine.

The HM-117A is fast and easy-to-use with comfortable hand grip and one-touch operation. The sturdy plastic case is shock and splash resistant. The large LCD display quickly indicates both location and depth of embedded metal objects. Differentiates between magnetic and nonmagnetic metals based on their magnetic properties. Location accuracy for rebar is approximately ±1in (25mm), dependant upon size and depth of the bar.

Powered by a 9V alkaline battery (not included).

ELECTRONIC METAL DETECTOR	
Electronic Metal Detector	HM-117A

CONCRETE HUMIDITY MEASUREMENT SYSTEMS
ASTM F2170

Excessive moisture in concrete floors can cause expensive floor covering or coating failures such as de-bonding, warping, blistering, and increased potential for mold growth. Relative Humidity (RH) Measurement Systems provide a complete profile of moisture content throughout the slab, not just the surface.

With these systems, a 3/4in (19mm) borehole is drilled to the specified depth and humidity levels are measured periodically using electronic moisture sensing probes. The boreholes and probes require time to reach temperature and moisture equilibrium before accurate readings can be obtained. Probes are installed below the floor surface and do not interfere with normal construction activities. After monitoring is complete, the test holes are easily filled with standard cementitious patching compound. Both systems meet the requirements of ASTM F2170.

HM-85 Concrete Hygro-i Inspection Kit by Tramex is versatile and efficient. It features a special tool for easy insertion and recovery of the multi-use Hygro-i probes for re-use, maintenance, or periodic calibration checks. Complete kit includes everything required for concrete humidity testing, and is based on the popular HM-669 CMEXpert II Moisture Meter. The meter may also be used alone for concrete surface moisture testing to ASTM F2659, and with the Hygro-i probes for ambient measurements of relative humidity, temperature, and dew point. Inquire for additional components to conduct the ASTM F2420 floor moisture test using an insulated hood and RH probes.

Range is 0—100%. Humidity accuracy between 10%—90% is ±1.8% at 25°C (77°F), and ±3% above 90%. The HM-85 Kit includes a CMEXpert II Digital Moisture meter, twelve Hygro-i RH probes, electronic interface cable, twenty-five hole-liners with caps, an infrared surface thermometer, and sturdy plastic carrying case. Three Calibration Salt Check containers with reference material for 75% RH calibration are also included. All components can be purchased separately as replacements. **Product Dimensions:** 17x5x13in (432x127x330mm), WxDxH.

CONCRETE HUMIDITY MEASUREMENT SYSTEMS	
Concrete Hygro-i Inspection Kit	HM-85
Accessories	
Hygro-i Probes, pkg. 3	HMA-651
Hygro-i Probes, pkg. 12	HMA-652
Plastic Hole Liners with caps, pkg. 12	HMA-653
Plastic Hole Liners with caps, pkg. 50	HMA-654
Plastic Hole Liners with caps, pkg.100	HMA-655
75% RH Calibration Salt Check	HMA-656

HM-674D

HM-668A HM-669

MOISTURE EMISSION TEST KITS
ASTM F1869

Gilson's Concrete Moisture Emission Test Kits are the flooring industries most recognized method to determine moisture emission through concrete floor slabs. Millions of dollars in damage to coatings and flooring systems occurs every year as a result of moisture migration through concrete slabs and structures. Electronic moisture meters will indicate the existing degree of saturation but not the rate of moisture emission.

A container of moisture-absorbing calcium chloride is weighed and placed under a plastic "dome" that is sealed to the concrete surface with a self adhereing gasket. At the conclusion of the 60—72 hour test cycle, the plastic is cut open and the dish of calcium chloride is removed, and immediately weighed. The weight gain and exposure time values are used to compute the test result, expressed in pounds of moisture emitted per 1,000 square feet in 24 hours. Recommended test frequency is three for the first 500 square feet and one test for each additional 500 square feet of total area.

Each test kit consists of a sealed calcium chloride dish and a plastic dome with a pre-installed butyl rubber gasket. Three pH test strips with color chart are also included. Test kits are supplied in 3 or 12 packs. For a complete evaluation of the concrete floor surface, see moisture meters and pH meters listed elsewhere in the catalog.

MOISTURE EMISSION TEST KITS	
Moisture Emission Test Kit, 3 pack	HM-674D
Moisture Emission Test Kit, 12 pack	HM-674B

also available

See our Scales and Balances section for a complete selection of portable field scales for moisture determinations.

CONCRETE MOISTURE METERS
ASTM F2659

Nondestructive Concrete Moisture Meters measure moisture content instantly on concrete floor surfaces prior to the application of floor coverings. Designed and calibrated specifically for concrete, they can also determine comparative readings on stone, lightweight concrete, gypsum floor screeds, ceramic tiles and other masonry type materials. The meter is simply pressed firmly onto a clean concrete surface and impedance measurements are obtained by electrodes located on the base of the meter. No drilling is required. Both meters are housed in rugged, ABS Plastic cases, and are supplied with batteries.

HMA-661 Calibration Check Plate is used to monitor proper operation of either HM-668A or HM-669 meters. Adjustments or recalibration must be performed by the factory.

HM-668A Concrete Moisture Encounter 4 has an analog dial to show readings of 0—6% moisture in concrete or 0—10% moisture in gypsum, with a "Hold" button to freeze the display. The unit is user calibrated at the start of each use for accurate repeatable readings. The meter has a low battery LED indicator. **Product Dimensions:** 6x3x1.5in (152x76x38mm).

HM-669 CMEXpert II is a hand-held digital model, providing direct surface measurements of up to 6.99% moisture content in concrete. It is also equipped with a port for the Hygro-i Relative Humidity Probe, sold separately. Inquire for probe to measure from 7%—40% moisture content in wood. The HM-669 CMEXpert II Meter and HMA-650 Hygro-i Probe are also available in HM-85 kit with accessories to run ASTM F2170 sub-surface tests. See separate listing for details. **Product Dimensions:** 6x3x1.5in (152x76x38mm).

HMA-650 Hygro-i Relative Humidity Probe, used exclusively with the CMEXpert II, allows the meter to be used as a stand-alone RH meter, with accuracy traceable to NIST for humidity in %RH, grains/lb, or g/kg, as well as temperature and dew point. Humidity Range, 0—100% RH non-condensing, accuracy is ±1.8% from 10%—90%RH at 25°C, and ±3% above 90%.

CONCRETE MOISTURE METERS	
Concrete Moisture Encounter 4	HM-668A
CMEXpert II	HM-669
Accessories	
Calibration Check Plate	HMA-661
Hygro-i Relative Humidity Probe	HMA-650

CONCRETE MATURITY METERS
ASTM C918, C1074; AASHTO T 276

Concrete maturity provides a simple method of estimating the actual strength of concrete in place, based on its age and temperature history. Accurate strength prediction is valuable for scheduling form removal and reshoring, or prestressing and post-tensioning operations. The heat signature of a specific mix enables strength prediction using mathematical equations to compare a maturity index to previous physical tests of the same mix design. These widely practiced and accepted methods have been in use for over thirty years. Easy-to use datalogging meters continuously collect time-stamped temperatures from pre-placed probes, and maturity numbers can be calculated over time from a few hours to a few months.

HM-680

MA-324

HM-134

CONCRETE MATURITY METERS

Command Center™ Concrete Maturity Systems use self-powered sensors to collect, store and upload time and temperature data to a laptop or Pocket PC. Sensor/loggers are embedded, leaving only exposed wire connectors for later collection of information. Sensors are preprogrammed by user and log data up to two years in protected memory at intervals from 1 to 255 minutes. Pocket Command Center Kit includes a Pocket PC with pre-installed software, 50 sensors and required accessories. Command Center Software Kit is designed for use with a laptop or desktop computer. This kit includes Command Center Software, 50 sensors and required accessories. Software provides a graphical display and output of temperatures, maturity index and estimated strength using the Nurse-Saul maturity equation. Standard Sensors are furnished with 8ft (2.4m) leads. Sensors with 15ft (4.6m) leads are also available. Custom sensors are also available in lengths up to 100ft (30.5m) Sensor accuracy is ±1°C (1.8°F). Product Dimensions: 3x5x1in (76x127x25mm), WxDxH.

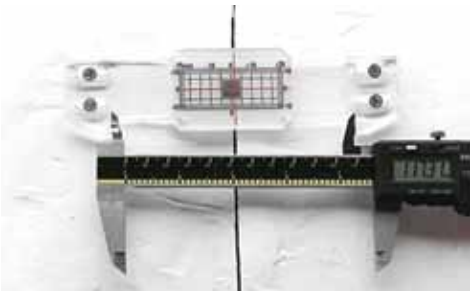
Pocket Command Center Kit	HM-680
Command Center Software Kit	HM-681
COMMAND Center Sensor w/ 8ft (2.4m) cable	HMA-701
COMMAND Center Sensor w/15ft (4.6m) cable	HMA-702

4-Channel Data Logging Thermometer displays data from four probes simultaneously on a backlit LCD screen in °C or °F, using standard Type K thermocouples. Features include automatic shut-off, auto ranging, Max/Min, and hold functions. Accuracy is ±0.5% of reading +1°C or 2°F, full-scale. Up to 16,000 time and temperature data points can be exported to an ASCII spreadsheet with included RS-232 cable and software for later calculation. Software does not calculate maturity values. Includes foam-lined case, two beaded-wire probes, and 9V battery. An AC adapter is optional. Product Dimensions: 2.5x1.25x7.25in (64x30x184mm), WxDxH.

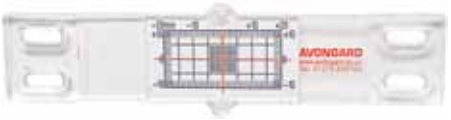
4-Channel Data Logging Thermometer	MA-324
Type K Thermocouple Wire, 100ft (30m)	HMA-324
Type K Male Connector	HMA-323
RS-232 to USB Adapter	MAA-231
Data Software	MAA-226
AC Adapter, 115V/60Hz	MAA-227

Four-Channel Concrete Maturity Meters have internal memory for over ten months of continuous recording of half-hour interval readings. Datum temperature and activation energy are user programmable. One to four locations can be monitored at once, and all data is accessed via membrane keyboard and alphanumeric display. Maturity can be checked directly from the meter at any time. Standard meter is operated by included 9V lithium battery for three weeks or more. Rechargeable meter has a NiCad battery and charger for more battery life or operation directly from 115V AC. Both meters include Type T thermocouple wire, four connectors, RS-232 cable for downloading to a PC, and a plastic carrying case. Product Dimensions: 8x4.8x3in (203x122x76mm).

Maturity Meter, 4-Channel Standard	HM-136
Maturity Meter, 4-Channel Rechargeable	HM-134
Type T Thermocouple Wire, 100ft Roll	HMA-20
Serial Printer Cable	HMA-82



HM-634 shown with calipers



HM-637

HM-635

HM-638

HM-642 shown with HM-643

HM-636

HM-639

CONCRETE CRACK MONITORS

Monitoring crack widths in concrete buildings, bridges, and roads is easy and reliable with Gilson Concrete Crack Monitors. Opening and closing and differential movement of the crack is continuously monitored. Monitors are affixed with user-supplied screws or adhesive.

CONCRETE CRACK MONITORS	
Crack Monitor Plus is vandal-resistant clear polycarbonate with a range of 25mm horizontally and 10mm vertically. Adjustment slots for screws ensure secure placement. After affixing, temporary pegs are removed so plates move independently. Spigots on both plates enable exact measurement to 0.1mm with calipers, available separately. A second Crack Monitor may be positioned for monitoring in three dimensions.	
Crack Monitor Plus Digital Caliper	HM-634 TSA-271
Corner Adapter enables Crack Monitors to be used in corners with greater or less than 90˚ angles.	HM-635
Standard Crack Monitor is a simpler design with a range of 20mm horizontally and 10m vertically. The overlapping upper plate is transparent and marked with a red crosshair cursor. The white bottom plate measuring grid is marked in millimeters. There are no spigots for use with calipers. Readability is 1mm.	HM-637
Displacement Monitor measures out-of-place movement across a crack, such as settling of a floor slab. It also measures opening and closing of the crack itself. White plastic with easy to read divisions. Displacement range is 110mm. Horizontal range is -10—+50mm.	HM-638
Scratch-A-Track Motion Monitor provides a continuous graphic record of relative movement of adjacent surfaces. Mounted over a crack, joint or other void, the Monitor tracks any change in relative positioning. The unit is small, lightweight, inexpensive and weather resistant. The single-use plastic Recording Pad is coated with a white film and has space for written data such as date, location, etc. The Pad is bonded to one surface using super-glue or epoxy (not included). The spring steel Finger assembly is bonded to the opposing surface and adjusted with a thumb screw so that the stainless steel Scriber leaves a thin, well-defined black scratch on the pad to permanently record its movement. Finger and Scriber assembly may be used over and over.	
Scratch-A-Track Motion Monitor Recording Pads, pkg. 10	HM-642 HM-643
Crack Width Gauge assists those who survey and report on damaged buildings. This durable acrylic Gauge is scaled to measure cracks up to 7mm and wider in corners and awkward locations.	HM-636
Economy Crack Comparator is a handy, credit card-sized field reference that slips easily into your pocket or wallet. Clear plastic card is marked with inch and metric scales as well as a range of common crack sizes.	HM-639

HM-271 shown with HMA-104

HMA-113

HMA-115

GILSON CONCRETE CTE SYSTEM
AASHTO T 336

Coefficient of Thermal Expansion (CTE) determinations predict thermally induced expansion and contraction movements in concrete pavement. CTE values help in developing concrete pavement mix designs that maximize service life. The NCHRP 1-37A research program found that these thermal movements have a significant impact on concrete pavement performance, and integrated the use of CTE values into the Mechanistic-Empirical Pavement Design Guide (MEPDG). AASHTO T 336 is the standard test method for determination of CTE values, and other agencies are evaluating its development.

Once the saturated 4x7in (101.6x177.8mm) Dia.xL concrete specimen is mounted in the measuring frame and immersed in the water bath, the test is initiated simply by pressing the start button. Precise length change measurements of the specimen are recorded at specified controlled temperatures over a range of 10°—50°C (50°—122°F). At completion, the CTE value is computed and reported.

Gilson CTE System components all work together to achieve significant improvements in accuracy, repeatability, and versatility over currently available systems. Pre-loaded software on the included laptop computer completely automates measuring, recording and calculating of final CTE values in accordance with AASHTO T-336. The portable bench-top stainless steel water bath has capacity for testing two samples simultaneously. A water circulation unit uses a thermistor with 0.01°C resolution and ±0.05°C accuracy to control and record bath temperatures. Water is recirculated every twenty seconds, insuring uniform temperature levels. The effects of evaporative loss are eliminated by a water level control device that precisely maintains a constant water level throughout the test. The heavy-duty adjustable specimen measuring frame is constructed of Type 304 stainless steel, assuring uniform expansion characteristics. An LVDT securely mounted to the measuring frame has 1.27mm of travel with a resolution of 3.1x10-8mm, assuring extremely precise length change measurements. **Product Dimensions for both:** 4x7in (101.6x177.8mm), WxDxH.

The HM-271 CTE System includes a laptop computer pre-loaded with CTE software, and required computer interfaces, a bench-top stainless steel water bath with 20L (5gal) capacity and dimensions of 25x15x13in (635x381x330mm) WxDxH, one stainless steel measuring frame with LVDT, a stand-alone water circulating unit with thermistor temperature probe, and a water level control device. **Circulator Dimensions:** 17x26x21in (432x660x533mm), WxDxH.

Calibration and Verification Specimens are purchased separately. Each is provided with a certification of CTE values to ASTM E228 by an ISO 9001 facility, as required by AASHTO T 336. HMA-104 Calibration Specimen is 304 Stainless Steel, and HMA-115 Verification Specimen is 410 Stainless Steel. Grade 5 Titanium Steel and Nickel Calibration Specimens are available and can be certified to ASTM E228 by an ISO 9001 facility for additional confidence, inquire. Also inquire for non-certified stainless steel Calibration and Verification specimens for use when testing to other specifications.

An additional HMA-114 CTE Measuring Frame with LVDT, purchased separately, allows testing of two specimens simultaneously for greater sample efficiency. The frames are supplied ready to connect the LVDT directly to the USB port of the computer. MA-113 LVDT Calibrator with Digital Micrometer can be purchased separately to verify performance of the LVDT.

GILSON CONCRETE CTE SYSTEM	
Concrete CTE System, 110V/60Hz	HM-271
Concrete CTE System, 230V/50Hz	HM-271F
Accessories	
Certified Calibration Specimen, 304 Stainless Steel	HMA-104
Certified Verification Specimen, 410 Stainless Steel	HMA-115
CTE Measuring Frame, 304 Stainless Steel	HMA-114
LVDT Calibrator with Digital Micrometer	HMA-113

HM-246

CONCRETE CORROSION MAPPING SYSTEM
ASTM C876; BS 1881

The Corrosion Mapping System rapidly scans concrete surfaces for the presence of or tendency for chloride-induced corrosion in reinforcing steel. Operating on the half-cell potential method, this instrument is used for assessment of bridge decks, pavement, walls, and other structures.

Steel buried in concrete is normally passive to corrosion until chlorides from the environment permeate the concrete and create anodic and cathodic areas, starting the flow of corrosion currents. Half-cell measurements are an indicator of corrosion activity. The half-cell probe electrically connects to the concrete through a water-saturated foam sponge. A separate cable from the meter is attached to a rebar in the structure, completing the electrical circuit. The resulting potential reading can be correlated to corrosion activity of the steel in the vicinity of the probe. Readings can be plotted on paper or on the structure itself to provide an easy to interpret graphic assessment of the structure. Probable corrosion areas and the total area of the structure subject to corrosion can be determined.

The System includes a specialized voltmeter in a protective pouch, copper/copper sulfate electrode with surfactant reservoir and dispensing sponge, a separate electrode for overhead readings, two 15in (381mm) extensions, reel with 250ft (76M) of wire, surfactant solution, copper sulfate crystals, operating manual, all in a sturdy plastic case. The probe can attach to a long handle for ceilings. A rebar locator is also recommended to reference bar position.

CONCRETE CORROSION MAPPING SYSTEM	
Concrete Corrosion Mapping System	HM-246
Accessories	
Surfactant Reservoir with $CuSO_4$ Electrode	HMA-385
Concrete Surfactant Solution	HMA-386
Replacement Dispensing Sponge	HMA-387

HM-723

RAPID CHLORIDE PERMEABILITY TESTER
ASTM C1202; AASHTO T 277

Chloride permeability characteristics of concrete can be reliably determined with the Proove'it system by Germann Instruments. The simple Rapid Chloride Permeability Test (RCPT) is performed on concrete specimens taken from cores or test cylinders. Electrical current flow is measured across a 4x2in (102x51mm) dia.xH specimen positioned in a test cell with fluid reservoirs at each end. The negative end is immersed in a 3% sodium chloride solution, and the positive end in a 0.3N sodium hydroxide solution. The specimen is subjected to a 60V DC potential across the ends for six hours. The more permeable the concrete, the higher the total charge or Coulombs passed across the specimen will be.

The HM-723 Proove'it microprocessor power supply module distributes precisely controlled voltage to as many as eight RCPT specimens simultaneously. Windows®-based software installed on the user's PC controls test parameters, stores test data, and prepares professional quality reports that can be customized with a company logo. Electrical current readings are updated every 5 seconds, and a predicted 6-hour Coulomb value is generated every 5 minutes. Test results can be exported to Excel for comprehensive statistical analyses of the results. Software, power cord, serial cable, and manual are included. Testing time and parameters are programmable as required. The Proove'it system can also be used for ASTM C1760 Bulk Electrical Conductivity Testing using special cell extension rods (inquire), and to determine Chloride Migration Coefficient as described in NordTest Build 492. Voltage settings can be adjusted from 5 to 60V in 5V increments.

HMA-278 Specimen Cells are purchased separately and are ready to use with sealing rings for 4in (102mm) diameter specimens, connecting cables and temperature probe. Each cell consists of two plexiglass end-caps with embedded conductive mesh and required electrical connections. HMA-279 Sealing Rings adapt Specimen Cells for use with 100mm (3.9in) specimens. Inquire for a special cell with cooling fins for testing highly permeable concrete or for tests requiring constant temperatures. For efficient sample conditioning, the HMA-283 Vacuum Chamber saturates 4 to 6 samples at a time. The user can operate with their own vacuum pump, or the HMA-284 Vacuum Pump is available as an option. Larger HMA-286 Vacuum Chamber has capacity for up to 20 specimens, and the HMA-287 Vacuum Pump is available for use with it. The HMA-299 Verification Unit verifies output from the Proove'it Controller. Each channel of the Controller is set up for a selected voltage and connected to the Verification Unit. Actual current is displayed on the computer screen.

CONCRETE CORROSION MAPPING SYSTEM	
Rapid Chloride Permeability Tester, 115V/60Hz	HM-723
Accessories	
Rapid Chloride Permeability Measuring Cell for 4in Specimens	HMA-278
Sealing Ring for 100mm Specimens	HMA-279
Verification Unit	HMA-299
Standard Vacuum Chamber (4 to 6 Specimens)	HMA-283
Standard Vacuum Pump	HMA-284
Large Vacuum Chamber (Up to 20 Specimens)	HMA-286
Large Vacuum Pump	HMA-287

HM-195

HM-240 shown with HM-241 & HM-242

EMODUMETER™
ASTM C215, C666; AASHTO T 161

The Emodumeter™ measures the resonant frequency of concrete and other materials for determinations of Young's modulus, modulus of rigidity and Poisson's ratio. This device is used extensively in the lab for nondestructive analyses of concrete freeze-thaw samples. An impact using a hardened steel ball is sensed by an accelerometer, then measured and displayed by the Emodumeter™. The frequency spectrum is computed and displayed by the meter. Three different modes of vibration are measured; longitudinal, transverse (flexural), and torsional.

Samples with cross-section up to 6in (150mm) length from 1.75 inches (45mm) to 28 inches (700mm) in length can be tested. Frequency range is 10Hz to 40kHz, with 4.9 to 78.1Hz resolution. Maximum amplitude is automatically calculated, eliminating cumbersome frequency scanning. Time domain and frequency spectrum results for 200 tests can be stored and uploaded to a PC for further analysis.

The system includes the Emodumeter™ in an integral sturdy plastic carrying case, accelerometer with pick-up cable, set of six hardened steel balls, universal charger, RS-232 cable, software, and specimen bench fixture. Emodulinx software is also included, and allows to user to export data to a PC for management and analysis. The charger includes a universal plug adaptor and operates on 110 to 240V/47 to 63Hz. 12V rechargeable battery allows 4 to 10 hours of continuous use.

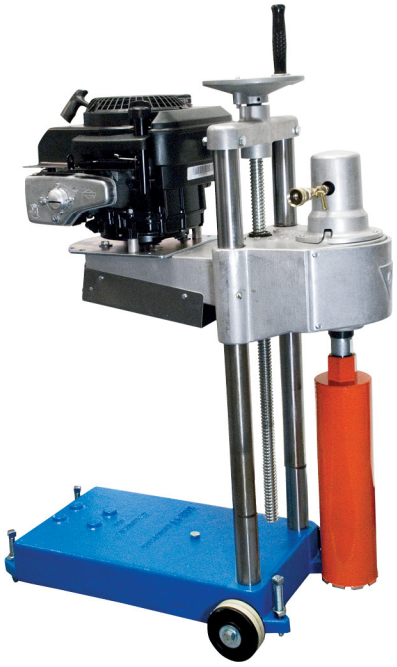
EMODUMETER™	
Emodumeter™	HM-195

STRAIN GAUGE SET
ASTM C426

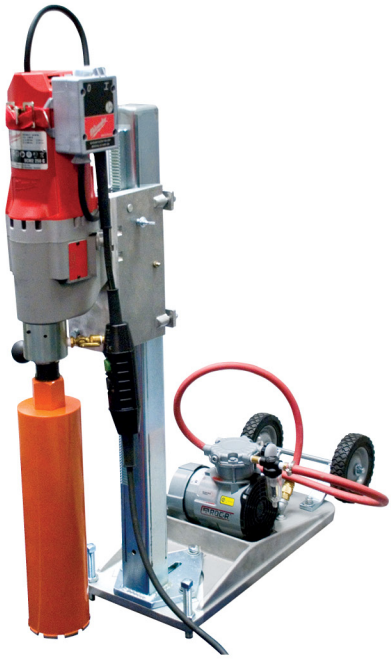
The Strain Gauge Set mechanically measures strain in masonry-type materials or in structural components under load, relative displacements in structures, opening or closing of cracks, shrinkage of concrete block during drying, and similar applications. The anodized aluminum alloy instrument frame adjusts for measuring at 2, 4, 6, 8, or 10in spacing (5, 10, 15, 20, 25cm for metric) of Punch Bar and Invar Master Bar used. Brass inserts are mounted in specimen at selected spacing to hold stainless steel Contact Seats, threaded in place in the inserts. Hardened steel Contact Points mount in strain gauge frame for positioning in Contact Seats for measuring strain on dial indicator. Model HM-240 indicator has 0.0001in (0.002mm for HM-240F) graduations, maximum travel of 0.4in (10mm), and 0.3in (7.6mm) range of strain measurement. Digital Model HM-240D is switchable to measure to 0.0001in or 0.001mm and has a data output interface. Battery life is 5,000 hours.

Strain Gauge Set includes strain gauge dial indicator, eight brass Inserts, two Contact Seats, two mounted Contact Points and a wooden storage case. Case includes slot for Invar Master Bar Accessory and Punch Bar Accessory, not included, but required—order English or metric as needed. Master Bar has stainless steel seat inserts to check gauge space settings. Punch Bar has one fixed point and one moveable point, and is used for accurately locating brass Inserts in the specimen.

STRAIN GAUGE SET	
Strain Gauge Set	HM-240
Strain Gauge Set, metric	HM-240F
Strain Gauge Set, digital	HM-240D
Accessories	
Invar Master Bar Accessory	HM-241
Invar Master Bar Accessory, metric	HM-241F
Punch Bar Accessory	HM-242
Punch Bar Accessory, metric	HM-242F
Contact Seat	HMA-150
Contact Point	HMA-151
Brass Inserts, pkg. 100	HMA-152



CD-1 shown with CDA-141



CD-6 shown with CDA-141

CDA-50

CDA-142

CDA-243

CORE DRILLING MACHINES
ASTM C42; AASHTO T 24

Gasoline or electric-powered core drilling machines offer easy set up, fast drilling, and low bit wear for low cost per core. The drills have bit capacities up to 8in (203mm) diameter. Inquire for larger, trailer-mounted rigs for bits up to 16in (406mm). Quick disconnect fittings for water supply are provided. Diamond Coring Bits are ordered separately.

CD-1 Gasoline-Powered Core Drill is designed for vertical coring of pavements and slabs. Stable platform with leveling screws, a heavy-duty column and smooth, precision-feed system combine to make this model the ideal choice for large projects. Gasoline-powered drill allows the operator to operate independently of power supplies, and have minimal set up time and faster drilling. The unit easily adapts to mount to a pickup truck and has a 6.5hp four-cycle manual start engine. Carriage travel is 24in (610mm). **Product Dimensions:** 14x32x46in (356x813x1168mm), WxDxH.

CD-6 Electric Core Drill adapts to a wide range of drilling jobs in addition to pavement coring. The column rotates 180° horizontally, allowing precise placement of drill bit. The super-duty two-speed (450/900rpm) 3.5hp motor and carriage can be removed or reattached without changing location for ease in snapping cores and adding extension rods. The 10in (254mm) wide wheeled base has a vacuum anchor to solidly grip smooth pavement or floors. Unit includes oilless vacuum pump, filter, hose, and quick connections. **Product Dimensions:** 12x34x36in (305x864x914mm), WxDxH.

Accessories for the Core Drilling Machines are purchased separately. CDA-20 is a 4gal (15L) manually-pressurized portable water tank, and CDA-22 is a trap-ring and electric pump to recirculate used drilling water. CDA-24 9in (229mm) extension allows drilling to extended depth, and CDA-26 18in (457mm) strap wrench is for attaching and removing coring bits without damage. CDA-32 is a replacement gasket with mastic for the CD-6 vacuum base.

CORE DRILLING MACHINES	
Gasoline-Powered Core Drill	CD-1
Electric Core Drill, 115V/60Hz	CD-6
220V/50-60Hz	CD-6F

Accessories	
Pressurized Water Tank, 4gal (15L)	CDA-20
Water Recirculator, 115V/60Hz	CDA-22
Water Recirculator, 220V/50-60Hz	CDA-22F
Extension Rod, 9in (229mm)	CDA-24
Strap Wrench, 18in (457mm)	CDA-26
Replacement Vacuum Gasket	CDA-32
Core Retrieval Tongs, for 4in Cores	CDA-15
Core Retrieval Tongs, for 6in Cores	CDA-16

DIAMOND CORING BITS
ASTM C42; AASHTO T 24

Open-Head Coring Bits require Expander Sets listed for attachment to drills. These bits are slightly less expensive, and the expander sets can be reused many times as the core barrels wear out and are replaced. They are an economical choice for high-output and heavy use applications.

Closed-Head Coring Bits are one piece construction for convenience and easy, direct attachment to drills. There are no extra parts to buy or lose. These are best suited for light to medium duty, or for occasional use.

Both bit styles are available in designs optimized for asphalt pavements, or for reinforced concrete and other hard materials. All bits are constructed for wet use, and are fast-cutting when used according to design applications. Standard length is 14in (356mm) for cutting cores up to 12in long. Our most popular bit sizes are listed here. Please inquire for sizes not shown. All bits may be refurbished when worn.

DIAMOND CORING BITS

Nominal Bit Size OD, in (mm)	Open-Head Bits			Closed-Head Bits	
	Concrete	Asphalt	Expander Sets	Concrete	Asphalt
2 (50.8)	CDA-120	CDA-220	CDA-40	CDA-121	CDA-221
2-1/4 (57.2)	CDA-122	CDA-222	CDA-41	CDA-123	CDA-223
3 (76.2)	CDA-130	CDA-230	CDA-43	CDA-131	CDA-231
3-1/4 (82.6)	CDA-132	CDA-232	CDA-55	CDA-133	CDA-233
4 (101.6)	CDA-140	CDA-240	CDA-45	CDA-141	CDA-241
4-1/4 (108)	CDA-142	CDA-242	CDA-46	CDA-143	CDA-243
6 (152.4)	CDA-160	CDA-260	CDA-50	CDA-161	CDA-261
6-1/4 (158.8)	CDA-162	CDA-262	CDA-51	CDA-163	CDA-263

CDA-15

HM-60 shown with HMA-234 & HMA-224

HM-62 shown with HMA-234

CORE RETRIEVAL TONGS

Fast, easy-to-use patented Core Retrieval Tongs remove cores from asphalt or concrete surfaces. Simply insert blades into space from core drill bit, grasp the core with the tongs, and lift. Recovered cores are free of damage that may occur from use of improper tools. Laboratory acceptance for testing is assured without repeat drilling. Models are available for 4in (102mm) or 6in (152mm) core sizes. Tongs are welded, painted steel with plastic handle grips.

CORE RETRIEVAL TONGS	
Core Retrieval Tongs, for 4in Cores	CDA-15
Core Retrieval Tongs, for 6in Cores	CDA-16

CORE EXTRACTORS

Gilson Core Extractors are efficient and easy-to-use for the removal of drilled cores from asphalt or concrete pavements. To operate, simply insert the curved blades into the cut area around the core. Adjust the top screw, enabling the blades to grasp the core, and lock the device into place by squeezing the handles. Push sharply to break off the core bottom and lift the specimen out. Release lever to free the core.

The lock feature protects cores from damage during extraction and assures laboratory acceptance for testing without repeat drilling. Models for 4in (102mm) or 6in (152mm) core sizes have identical features and operation. Models are available for 4in (102mm) or 6in (152mm) core sizes. Extractors are welded, painted steel with sturdy handle grips. **Product Dimensions:** 12x10x10in (305x254 x254mm) WxDxH.

CORE RETRIEVAL EXTRACTORS	
Core Extractors, for 4in Cores	CDA-18
Core Extractors, for 6in Cores	CDA-19

HUSQVARNA® MASONRY SAWS

Masonry Saws from Husqvarna® are ideal for trimming concrete, asphalt and masonry specimens to size for testing. Models include a lightweight 1.5hp Portable unit and a larger 5hp Heavy-duty version for high-production applications. Both include reliable high-torque motors and heavy-duty shafts mounted on quality ball bearings. Water distribution by submersible pumps permits wet cutting.

HM-60 Portable Masonry Saw has 2,330 blade rpm from the 1.5hp electric motor. The HM-60 uses 14in (356mm) diameter blades for up to 5in (127mm) cut depth. This saw features a unique, patented water distribution system designed to keep both the work piece and the work area cleaner and drier. The optional HMA-226 Portable Rolling Stand is quickly set up, easily relocated by one person, and has fast adjustment for proper height. The stand folds flat for easy portability. Lightweight, economical HMA-224 Fixed-Leg Stand is also available. A 14in (356mm) Vari-Cut™ blade is included with the saw. **Product Dimensions:** 27.5x39.8x27.5in (699x1,011x699mm), WxDxH. Height with Fixed leg stand is approximately 54in (1372mm).

HM-62 Heavy-Duty Masonry Saw is equipped with a powerful 5hp high-torque motor with 2,350 blade rpm to assure high-production performance. A convenient crank on the foot pedal sets table height and the patented Sta-level® blade guard controls blade orientation to assure the most accurate cuts possible. The painted integral rigid steel support stand resists flexing. The 20in (508mm) blade capacity permits cutting of 6in (152mm) cylinders or 8in (203mm) blocks in a single pass. Blades are purchased separately. **Product Dimensions:** 22x47.8x57.5in (559x1213x1461mm), WxDxH.

High-quality Diamond Blades are ordered separately. Premium grade blades for medium-sized jobs feature fast cutting and long life. Super Premium Blades allow maximum production for the largest jobs, and have the lowest cost per cut. All blades listed below can be used wet or dry and cost less in quantities of five.

HUSQVARNA® MASONRY SAWS		
Portable Masonry Saw, including blade, 1.5hp,	115V/60Hz	HM-60
	230V/50Hz	HM-60F
Heavy-Duty Masonry Saw, without blade, 5hp,	208-230V/60Hz	HM-62
	230V/50Hz	HM-62F

Accessories	
Portable Rolling Stand for HM-60 and HM-60F	HMA-226
Fixed-Leg Stand for HM-60 and HM-60F	HMA-224
14in Super Premium Blade	HMA-234
14in Super Premium Blade, price each for qty. 5 or more	HMA-234D
20in Premium Blade	HMA-232
20in Premium Blade, price each for qty. 5 or more	HMA-232D
20in Super Premium Blade	HMA-236
20in Super Premium Blade, price each for qty. 5 or more	HMA-236D

CUBE & PRISM MOLDS

Gilson offers a wide selection of cube and prism molds for use with cement, mortar, grout, concrete, and capping compound. Metal molds meet ASTM and AASHTO specifications. Lighter, easy to clean, plastic molds are economical for internal QC programs. All molds are 3-gang except for single specimen, 6in (152mm) and 150mm single specimen cube molds.

HM-294

HM-296

HM-297

HM-335

HM-340

CUBE & PRISM MOLDS

Description	Model	Size	ASTM/ AASHTO
Bronze Cube Molds are 2in (51mm) and 50mm. Forged cube molds are accurately machined for casting cubes in a diagonal arrangement. Wing-nut clamps secure mold halves to the detachable brass base plate. This is the mold of choice for testing of sulfur mortar capping compound cubes when fitted with HM-299 brass cover plate. The HM-309 1/2in thick plastic cover plate also fits this mold for casting expansive grout cubes.	HM-294	2x2in	C87, C91, C109, C141, C311, C472, C579, C942/T 106
	HM-294M	50x50mm	C109M/T 106
Cover Plate for HM-294; Sulphur Cubes	HM-299	—	C617/T 231
Cover Plate for HM-294; Grout Cubes	HM-309	—	—
Stainless Steel Cube Molds are accurately machined for casting 2in (51mm) and 50mm cubes in diagonal position. Wing nuts secure the mold halves to the detachable base plate.	HM-296	2x2in	C87, C91, C109, C141, C311, C472, C579, C942/T 106
	HM-296M	50x50mm	C109M/T 106
Econ-O-Cube Molds are three-piece engineered plastic molds. These units meet size tolerances only for ASTM C109. The molds are held together by self-aligning thumb screws.	HM-297	2x2in	—
HDP Plastic Cube Molds are machined of high-density polyethylene strips that assemble easily, and are held together with heavy rubber straps. Corrosion-proof and easy to clean and store. The set includes a tamper and mold cover.	HM-335	2x2in	—
Cube Maker System utilizes disposable polypropylene mold liners that fit into a permanent three-gang stainless steel frame. Cured cubes are lifted out of the frame and the liners are stripped away. The reusable frame never needs cleanup. The system includes an unbonded capping set of four polyurethane pads with two stainless steel retainers, reusable for up to 300 compression tests, and 27 Poly-liners. This inexpensive, timesaving system is reliable for in-house quality control and other non-specification applications. Liners, pads, and extra mold frames are available separately below in accessories.	HM-340	2x2in	—
Frame for HM-340	HMA-139	—	—
Poly Liners for HM-340, case of 196	HMA-140	—	—
Polyurethane Pads for HM-340, pkg. 4	HMA-141	—	—

CUBE & PRISM MOLDS

HM-290

HM-291

HM-298

CUBE & PRISM MOLDS			
Description	**Model**	**Size**	**ASTM/ AASHTO**
Steel Single Cube Mold is all-steel and collapsible 6x6in (152x152mm) mold that produces concrete specimens for compression testing or serves as a container for mortar penetration tests. Sides are hinged to the base, and ends are hinged to the sides. Wing nut fasteners secure the assembly in place.	HM-290	6x6in	C403/T 197
Plastic Single-Cube Mold is a rugged one-piece plastic 150x150mm (5.9x5.9in) mold that produces concrete specimens for compression testing or serves as a container for mortar penetration tests. Cured specimens are easily de-molded using compressed air injected through the base.	HM-291	150mm	C403/T 197
Hard Rubber Tamper is required by specification for consolidating mortar or grout specimens into molds.	HM-298	6x1/2x1in	C87, C91, C109, C141, C311, C472, C579, C942/T 106
ASTM Trowel has straight sides as specified for proper consolidation and strike off of mortar and grout specimens. Regular Trowel is convenient for mixing and handling of samples. ASTM Trowel Trowel	 HMA-307 HMA-306	 4.5x3in 4.5x3in	C87, C91, C109, C141, C311, C472, C579, C942/T 106 — —
Grout Sample Box (GSB) meets requirements of in ASTM C1019 and UBC 21-18, but avoids expensive and time-consuming construction of block, spacers and filter paper. The GSB protects and forms field samples and doubles as a shipping container. Slotted, corrugated material closely duplicates absorption characteristics of concrete masonry units and samples yield proven compressive strength values comparable to traditional molding methods. Due to the uniform size and surface characteristics of the GSB, laboratory tests are much more consistent and repeatable. Single-use cardboard boxes ship and store flat, taking only seconds to set up for molding. Each box yields four 3x3x6in (76x76x152mm) mortar samples. 25 boxes per carton. Optional Grout Sample Box Fixture reinforces the sidewalls of the cardboard GSB to maintain square shape, assuring more consistent specimens. Sturdy ventilated steel construction allows excess moisture to escape. Grout Sample Box, pkg 25 Grout Sample Box Fixture, Ea.	HM-295 HMA-349	— 3x3x6in	— C1019

HMA-307

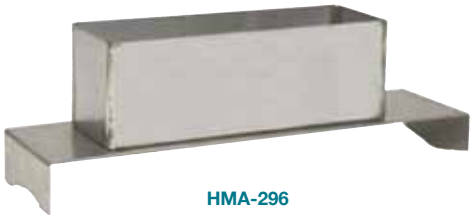
HM-295

NEW! Ship Weight Index

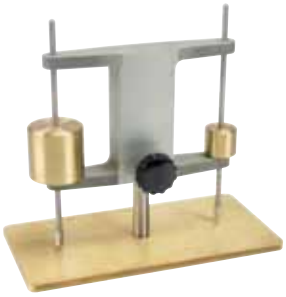
The Estimated Ship Weight for every product is easy to find in the NEW Ship Weight Index!

HM-300

HMA-290



HMA-296



HM-310

HM-570

CEMENT, MORTAR & GROUT PENETRATION DEVICES

Vicat, Gillmore Needle, and Mortar Penetrometer devices determine consistency, set times, and false set of hydraulic cement, mortar, and grout.

CEMENT, MORTAR & GROUT PENETRATION DEVICES		
Description	**Model**	**ASTM/AASHTO**
Standard Vicat has a reversible 300g stainless steel rod with a 10mm plunger on one end and a 1mm double-threaded needle at the other. The adjustable indicator on the rod may be set to indicate in either orientation on a 0-50 x 1mm scale. A conical plastic mold, 60/70mm top/base ID x 40mm high, and glass plate are included. Threaded Adapter Weight modifies the HM-300 to a HM-302 Modified Vicat.		C91, C141, C187, C191, C308, C451 T 129, T 131, T 186
Standard Vicat Apparatus	HM-300	
Additional Conical Plastic Mold, 60/70mm top/base ID x 40mm high	HMA-290	
Additional 1mm SS Needle with reversible, threaded end for HM-300	HMA-292	
Threaded Adapter Weight, modifies HM-300 to HM-302	HMA-293	
Modified Vicat for False Set is used for false set (early stiffening) determination of Portland cement mortar, this unit has a 400g plunger assembly. A conical plastic mold, 60/70mm top/base ID x 40mm high, and glass plate are included.		C359/T 185
Modified Vicat Apparatus	HM-302	
False-Set Container, 50x50x150mm	HMA-296	
400ml Cylindrical Unit Measure	HMA-136	
Additional Conical Plastic Mold, 60/70mm top/base ID x 40mm high	HMA-290	
Gillmore Needle Apparatus determines initial and final set times of portland cement, masonry cement, hydraulic hydrated lime, and certain mortars. The adjustable support has horizontal arms guiding two weighted needles with flat-end cylindrical stainless steel tips. The initial-set needle is 1/4lb (113.4g) and 1/12in (2.12mm) diameter; final-set needle is 1lb (453.6g) and 1/24in (1.06mm) diameter. Base has ample flat shelf for positioning specimens.	HM-310	C266, C414 T 154
HM-570 Acme Penetrometer measures penetration resistance to determine set times of concrete mixes, mortars , and grouts. A 200lb (890N) capacity load cell displays loads on a dial gauge in 1lb divisions. Product Dimensions: 10x13x31in (250x330x787mm), WxDxH.	HM-570	C403/T 197
Manual Mortar Penetrometer is operated with a downward force to penetrate 1in (25mm) into a sample. Pressure is indicated on a scale located on the handle stem with a sliding ring indicator. Unit comes with convenient carrying case and includes six stainless steel penetration needles with 1, 1/2, 1/4, 1/10, 1/20, 1/40 in^2 (645, 323, 161, 65, 32, and 16mm^2) bearing areas. Replacement needles available on request.	HM-571	C403/T 197

HM-571

HM-250D

HM-250

HM-252

HM-256

HM-257

HM-259

HM-268

LENGTH CHANGE TEST APPARATUS
ASTM C151, C490; AASHTO M 210, T 107

Length Change Apparatus measures changes in length of cast prisms due to autoclave curing, alkali reactivity, and other causes not related to applied load. Methods are applicable to testing of hardened portland cement paste, mortar, concrete, or evaluation of hydraulic hydrated lime for structural purposes.

HM-250 and HM-250D Length Comparators are units for measuring length changes in 10in (254mm) specimens cast with special gage studs in the ends to fit the bottom and top anvils of the Comparator. Sensitive indicator with 0.0001in (0.0025mm) divisions measures specimen length. Recommended HM-250D has a quick-reading 0.5in (12.5mm) range LCD digital indicator with in/mm switch, RS-232 port, and replaceable 200 hour battery. The analog HM-250 has a 0.4in range mechanical dial indicator, which will convert to time-saving digital version with purchase of a digital indicator. Comparators include a heat treated, hardened Invar Reference Bar for exactly zeroing the dial indicator at regular intervals. Construction is a sturdy upright support attached to a solid base. Test specimens up to a 4x4x10in (102x102x254mm) cross section, but 1x1x10in (25x25x254mm) prisms are normal. Inquire for special adapter and shorter Invar Reference Bar if 5in (127mm) long prism samples are tested. **Product Dimensions:** 11x11.5x17in (279x292x432mm), WxDxH.

HM-252 Cement Autoclave (ASTM C151, AASHTO T 107, others) provides an accelerated means of estimating delayed expansion of portland cement caused by hydration of CaO and MgO. Test bars are exposed to controlled steam pressure and constant temperature. Unit is capable of pressures in the 60—350psi (0.4—2.4mPa) range and includes steam vessel, pressure regulator, pressure gauge (0—600psi x 5psi), air vent valve, power switches, a safety pop valve set at 350psi, MA-421F thermometer, wrench, and package of five gaskets. Replacement gaskets, and safety pop valves are available as accessories. Autoclave chamber is 6-1/8in (156mm) IDx16in (407mm) H. 1,800 Watts/15.7 amps maximum power demand on 115 VAC supplies. For use with 230V service, order TR-3002 transformer. **Product Dimensions:** 17x48x28in (432x1220x711mm), WxDxH

HM-254 Test Bar Holder (order separately) holds up to eight 1x1in (25x25mm) bars of 10in (254mm) gage length. Bars are held vertically above water level to expose all specimens to Autoclave steam.

Prism Molds, Gage Studs (ASTM C490, AASHTO M 210, others): Prism Molds are corrosion-resistant steel (HM-258 is stainless) with base plate, removable partitions and end plates, designed to provide required length of 10in (254mm) between ends of gage studs cast in ends of bars. Dimensions from outside ends of studs (comparator gage contact points) are 11-5/8in (296mm); specimens are 11-1/4in (286mm) long.

Select molds for specimen cross sections of 1x1in, 2x2in, or 3x3in. Molds for 5in (127mm) gage length specimens available. Package of ten stainless steel Gage Studs HM-268 are knurled and threaded, 1/4x13/16in (6.35x20.64mm) diameter x L.

HM-270 Mortar Bar Container (ASTM C 227), is stainless steel with tight fitting cover to seal in water vapor. Vertically supports up to 36 mortar bars in container with lower end above water surface. Box is 9x11x15.5in (229x279x394mm), LxWxH.

LENGTH CHANGE TEST APPARATUS	
Digital Length Comparator	HM-250D
Length Comparator	HM-250
Cement Autoclave[1], 115V, 50/60Hz	HM-252
Accessories	
Gaskets, pkg. 100	HMA-85
Safety Pop Valve	HMA-86
Test Bar Holder	HM-254
Thermometers, 20°—580°F	MA-421F
Thermometers, -5°—300°C	MA-421C
Prism Molds 1x1x10in (25x25x254mm), Single	HM-256
Prism Molds 1x1x10in (25x25x254mm), 2-Gang	HM-257
Prism Molds 1x1x10in (25x25x254mm), 2-Gang Stainless	HM-258
Prism Molds 2x2x10in (51x51x254mm), 2-Gang	HM-255
Prism Molds 3x3x10in (76x76x254mm), Single	HM-259
Gage Studs, pkg. 10	HM-268
Mortar Bar Container	HM-270
Tamping Rod, 3/8x12in	HM-47

HM-273

FLOW TABLES
ASTM C87, C109, C110, C185, C230, C348, C593, C860; AASHTO M 152, T 71, T 106, T 137

Flow tables are used for determining consistency (flow) and for preparing mortars of standard consistency for testing. Flow is determined as percent increase in diameter of a conically-molded mortar. The sample is subjected to a required number of cam-actuated 1/2in (12.4mm) table drops at a fixed 100rpm rate.

All flow tables have the 10in (254mm) diameter rigid cast bronze table supported in a cast iron frame. Base and special drive motor bracket are mounted to a concrete pedestal provided by user. A Flow Mold is included with all tables; extras are available as HMA-133. Mold is cast bronze, 2.75/4in (70/102mm) top/bottom ID with collar. The HMA-134 Percent Flow Caliper has special scale to give the average flow directly by adding four readings. The 11.8in (300mm) long Stainless Steel Straightedge (HMA-135) for striking off specimens in containers, measures or molds is 1.6in wide x 1/8in thick (40x3mm) and has one beveled edge.

HM-272 and HM-273 Motorized Flow Tables have rates controlled precisely in accordance with ASTM and AASHTO standards.

HM-274 Manual Flow Table gives reliable results and is recommended for applications where strict adherence to standards is not essential.

FLOW TABLES	
Motorized Flow Table w/Counter, 115V/60Hz	HM-272
230V/50Hz	HM-272F
Motorized Flow Table, w/o Counter, 115V/60Hz	HM-273
230V/50Hz	HM-273F
Manual Flow Table w/Hand Wheel & Flow Mold	HM-274
Accessories	
Flow Mold	HMA-133
Percent Flow Caliper	HMA-134
Stainless Steel Straightedge, 11.8x1.6x0.12in	HMA-135
Rubber Tamper, 0.5x1x6in	HM-298

HM-372 shown with MA-48

FLOW CONE SETS
ASTM C939

HM-372 Flow Cone Set measures flowability of hydraulic grout used in preplaced aggregate concrete. Set consists of a cast aluminum flow cone, a steel stand, and a 2L (2.1qt) stainless steel measuring container. Flowability is measured by time of discharge of a 1.725L sample of grout through the 1/2in (12.7mm) ID discharge tube orifice from the cone.

The 12in (305mm) high Flow Cone has 7in (178mm) top ID and comes with point gauge level indicator. Sturdy 3-legged painted steel stand is 20.5in (414mm) high with adjustable neoprene rubber feet for leveling and isolation from vibration. Unit disassembles quickly for storage or transport. The included 2L beaker is sized to receive grout from a single test, or add 6L beaker to collect grout from up to three tests. The flow cone method is for use with grouts having 35 seconds or less efflux time.

HM-373 Flow Cone Set has similar dimensions to the HM-372, but with special 3/4in (19mm) orifice for less flowable grouts.

FLOW CONE SETS	
Flow Cone Set	HM-372
Flow Cone Set, 3/4in orifice	HM-373
Accessories	
Cone, 1/2in orifice	HM-372B
Cone, 3/4in orifice	HM-373B
Stand	HM-372A
Stopwatch, Large Display Digital	MA-30
Stainless Steel Beaker, 6L	MA-48
Stainless Steel Beaker, 2L	MA-42

HM-677

MASONRY GROUT WINDOWS

Grout Windows enable debris cleanout while allowing monitoring and visual confirmation of grout placement in masonry structures to ensure block cores are properly filled. Simply open one cell in the bottom course of block to be filled and install the window using the specially designed anchor bolt. After grout placement, the Acrylic Window can be removed by twisting and breaking off the exposed portion of the engineered plastic bolt. Proper use and grout placement assures soundness of the block face and eliminates costly repairs resulting from blow outs. The Acrylic Windows are reusable while the bolt is abandoned in place. Acrylic Grout Windows are supplied in packs of 20 pieces. Bolt and Nut sets are purchased separately in packages of 18 sets. **Product Dimensions:** 5x8in (127x203mm) WXD.

MASONRY GROUT WINDOWS	
Masonry Grout Windows, Pkg of 20	HM-677
Accessories	
Engineered Plastic Bolt and Nut, 18 sets	HMA-715

WT-1

WT-23ESB

HM-106

HM-107

BS-50

WT-62 shown with WTA-49

HM-108 shown with TSA-198

FINENESS TEST APPARATUS
ASTM C430, D1514; AASHTO T 98, T 192

The Fineness Test Apparatus meets standard methods for fineness of Portland, and other hydraulic cements, fly ash, natural pozzolan, masonry cement, and similar materials requiring constant-pressure wash apparatus.

WT-1 Spray Apparatus consists of valve, pressure gauge, piping, and spray nozzle. It is useful for any wet sieving application. Gauge is 4.5in (114mm) diameter, and graduated in psi to 30psi max. Red pointer indicates maximum reached.

WT-1A Connector Accessory is a 2ft flexible hose connector. Threaded end connects to valve of WT-1; other end fits standard garden hose outlet, and has screw-in fitting for attachment to sink faucet.

WT-23ESB Fineness Test Sieve has one-piece brass frame and No.325 stainless steel wire cloth. The frame is 2in (50.8mm) diameter, and 3in (76.2mm) deep from rim to cloth. To have the WT-23ESB Test Sieve verified to ASTM E11 Calibration or Inspection Grade, see separate listing for Test Sieve and Screen Tray Verification and Services. User calibration with NIST Standard Cement No. 114, available separately as BS-50, is required.

WT-62 Two-Piece Nickel Plated Sieve Frame may be used with WTA-49 No.325 Mesh Disc, purchased separately, to perform the fineness test as specified. The WT-62 frame is easily disassembled by removing three screws to replace the disc. To have the WTA-49 disc verified to ASTM E11 Calibration or Inspection Grade, see separate listing for Test Sieve and Screen Tray Verification and Services. User calibration with NIST Standard Cement No. 114, available separately as BS-50, is required. Inquire for replacement discs of ASTM E161 Precision Electroformed Cloth.

BS-50 NIST Standard Cement No.114 is available for calibration of fineness test sieves in accordance with ASTM C 430 and AASHTO T 192. Each package consists of twenty standard sample units in individual sealed vials and is supplied with a NIST certificate.

FINENESS TEST APPARATUS	
Fineness Test Sprayer Assembly	WT-1
2 ft Hose Connector for WT-1	WT-1A
Brass Fineness Test Sieve	WT-23ESB
Two-Piece Nickel Plated Fineness Sieve Frame	WT-62
Mesh for WT-62	WTA-49
NIST Standard Cement No.114	BS-50

STANDARD TEST SANDS

Specially graded sands for ASTM tests are naturally rounded silica sands of nearly pure quartz, mined from the Ottawa, Illinois area. All are supplied in 50lb bags and meet ASTM and AASHTO standards indicated.

HM-106 Density Sand for sand-cone density testing of soils is clean, uniform, uncemented, and free-flowing. Meets ASTM D1556 and AASHTO T 191. Few particles pass No.200 (75µm) or are retained on No.10 (2.00mm) sieves. Uniformity coefficient less than 2.0, and less than 3% passes No.60 (250µm). Bulk density varies less than 1%.

HM-107 20-30 Standard Sand (Tensile Test Sand) is manufactured to pass No.20 (850µm) sieve and be retained on No.30 (600µm). Meets ASTM C778 requirements. HM-107 sand also met former ASTM C190, now a discontinued standard.

HM-108 Graded Standard Sand (Cube Test Sand) is graded between No.30 (600µm) and No.100 (150µm) sieves. Meets requirements for ASTM C109 and C778, as well as AASHTO T 106.

STANDARD TEST SANDS	
Density Sand	HM-106
20-30 Standard Sand	HM-107
Graded Standard Sand	HM-108

MA-10

MA-15

HM-220

BLAINE AIR PERMEABILITY
ASTM C204; AASHTO T 153

Blaine Air Permeability Apparatus measures the specific surface area of fine materials in square centimeters per gram of test sample. A quantity of air is drawn through a bed of definite porosity. The pore volume in the bed is a function of the size of particles, and determines the rate of air flow.

The apparatus is supplied complete with stainless steel test cell, plunger, perforated disk, calibrated U-tube manometer, rubber aspirator and bulb, all mounted on a sturdy wooden panel and base. An 8oz bottle of red spirit manometer fluid, package of filter paper, and a wood block for holding cell during filling are included. For calibration, order BS-50, NIST Portland Cement standard reference material (20 units). Order additional 12.7mm, grade 597 Filter Paper discs in quantities of 1,000 as MA-11.

BLAINE AIR PERMEABILITY

Blaine Air Permeability Apparatus MA-10

Accessories

Filter Paper, qty. 1,000 .....MA-11
Replacement U-Tube.....MA-12
Manometer Fluid, 8oz.....MA-13
NIST Calibration Cement, qty. 20 .....BS-50

WAGNER TURBIDIMETER
ASTM C115; AASHTO T 98

The Wagner Turbidimeter determines the fineness of portland cement by measuring the specific surface area. A constant light source passes through a suspension of the cement and is detected by a photoelectric cell. Values are correlated to particle diameters measured of 50, 45, 40, 35, 30, 25, 20, 15, 10 and 7.5 micrometers. Turbidity changes as the particles settle from suspension. Turbidity is related to specific surface area, computed as described in ASTM and AASHTO procedures.

The Turbidimeter is supplied with photoelectric cell, light source, heat absorbing device, light filter, shield, and sedimentation tank in metal cabinet with wall mounts and adjustable shelf. Timing burette with stand, microammeter, stirring apparatus, wet sieving assembly with No. 325 sieve, flasks, test tubes, and instruction book are also included. A 6V storage battery or other constant emf source is required, but not included. For calibration, order BS-50, NIST Portland Cement standard reference material separately.

WAGNER TURBIDIMETER

Wagner Turbidimeter, 115V/60Hz MA-15
230V/50Hz..... MA-15F

Accessories

NIST Calibration Cement, qty. 20 .....BS-50

PORTABLE CONCRETE MIXERS
ASTM C192; AASHTO R 39, T 126

Gilson Portable Concrete Mixers are available in two versions. Both have 3ft³ (85L) batch capacity, wheels for portability, and are powered by a 1/3hp electric motor. Mixers are built durably for long life and with a lightweight design for portability. Heavy-gauge steel drums with reinforced rims feature replaceable mixing blades to give four mixing actions with each drum turn. One-piece cast iron ring on drums, and tapered roller bearings on drive and drum shafts assure smooth, efficient operation. Drum diameter is 26in (660mm), opening size is 14in (356mm) and discharge height is 20in (508mm). Total drum volume is 5.5ft³ (156L). The mixers are equipped with a five position drum lock and tilt bar for discharging mix, and predrilled base plates for permanent mounting if desired. 115V/60Hz, 1/3hp electric motor. **Product Dimensions for both:** 30x46x48in (762x1168x1219mm), LxWxH.

HM-220 Portable Concrete Mixer has handles for manual positioning and pneumatic tires with tapered roller bearings. Tire diameter is 10in (254mm).

HM-221 Portable Concrete Mixer has a telescoping tow bar and larger tires suitable for high-speed towing behind a vehicle with a 2in hitch ball. Wheel (rim) diameter is 12in (305mm).

PORTABLE CONCRETE MIXERS

Portable Concrete Mixer.....HM-220
Portable Concrete Mixer.....HM-221

MA-66

MA-67

MA-52

PORTABLE MIXERS

The portable Asphalt/Concrete Mixers are ideal for sample or small batch mixing in just about any setting. The enameled-steel mixer holds a utility bucket securely in place. As the bucket rotates at 60rpm, a stationary Mixing Paddle scrapes sides and bottom of the bucket to ensure thorough mixing. All 115V/60Hz mixers are supplied with a 1/2hp motor, On/Off switch, fuse protection, and an 8ft cord with three-prong plug. For 230V/50Hz mixer, add "F" to model number suffix. The 10 gallon "F" model is supplied with a 1hp motor.

MA-66 Light-Duty Stationary Mixer includes a removable 5gal Utility Bucket and Standard Mixing Paddle. A Deluxe Mixing Paddle with extra fins is available for heavy loads. MA-66 is powered by a constant speed motor and belt pulley. Other heavy-duty models are recommended for asphalt mixes. **Product Dimensions:** 12x18x24in (305x457x610mm), WxDxH.

MA-67 and MA-68 Heavy-Duty Portable Mixers use 5gal and 10gal Utility Buckets, respectively, and are equipped with 8in wheels for maximum mobility. By using a direct drive motor more power is generated for mixing. Mixing paddles not included. Gilson recommends MA-67 Mixer with either MAA-146 Paddle for asphalt or MAA-148 Paddle for concrete applications. The 5gal bucket can be preheated in ovens if necessary. Inquire for other available paddles. **Product Dimensions:** 24x21x35in (610x508x889mm), WxDxH.

PORTABLE MIXERS	
Light-Duty Stationary Mixer, 5gal	MA-66
Heavy-Duty Portable Mixer, 5gal	MA-67
Heavy-Duty Portable Mixer, 10gal	MA-68
Accessories	
Bucket & Cover	MAA-141
Replacement Paddle	MAA-142
Deluxe Paddle	MAA-143
Utility Bucket for MA-67, 5gal	MAA-144
Utility Bucket for MA-68, 10gal	MAA-145
Asphalt Paddle for MA-67, 5gal	MAA-146
Paddle for MA-68, 10gal	MAA-147
Concrete Paddle for MA-67, 5gal	MAA-148

LABORATORY MIXERS

ASTM C109, C227, C305; AASHTO T 106, T 162

Industrial-grade Laboratory Mixers have planetary action for thorough mixing, and blending of materials. Direct gear drives and heavy-duty motors assure constant mixing speeds under load. Locking hand-lever raises and lowers bowl. All mixers are supplied with stainless steel bowl, wire whip, dough hook, and aluminum flat beater. MA-52 and MA-52X include an additional stainless steel flat beater and other modifications to meet ASTM and AASHTO specifications. Add "F" suffix to any mixer or heating adapter model number for similar unit that operates on 230V/50Hz power supply.

MA-52 Laboratory Mixer has 5qt (4.7L) capacity and a 1/6hp motor with selectable operating speeds of 139, 285 and 591rpm. Additional heavy-duty Stainless Steel Flat Beater is included, as well as a 6ft (1.8m) power cord. The MAA-30A Clearance Adjustment Bracket can be purchased separately to meet requirements of ASTM C305, C227 and C109. MAA-31 Acrylic Bowl Lid is also available for all 5qt (4.7L) bowls. **Product Dimensions:** 10.5x15x17in (267x381x432mm).

MA-52X Laboratory Mixer has the same specifications as MA-52, but has been modified with a MAA-30A Clearance Bracket to meet the requirements of ASTM C305, C227 and C109 (AASHTO T 162 and T 106) and certain other tests for mortar and cement. **Product Dimensions:** 10.5x15x17in (267x381x432mm).

MA-54A Laboratory Mixer is a 12qt (11.4L) capacity benchtop mixer for larger batch requirements. This unit is supplied with a 1/2hp motor for selectable mixing speeds of 107, 198 and 365rpm. A 6ft (1.8m) power cord is included. **Product Dimensions:** 19x23x29in (483x580x750mm), WxDxH.

Heating Adapter Kits maintain elevated temperatures when preparing hot-mix asphalt specimens in Laboratory Mixers. Heating mantles mount under mixing bowls with hook and loop fasteners. Electronic proportional controller with built-in circuit breaker attaches with a twist-lock connector on 4ft (1.2m) cable.

LABORATORY MIXERS	
5qt Laboratory Mixer, 115V/60Hz	MA-52
5qt Laboratory Mixer for ASTM C 305 and C 109, 115V/60Hz	MA-52X
12qt Laboratory Mixer, 115V/60Hz	MA-54A
Accessories	
Wire Whip for MA-52	MAA-260
Heavy-Duty Stainless Steel Flat Beater for MA-52	MAA-266
Bowl for MA-52	MAA-32
Bowl for MA-54A	MAA-34A
Clearance Adjustment Bracket for MA-52	MAA-30A
Heating Adapter for MA-52, 250 Watts	MAA-28
Heating Adapter for MA-54A, 600 Watts	MAA-64

Manufactured in cooperation with KAROL-WARNER

HM-397 shown with HMA-685 and BRA-60

HM-398 shown with HMA-685D, BRA-60 and HMA-94

BR-10

CALIFORNIA BEARING RATIO (CBR) LABORATORY TEST SYSTEMS

ASTM D1883; AASHTO T 193

The California Bearing Ratio (CBR) test yields relative strength of laboratory-compacted or in–situ soils and base course materials. The test can be performed in the laboratory or field with different equipment, and is based on penetration resistance of a soil to a standard-sized piston. In the lab, this is carried out in a load frame on soil compacted into a soil mold.

Karol-Warner Pro-Loader Load Frames are ideal for Laboratory CBR testing, and a quick change of test components converts them to perform other soil testing applications. Pro-Loader frames feature 10,000lbf (44.5kN) capacity with 11.9x37.3in (302x947mm) WxH frame openings. 3/4hp DC motors and controllers precisely regulate strain rates to ±1% of set point, and the frames have sturdy 14-gauge painted steel enclosures. Adjusting nuts on the coarse-threaded vertical rods quickly adjust the horizontal cross-head height. Units operate on 115V/60Hz power supplies. Rolling Cart for Pro Loader Frames is sturdy steel and makes positioning of Load frames easy. Add "F" suffix to model numbers to order units operating on 230V/50Hz. **Product Dimensions:** 18x29x54.5in (457x737x1,384mm) WxDxH.

HM-396 Pro-Loader Load Frame features a high-speed platen advance to rapidly position the platen for faster set-up. Strain Rate is 0.001—0.1in/min (0.0254—2.54mm/min).

HM-397 Pro-Loader Load Frame has a wider range of strain rates. The micro-stepping drive controller also allows more precise control of loading rates. Strain Rate is 0.0001—0.3in/min (0.00254—7.62mm/min).

HM-398 Pro-Loader II Load Frame has a higher overall strain rate. This unit does not use a high-speed platen advance. Strain Rate is 0.02—2.0in/min (0.508—50.8mm/min).

BR-10 Economy Manual CBR Press has separate cranks for platen positioning and testing operation. The 10,000lbf (44.5kN) capacity press meets specifications when cranked at required speed. Load Ring, Dial Indicator, and Penetration Piston are included; this model does not require purchase of a separate Component Set. **Product Dimensions:** 18x13x40in (457x330x1,016mm), WxDxH.

Component Sets for CBR testing with the Pro-Loader Frames feature high-quality instrumentation required to perform the laboratory CBR tests and quickly install on the Load Frames. Fixtures and brackets are included for direct mounting to the frames.

HMA-684 Analog CBR Component Set includes a CBR Penetration Piston, 6,000lbf capacity Load Ring, a 1x0.001in Dial Indicator, and Indicator Clamp.

HMA-685 Analog CBR Component Set has a 10,000lbf capacity Load Ring, CBR Penetration Piston, a 1x0.001in Dial Indicator, and Indicator Clamp.

HMA-685D Digital CBR Component Set includes a CBR Penetration Piston, 10,000lbf Load Cell with 2in travel Displacement Transducer that connects to the included two-channel Digital Readout. A Transducer Clamp is also included. Select this Component Set for use with GEO-DAS Data Acquisition Software.

HMA-751 CBR/LBR Software is part of the Geotechnical Data Acquisition Suite (GEO-DAS) of software applications, custom-designed for data collection from Gilson's Karol-Warner two-channel or four-channel digital readouts. Software collects and analyzes data for both CBR and Florida FM-5-515 Limerock Bearing Ratio Test. Specimen Information is input through simple, interactive menus. Real-time Test information is collected and displayed in graphical or tabular format, allowing on-the-spot monitoring of test progress. Data is easily switched between metric and imperial units and is saved automatically. The software can be downloaded as an executable file for a free 30-day evaluation period. An activation code for permanent use can be purchased at the end of the trial period. GEO-DAS Applications for direct shear, triaxial, unconfined, and consolidation are also available and listed separately.

HMA-94 Rolling Load Frame Cart is sturdy bolted steel construction and positions load frames at the proper working height. Rugged casters allow convenient placement.

CALIFORNIA BEARING RATIO (CBR) TEST SYSTEMS

Pro-Loader Load Frame, 115V/60Hz	HM-396
Pro-Loader Load Frame, 115V/60Hz	HM-397
Pro-Loader II Load Frame, 115V/60Hz	HM-398
Economy Manual CBR Press	BR-10

Accessories

Analog CBR Component Set	HMA-684
Analog CBR Component Set	HMA-685
Digital CBR Component Set	HMA-685D
CBR/LBR Software	HMA-751
Rolling Load Frame Cart	HMA-94

BRA-59

BRA-60

BRA-61

BRA-31

BRA-63

BRA-64

BRA-67

BRA-68

BRA-70

BRA-55

CALIFORNIA BEARING RATIO (CBR) EQUIPMENT
ASTM D1883; AASHTO T 193

CALIFORNIA BEARING RATIO (CBR) EQUIPMENT	
CBR Molds and Spacer Discs CBR Compaction Molds are 6x7in (152x178mm) IDxH with 2in (51mm) collar and perforated base. CBR Spacer Disc is 5-15/16x2.416in (151x61mm), Dia.xH with threaded opening for insertion and removal. Both are rugged and rust-resistant plated steel.	
CBR Mold	BRA-60
CBR Spacer Disc	BRA-61
LBR Molds and Spacer Discs LBR Compaction Mold (FM 5-515 Florida Limerock Bearing Ratio test) is 6x6in (152x152mm), IDxH with 2-1/2in (64mm) collar. Disc for LBR is 5-15/16x1.41in (151x36mm) with threaded opening, Dia.xH. Plated steel construction.	
LBR Mold	BRA-59
LBR Spacer Disc	BRA-62
Penetration Pistons CBR Penetration Piston is 7.5x1.954in (191x49.6mm) LxDiam. and fits standard fixtures for use in testing. Choose models with threaded male connectors of 1/2in (12.7mm) or 3/4in (19mm) diameters.	
CBR Penetration Piston, 3/4in Threaded Male Connector	BRA-30
CBR Penetration Piston, 1/2in Threaded Male Connector	BRA-31
Surcharge Weights Annular type has 2-1/8in (54mm) center hole. Slotted type has 2-1/8in (54mm) radius slot. Both are 5-7/8in (149mm) diameter plated steel and weigh 5lb (2.27kg).	
Annular Surcharge Weight	BRA-63
Slotted Surcharge Weight	BRA-64
Swell Plate Perforated Swell Plate is 5-7/8in (149mm) diameter and has threaded stem for insertion and removal.	BRA-67
Swell Tripod Tripod to measure specimen swell has 1x0.001in dial indicator. Metric version has 25x0.01mm dial indicator.	
Swell Tripod	BRA-68
Metric Swell Tripod	BRA-68F
Filters Stainless steel woven-wire mesh Filter with No.100 (150µm) openings is 5-15/16in (151mm) diameter. Coarse Filter Paper is same diameter and comes in a package of one hundred pieces.	
No.100 Stainless Steel Mesh Filter	BRA-75
Coarse Filter Paper, pkg. 100	BRA-76
Cutting Edge 6x2in (152x51mm) plated steel cutting edge fits on end of BRA-60 mold for field-sampling of in-place soils.	BRA-70
CBR Accessory Set Convenient CBR Accessory Set includes four each of BRA-60 Molds, BRA-63 Surcharge Weights, BRA-64 Surcharge Weights, BRA-67 Swell Plates, and BRA-75 Filter Screens. One each BRA-61 Spacer Disc and BRA-68 Swell Tripod are also included for typical CBR lab operation.	BRA-55

BR-2

BRA-31, BRA-33, BRA-40, BRA-41 & BRA-42

BRA-32

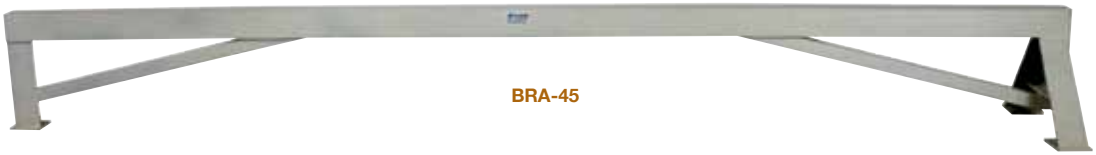
MA-334

HM-428

CALIFORNIA BEARING RATIO (CBR) FIELD EQUIPMENT
ASTM D4429

The California Bearing Ratio (CBR) field test yields in–situ strength of soils and some base course materials. Field CBR tests involve using a loading jack to force a piston into the soil at the test site and comparing the piston load to the depth of penetration. Typically, the jack is loaded against heavy dead weights or a heavy piece of equipment such as a loaded dump truck. Components of Gilson's Field CBR Equipment are ordered individually to form a full set for tests according to ASTM or U.S. Army Corps of Engineers (COE) methods.

CALIFORNIA BEARING RATIO (CBR) FIELD EQUIPMENT	
Two Speed Field ASTM Jack has 10,000lbf (45kN) capacity with 3-1/2in (89mm) lift. **Three Speed Field COE Jack** is similar and has 2in (51mm) maximum lift. Both jacks are supplied with a swivel base and manual crank handle.	
ASTM Two-Speed Field Jack with Swivel Base	BR-2
COE Three-Speed Field Jack with Swivel Base	BR-3
Penetration Piston is 7.5x1.954in (191x49.6mm) LxDia. It meets requirements for ASTM or COE methods. The Piston Extension Set and Connector Set are required for proper set up and use of the Field Jack, Load Ring, and Piston assembly.	
CBR Penetration Piston, 1/2in Threaded Male Connector	BRA-31
Field Piston Extension Set	BRA-32
Field Connector Set	BRA-33
Penetration Dial Gauges are available with inch or metric analog dial faces. The 8ft (2.4m) Dial Support Bridge and Magnetic Gauge Holder position the Penetration Dial Gauges for measuring penetration strain.	
Dial Support Bridge	BRA-45
Penetration Dial Gauge, 1in x 0.001in	MA-334
Penetration Dial Gauge, 25mm x 0.01mm	MA-346
Magnetic Gauge Holder	HMA-338
Load Rings are machined from high strength aluminum alloy plate and designed for compression measurement. Loads are measured to ±0.5% on the included mechanical dial indicator (0.0001in resolution). Measurements are plotted on a calibration chart prior to shipment. Ring dimensions are 6.25in high x 1.0in thick. Mounting holes are 1/2in-20 threads per inch.	
Load Ring, 2,000lbf x 1lbf	HM-425
Load Ring, 6,000lbf x 5lbf	HM-428
Field Surcharge Plate with circular opening, and Surcharge Masses with u-shaped openings simulate loads from base course or pavement which will overlie the test material. U-shaped openings allow addition or removal of masses with penetration piston in place. Additional Surcharge Masses may be needed to simulate large pavement loads.	
10lb Field Surcharge Plate, 10in dia.	BRA-40
10lb Field Surcharge Mass, 8.5in dia.	BRA-41
20lb Field Surcharge Mass, 8.5in dia.	BRA-42



BRA-45

HM-397 shown with HM-430

Manufactured in cooperation with KAROL-WARNER

HM-398 shown with HM-430D, HM-418 and HMA-94

UNCONFINED COMPRESSIVE STRENGTH TEST SYSTEMS
ASTM D2166; AASHTO T 208

Unconfined compression tests quickly provide approximate strength values of cohesive soils. This test can be performed on intact, remolded, or reconstituted soil specimens using strain-controlled application of axial loads. A wide selection of reliable Karol-Warner Load Frames, components and accessories offer versatility to select a system meeting your specific needs.

Karol-Warner Load Frames are a good choice for unconfined compression testing, and can perform other soil testing applications with just a quick change of components. All models feature 10,000lbf (44.5kN) total capacity and frame openings of 11.9x37.3in (302x947mm) WxH. The frames have sturdy 14-gauge painted steel cabinets, and 3/4hp DC motors with controllers to precisely regulate strain rates to ±1% of set point. Horizontal cross-head heights are quickly changed using adjusting nuts. Coarse-threaded high strength vertical rods are plated for corrosion resistance. Units operate on 115V/60Hz power supplies. Sturdy steel Rolling Cart offers portability for positioning of the Load Frame. Add "F" suffix to model numbers to order units operating on 230V/50Hz. **Product Dimensions:** 18x29x54.5in (457x737x1,384mm) WxDxH.

HM-396 Pro-Loader Load Frame features a high-speed platen advance to rapidly position the platen for faster set-up. Strain Rate is 0.001—0.1in/min (0.0254—2.54mm/min).

HM-397 Pro-Loader Load Frame has a wider range of strain rates. The micro-stepping drive controller also allows more precise control of loading rates. Strain Rate is 0.0001—0.3in/min (0.00254—7.62mm/min).

HM-398 Pro-Loader II Load Frame has a higher overall strain rate. This unit does not use a high-speed platen advance. Strain Rate is 0.02—2.0in/min (0.508—50.8mm/min).

Unconfined Compression Component Sets feature all the high-quality instrumentation needed to perform unconfined compression tests and are ready for easy installation on Pro-Loader Load Frames. Fixtures and brackets are included for direct mounting to the frames.

HMA-683 Analog Unconfined Compression Component Set includes a 1,000lbf capacity Load Ring, a 1x0.001in Dial Indicator, Indicator Bracket, and 2.8x0.25in Plastic Disc.

HMA-683D Digital Unconfined Compression Component Set has a 1,000lbf Load Cell and 2in travel Displacement Transducer that connect to the two-channel Digital Readout. A Transducer Bracket and 2.8x0.25in Plastic Disc are also included. Select this Component Set for use with GEO-DAS Data Acquisition Software.

HMA-752 Unconfined Compression Software is part of the Geotechnical Data Acquisition Suite (GEO-DAS) of software applications, custom-designed for data collection from Gilson's Karol-Warner two-channel or four-channel digital readouts. Specimen Information is input through simple, interactive menus. Real-time Test information is collected and displayed in graphical or tabular format, allowing on-the-spot monitoring of test progress. Data is easily switched between metric and imperial units and is saved automatically. The software can be downloaded as an executable file for a free 30-day evaluation period. An activation code for permanent use can be purchased at the end of the trial period. GEO-DAS Applications for direct shear, triaxial, CBR/LBR, and consolidation are also available and listed separately.

UNCONFINED COMPRESSIVE STRENGTH TEST SYSTEMS

Pro-Loader Load Frame, 0.001—0.1in/min Strain Rate	HM-396
Pro-Loader Load Frame 0.0001—0.3in/min Strain Rate	HM-397
Pro-Loader II Load Frame0.02—2.0in/min Strain Rate	HM-398

Accessories

Analog Unconfined Compression Component Set	HMA-683
Digital Unconfined Compression Component Set	HMA-683D
GEO-DAS Unconfined Compression Software	HMA-752
Rolling Load Frame Cart	HMA-94

HMA-517

HMA-521

HM-350M

TRIAXIAL SOIL TEST SYSTEMS
ASTM D2850, D4767; AASHTO T 296, T 297

Reliable information about soil strengths is a governing factor for safe and effective construction of embankments and foundation systems. Triaxial testing of soils involves preparing and mounting undisturbed or remolded specimens in a Test Chamber pressurized with water to create a confining pressure around the specimen. The Test Chamber is placed in a Pro-Loader Load Frame for testing by axial loading. Testing a specimen under confining pressure gives information about shear resistance, strength and cohesion, to predict such things as slope stability and structural foundation behavior. Tests can be conducted with specimens in unconsolidated-undrained condition as described in ASTM D2850, or consolidated-undrained or consolidated-drained conditions as noted in ASTM D4767.

Triaxial Control Panels regulate air and fluid pressures in the Testing Chambers through a system of burettes, valves and regulators, and are a central point for supply connections of air, water, and drains. These Control Panels also used for hydraulic conductivity/flexible wall permeability testing as described in ASTM D5084.

HM-350M Master Control Panel is required for connection to a single Test Chamber. All cell and burette pressures are individually adjustable and easily monitored by a single digital pressure gauge. Precision regulators and zero volume change ball valves allow accurate setting of critical pressures during saturation, consolidation and testing phases. Effective cell pressure and cell and sample back-pressure are all controlled through a single regulator.

Supply connections for water, air, and drain are located at the rear of the panel, connections for the testing chamber are located on the front. The chamber and reservoirs can be filled and drained from the front connections. The panel includes two 50x0.1cc burettes and two 4x0.008cc pipettes for accurate flow measurements. Each is encased in large 400cc storage reservoirs. The Digital Pore Pressure Gauge with transducer precisely measures pore pressure for control of loads and loading rates. Other accessories include the Specimen Height Indicator to track sample deformation and the Deairing Tank to prepare water for use in the testing chambers. An air compressor is required to generate confining pressures, but not included. Testing Chambers and other accessories are ordered separately. **Product Dimensions:** 21x6.25x37.25in (533x159x946mm) WxDxH.

HM-350A Auxiliary Control Panel is required for control of each additional Test Chamber. This system is useful for conducting multiple tests simultaneously. The Auxiliary Panel attaches to the Master Control Panel and uses its digital pressure readout to display confining and cell pressures. Precision regulators, valves, reservoir and burrette assemblies are included. **Product Dimensions:** 21x6.25x37.25in (533x159x946mm) WxDxH.

Triaxial Test Chambers are designed for optimum performance with Gilson Master or Auxillary Control Panels and Pro-Loader Frames. Heavy-wall clear acrylic Test Chambers have maximum operating pressures from 100 to 200psi (6.9 to 13.8bar) and solid, circular bases designed for heavy loading. Specimen Caps, Pedestals, Porous Stones, and O-Rings are included with each Test Chamber. The anodized aluminum specimen caps have two drain ports and are grooved for O-Rings to seal latex membranes. The pedestals have flow-through lines and are keyed to prevent turning and pinching the tubing during set up. To specify units equipped with stainless steel valves and fittings, add "S" suffix to model numbers when ordering. The precision-ground and polished stainless steel load piston with piston lock has ultra-low breakaway friction and is guided through internally lubed and sealed linear ball bearings. Triaxial Test Chambers can also be used for ASTM D5084 Flexible Wall Permeability testing. Gilson's HMA-519 Test Chamber is ideal for triaxial testing of large soils or asphalt samples up to 6in (152mm) diameter and 12in (305mm) height.

Latex Membranes encase the specimens inside the Test Chambers to protect them from water during testing and are installed with Membrane Stretchers. O-Rings are installed around the specimen caps with a Placing Tool to seal the ends of the membranes, and porous stones are placed at the each end of the specimen to protect it during testing, while still allowing water to pass through. All are available as accessories to fit various specimen diameters.

All Karol-Warner Pro-Loader Load Frames are designed for unconsolidated-undrained triaxial soil testing (ASTM D2850). For testing consolidated-undrained, or consolidated-drained specimens under ASTM D4767, only the HM-397 Proloader model can be used. All models feature 10,000lbf (44.5kN)

technote

TRIAXIAL TEST CHAMBERS

Specimen Size in (mm)	Triaxial Chambers	Dimensions WxDxH, in (mm)	Pressure Rating psi (bar)
2.8 (71)	HMA-517	6.5 x 8.25 x 24 (165 x 210 x 610)	150 (10.3)
4 (102)	HMA-518	8 x 10 x 25 (203 x 254 x 635)	200 (13.8)
6 (152)	HMA-519	12 x 16 x 29 (305 x 406 x 737)	100 (6.9)

HM-397 shown with HMA-517, HMA-686 and HMA-521

Manufactured in cooperation with KAROL-WARNER

HM-398 shown with HMA-577, HMA-413 and HMA-94

HMA-517, HMA-518 and HMA-519

total capacity with frame openings of 11.9x37.3in (302x947mm) WxH, and perform other soil testing applications just by switching component sets. Pro-Loaders have sturdy 14-gauge painted steel cabinets, 3/4hp DC motors, and precision controllers to regulate strain rates to ±1% of set point. Height of the horizontal cross-member is quickly set using adjusting nuts. Coarse-threaded high strength vertical rods are plated for corrosion resistance. Units operate on 115V/60Hz power supplies. Sturdy steel Rolling Cart offers portability for positioning of the Load Frame. Add "F" suffix to model numbers to order units operating on 230V/50Hz. **Product Dimensions:** 18x29x54.5in (457x737x1,384mm) WxDxH.

HM-396 Pro-Loader Load Frame features a high-speed platen advance to rapidly position the platen for faster set-up. Strain Rate is 0.001—0.1in/min (0.0254—2.54mm/min).

HM-397 Pro-Loader Load Frame has a wider range of strain rates. The micro-stepping drive controller also allows more precise control of loading rates. Strain Rate is 0.0001—0.3in/min (0.00254—7.62mm/min).

HM-398 Pro-Loader II Load Frame has the highest overall strain rate. This unit does not use a high-speed platen advance. Strain Rate is 0.02—2.0in/min (0.508—50.8mm/min).

Triaxial Loading Component Sets feature complete high-quality instrumentation required for Triaxial loading, ready for easy installation on Pro-Loader Load Frames. Fixtures are configured for direct mounting to the frames.

HMA-686 Analog Triaxial Loading Component Set includes a 1,000lbf capacity Load Ring, and a 1x0.001in Dial Indicator, Indicator Bracket,.

HM-413 Digital Triaxial Loading Component Set has a 1,000lbf Load Cell and 2in travel Displacement Transducer that connect to the included two-channel Digital Readout. Select this Component Set for use with GEO-DAS Data Acquisition Software.

Triaxial Software is part of the Geotechnical Data Acquisition Suite (GEO-DAS) of software applications, custom-designed for data collection from either the two-channel or four-channel digital readouts. Specimen Information is input through simple, interactive menus. Real-time Test information is collected and displayed in graphical or tabular format, allowing on-the-spot monitoring of test progress. Data is easily switched between metric and imperial units and is saved automatically. The software can be downloaded as an executable file for a free 30-day evaluation period. An activation code for permanent use can be purchased at the end of the trial period. GEO-DAS Applications for direct shear, unconfined, CBR/LBR, and consolidation are also available and listed separately.

HMA-754 UU Triaxial Software is specific for testing unconsolidated-undrained soil samples to ASTM D2850 requirements.

HMA-755 CU/CD Triaxial Software is used when testing consolidated-undrained, or consolidated-drained triaxial soil samples to ASTM D4767.

TRIAXIAL SOIL TEST SYSTEMS

Master Control Panel	HM-350M
Auxiliary Control Panel	HM-350A
2.8in Triaxial Test Chamber	HMA-517
4.0in Triaxial Test Chamber	HMA-518
6.0in Triaxial Test Chamber	HMA-519
Pro-Loader Load Frame	HM-396
Pro-Loader Load Frame	HM-397
Pro-Loader II Load Frame	HM-398

Accessories

Digital Pore Pressure Gauge with Transducer	HMA-521
Specimen Height Indicator	HMA-506
Deairing Tank, 1.5gal (5.7L) capacity	HMA-520
Rolling Load Frame Cart	HMA-94
Triaxial Software	HMA-754
Triaxial Software	HMA-755

TEST CHAMBER ACCESSORIES

Sample Dia.	Latex Membranes, pkg.12	Porous Stones, each	Membrane Stretchers	O-Rings, pkg.10	O-Ring Placing Tool
1.4in	HMA-527	HMA-547	HMA-557	HMA-567	HMA-577
2.0in	HMA-528	HMA-548	HMA-558	HMA-568	HMA-578
2.5in	HMA-529	HMA-549	HMA-559	HMA-569	HMA-579
2.8in	HMA-522	HMA-542	HMA-552	HMA-562	HMA-572
3.0in	HMA-523	HMA-543	HMA-553	HMA-563	HMA-573
4.0in	HMA-524	HMA-544	HMA-554	HMA-564	HMA-574
6.0in	HMA-526	HMA-546	HMA-556	HMA-566	HMA-576

HM-350M

HMA-514 shown with HMA-506

HMA-521

FLEXIBLE-WALL PERMEABILITY SOIL TEST SYSTEMS
ASTM D5084

Hydraulic conductivity or flexible-wall permeability testing determines flow characteristics of water or other permeant fluids through soils, and is frequently used to assess natural soils, fills, or clay liners in environmental applications. Testing involves preparing and mounting undisturbed or remolded soil specimens in a Test Chamber pressurized with water to create a confining pressure around the specimen. The test is designed to be run on water-saturated soil samples containing virtually no air, at a controlled level of effective stress. The flexible wall, a latex membrane, allows control of effective stress and prevents fluid exchange between the specimen and pressurized water in the chamber.

Permeability Control Panels regulate air and fluid pressures in the Testing Chambers through a system of burettes, valves and regulators, and are a central point for supply connections of air, water, and drains. These same Control Panels are also used for triaxial testing applications.

HM-350M Master Control Panel is required for connection to a single Test Chamber. All cell and burette pressures are individually adjustable and easily monitored by a single digital pressure gauge. Precision regulators and zero volume change ball valves allow accurate setting of critical pressures during saturation and testing phases. Effective cell pressure and cell and sample back-pressure are all controlled through a single regulator.

Supply connections for water, air, and drain are located at the rear of the panel, connections for the testing chamber are located on the front. The chamber and reservoirs can be filled and drained from the front connections. The panel includes two 50x0.1cc burettes and two 4x0.008cc pipettes for accurate flow measurements. Each is encased in large 400cc storage reservoirs. The Digital Pore Pressure Gauge with transducer precisely measures pore pressure for control of loads and loading rates. Other accessories include the Specimen Height Indicator to track sample deformation and the Deairing Tank to prepare water for use in the testing chambers. An air compressor is required to generate confining pressures, but not included. Testing Chambers and other accessories are ordered separately. **Product Dimensions:** 21x6.25x37.25in (533x159x946mm) WxDxH.

HM-350A Auxiliary Control Panel is required for control of each additional Test Chamber. This system is useful for conducting multiple tests simultaneously. The Auxiliary Panel attaches to the Master Control Panel and uses its digital pressure readout to display confining and cell pressures. Precision regulators, valves, reservoir and burrette assemblies are included. **Product Dimensions:** 21x6.25x37.25in (533x159x946mm) WxDxH.

Flexible-Wall Permeability Test Chambers are designed for optimum performance with Gilson Master or Auxillary Control Panels. Heavy-wall clear acrylic

technote

FLEXIBLE-WALL PERMEABILITY TEST CHAMBERS

Specimen Size in (mm)	Triaxial Chambers	Dimensions WxDxH, in (mm)	Pressure Rating psi (bar)
2.8 (71)	HMA-514	6.5 x 8.25 x 24 (165 x 210 x 610)	150 (10.3)
6 (152)	HMA-516	12 x 16 x 29 (305 x 406 x 737)	100 (6.9)

Test Chambers have maximum operating pressures from 100 to 200psi (6.9 to 13.8bar) and solid, circular bases. Specimen Caps, Pedestals, Porous Stones, and O-Rings are included with each Test Chamber. The anodized aluminum specimen caps have two drain ports and are grooved for O-Rings to seal latex membranes. The pedestals have flow-through lines and are keyed to prevent turning and pinching the tubing during set up. To specify units equipped with stainless steel valves and fittings, add "S" suffix to model numbers when ordering. Gilson Triaxial Test Chambers, listed separately are also acceptable for use as Flexible Wall Permeability Test Chambers. HMA-515 Adapter Set allows the HMA-514 Permeability Chamber to be used to test 4in (102mm) diameter samples.

Latex Membranes encase the specimens inside the Test Chambers to protect them from water during testing and are installed with Membrane Stretchers. O-Rings are installed around the specimen caps with a Placing Tool to seal the ends of the membranes, and porous stones are placed at the each end of the specimen to protect it during testing, while still allowing water to pass through. All are available as accessories to fit various specimen diameters.

FLEXIBLE-WALL PERMEABILITY SOIL TEST SYSTEMS

Master Control Panel	HM-350M
Auxiliary Control Panel	HM-350A
2.8in Flexible-Wall Permeability Test Chamber	HMA-514
4.0in Flexible-Wall Permeability Adapter	HMA-515
6.0in Flexible-Wall Permeability Test Chamber	HMA-516

Accessories

Digital Pore Pressure Gauge with Transducer	HMA-521
Specimen Height Indicator	HMA-506
Deairing Tank, 1.5gal (5.7L) capacity	HMA-520

TEST CHAMBER ACCESSORIES

Sample Dia.	Latex Membranes, pkg.12	Porous Stones, each	Membrane Stretchers	O-Rings, pkg.10	O-Ring Placing Tool
1.4in	HMA-527	HMA-547	HMA-557	HMA-567	HMA-577
2.0in	HMA-528	HMA-548	HMA-558	HMA-568	HMA-578
2.5in	HMA-529	HMA-549	HMA-559	HMA-569	HMA-579
2.8in	HMA-522	HMA-542	HMA-552	HMA-562	HMA-572
3.0in	HMA-523	HMA-543	HMA-553	HMA-563	HMA-573
4.0in	HMA-524	HMA-544	HMA-554	HMA-564	HMA-574
6.0in	HMA-526	HMA-546	HMA-556	HMA-566	HMA-576

HM-81

SHELBY TUBE PERMEAMETER

The Shelby Tube Permeameter allows tests to be performed on undisturbed soil samples in sections of 3in (76mm) diameter Shelby sampling tubes. Supplied apparatus consists of corrosion-resistant top and bottom plates, valves, two porous stones, two stainless steel screens, and three threaded tie rods with tilt nuts for quick repositioning. Inside of top plate is concave for de-airing.

Tie rods extend to permit testing in Shelby tubes up to 12in (305mm) long under constant or falling head conditions. Order HMA-838 or HMA-839 manometer to measure top and bottom head pressures during permeability testing. Both feature a 100mm graduated scale and necessary valves. HMA-49 Filter paper is useful for keeping fines from blinding porous stones. Paper is 2.95in (70mm) dia. and comes in packs of one hundred.

SHELBY TUBE PERMEAMETER	
Shelby Tube Permeameter	HM-81
Accessories	
Filter Paper, pkg. 100	HMA-49
Free Standing Manometer	HMA-838
Wall Mounted Manometer	HMA-839

HM-36

COMPACTION PERMEAMETERS

Compaction Permeameters measure constant or falling-head properties of compacted or remolded soils. The 4in and 6in Permeameters are constructed of plated steel for wear resistance and long life. Mold dimensions are 4x4.584in (101.6x116.4mm) and 6x7in (152.4x177.8mm), not including collars. These molds are similar to Proctor and CBR molds, except that the upper and lower plates have inlet/outlet connectors to allow the flow of water through the compacted sample. The overflow valve on the top plate is designed for air removal during the test. A porous stone filter is also provided. HMA-838 or HMA-839 manometers are purchased separately and are required to measure top and bottom head pressures during permeability testing. Both feature a 100mm graduated scale and necessary valves.

COMPACTION PERMEAMETERS	
4in Compaction Permeameter	HM-36
6in Compaction Permeameter	HM-37
Accessories	
Free Standing Manometer	HMA-838
Wall Mounted Manometer	HMA-839

HM-891

HM-831 thru 835

GRANULAR SOIL PERMEAMETERS
ASTM D2434; AASHTO T 215

ASTM/AASHTO Permeameters determine permeability by constant head method of granular soil samples. Gilson offers permeameters in sizes from 2.5—9.0in (63.5—228.6mm) diameter, which allows the customer to determine permeability of granular soils with a wide range of particle top sizes.

Clear acrylic sample chambers allow easy viewing during test procedure. Two manometer ports are vertically spaced at a distance equal to the chamber diameter. Stainless steel No.100 mesh screen at each port prevents migration of material into the manometer. Porous stones are included with the smaller chambers, while the 6 and 9in (152.4 and 228.6mm) diameter chambers are supplied with brass mesh screens. A compression spring in the top cap applies 5—10lb (2.3—4.5kg) of force to prevent changes in sample density during the test. Anodized aluminum end caps have valves and ports for vacuum and water sources. Tubing is included. Either the HMA-838 Free Standing or HMA-839 Wall Mounted Manometer is required and must be purchased separately. Both feature a 100cm graduated scale and valves. The HMA-836 2in (50.8mm) diameter sliding weight Permeability Compaction Hammer, and HMA-837 Acrylic 1000cc Constant head reservoir with mounting brackets are available as accessories.

Combination Permeameters are more economical and allow granular samples to be tested by either the constant-head or falling-head methods, but do not strictly meet ASTM and AASHTO requirements. Construction and chamber sizes are similar to the ASTM/AASHTO Permeameters, but they are not equipped with sidewall manometer ports. Constant-head reservoir, scale, manometers and all necessary tubing are included.

GRANULAR SOIL PERMEAMETERS	
ASTM/AASHTO Permeameter, 2.5in dia.	HM-831
ASTM/AASHTO Permeameter, 3.0in dia.	HM-832
ASTM/AASHTO Permeameter, 4.5in dia.	HM-833
ASTM/AASHTO Permeameter, 6.0in dia.	HM-834
ASTM/AASHTO Permeameter, 9.0in dia.	HM-835
Combination Permeameter, 2.5in dia.	HM-891
Combination Permeameter, 3.0in dia.	HM-892
Combination Permeameter, 4.5in dia.	HM-893
Combination Permeameter, 6.0in dia.	HM-894
Combination Permeameter, 9.0in dia.	HM-895
Accessories	
Permeability Compaction Hammer	HMA-836
Constant Head Reservoir	HMA-837
Free Standing Manometer	HMA-838
Wall Mounted Manometer	HMA-839

SOIL CEMENT TESTING SYSTEMS
ASTM D1632, D1633

Soil-cement is a compacted mixture of soil/aggregate, cement, and water widely used as a base for many different pavement applications. Sometimes known as cement-stabilized base, or cement-treated aggregate base, its strength and durability combine with low first cost can make it preferable to granular base materials. Specimens are prepared either with common soil moisture-density (Proctor) apparatus or specialized drop-hammer and 2.8in (71mm) diameter molds.

Karol-Warner Pro-Loader load frames equipped with proper Gilson Component Sets test specimens prepared for either Method A or Method B of ASTM D1633, and can quickly convert to run other tests simply by substituting Component Sets. All models feature 10,000lbf (44.5kN) total capacity and frame openings of 11.9x37.3in (302x947mm) WxH. The frames have sturdy 14-gauge painted steel cabinets, and 3/4hp DC motors with controllers to precisely regulate strain rates to ±1% of set point. Horizontal cross-head heights are quickly changed using adjusting nuts. Coarse-threaded high strength vertical rods are plated for corrosion resistance. Units operate on 115V/60Hz power supplies. Rolling Cart for Load Frame is sturdy steel and makes positioning easy. Add "F" suffix to model numbers to order units operating on 230V/50Hz. **Product Dimensions:** 18x29x54.5in (457x737x1,384mm) WxDxH.

HM-397 shown with HM-430

Manufactured in cooperation with KAROL•WARNER

HM-398 shown with HM-430D, HM-418 and HMA-94

HM-396 Pro-Loader Load Frame features a high-speed platen advance to rapidly position the platen for faster set-up. Strain Rate is 0.001—0.1in/min (0.0254—2.54mm/min).

HM-397 Pro-Loader Load Frame has a wider range of strain rates. The micro-stepping drive controller also allows more precise control of loading rates. Strain Rate is 0.0001—0.3in/min (0.00254—7.62mm/min).

HM-398 Pro-Loader II Load Frame has the highest overall strain rate. This unit does not use a high-speed platen advance. Strain Rate is 0.02—2.0in/min (0.508—50.8mm/min).

Soil Cement Component Sets feature all the high-quality instrumentation needed to perform tests on method A or B specimens, and are ready for easy installation on Pro-Loader Load Frames. Fixtures and brackets are included for direct mounting to the frames.

HMA-687 Analog Soil Cement Component Set includes a 10,000lbf capacity Load Ring, a 1x0.001in Dial Indicator, Indicator Bracket, and 4in diameter Swivel Platen.

HMA-687D Digital Soil Cement Component Set has a 10,000lbf Load Cell and 2in travel Displacement Transducer that connect to the included two-channel Digital Readout. A Transducer Bracket and 4in diameter Swivel Platen are also included. Select this Component Set for use with GEO-DAS Data Acquisition Software.

HMA-752 Unconfined Compression Software is part of the Geotechnical Data Acquisition Suite (GEO-DAS) of software applications, custom-designed for data collection from Gilson's Karol-Warner two-channel or four-channel digital readouts. Specimen Information is input through simple, interactive menus. Real-time Test information is collected and displayed in graphical or tabular format, allowing on-the-spot monitoring of test progress. Data is easily switched between metric and imperial units and is saved automatically. The software can be downloaded as an executable file for a free 30-day evaluation period. An activation code for permanent use can be purchased at the end of the trial period. GEO-DAS Applications for direct shear, triaxial, CBR/LBR, and consolidation are also available and listed separately.

The Soil Cement Compaction Apparatus is used for preparation of Method B soil cement specimens for compressive strength testing. A soil-cement mixture is consolidated into the mold assembly, using first a tamping rod, and then a dropping-weight compactor until the required length dimension is achieved.

HM-228 Dropping-Weight Soil Cement Compactor uses a 15lb (6.8kg) falling weight on a 3/4in (19mm) shaft guide to strike the top piston of the mold set. The Compactor base features a locating pin, assuring precise centering of the Test Mold Set. Drop height is controlled by a clip on the compactor shaft guide.

HM-229 Soil Cement Mold Set consists of a 2.8x9in (71x229mm) IDxL seamless steel mold, a 6in (152mm) mold extension with collar, top and bottom pistons, a split spacer clip, and two aluminum 1/16in (1.54mm) separating discs. Additional HMA-122 Molds are recommended for more efficient specimen preparation and curing.

The ½x 20in (12.7x508mm) DxL Tamping Rod required for initial consolidation is sold separately. A Sample Ejector, such as Gilson's HM-516 model, is recommended for extraction of specimens from molds.

SOIL CEMENT TESTING SYSTEMS	
Pro-Loader Load Frame, 115V/60Hz	HM-396
Pro-Loader Load Frame, 115V/60Hz	HM-397
Pro-Loader II Load Frame, 115V/60Hz	HM-398
Analog Soil Cement Component Set	HMA-687
Digital Soil Cement Component Set	HMA-687D
Accessories	
Dropping-Weight Soil Cement Compactor	HM-228
Soil Cement Mold Set	HM-229
9in Mold only	HMA-122
9in Mold with 6in Extension	HMA-123
Deairing Tank, 1.5gal (5.7L) capacity	HMA-520
Top & Bottom Piston Set	HMA-124
Tamping Rod, 1/2in x 20in	HMA-125
GEO-DAS Soil Cement Software	HMA-752
Rolling Load Frame Cart	HMA-94

KAROL-WARNER CONSOLIDATION TEST SYSTEMS
ASTM D2435, D4546; AASHTO T 216

One-dimensional consolidation of soils provides information for calculating expected settlement for structures and pavements. Karol-Warner Consolidation Frames meet the most stringent demands of soil testing labs.

HM-353 Lever-Loaded Consolidation Frame, often referred to as an oedometer, is simple and efficient to use. The compact table-top frame is constructed of anodized aluminum for corrosion resistance. The unit has a capacity of 48tsf and is equipped with a rear-weight counterbalance beam assembly allowing 9:1, 10:1 or 11:1 beam ratios. The design allows instantaneous loading with minimal impact. Weight sets must be purchased separately for each frame. Order HMA-89 Load Frame Stand if a free-standing unit is desired. **Product Dimensions:** 8x32x20in (203x812x508mm), WxDxH.

HM-354 CONBEL® Pneumatic Consolidation Test System has load capacity to 32tsf (3,064.3kPa) and requires a minimum of 123psi (8.5bar) of compressed air.

HM-355 CONBEL® Pneumatic Consolidation Test System has load capacity to 48tsf (4,596.5kPa) and requires a minimum of 188psi (13bar) of compressed air.

Karol-Warner CONBEL® Pneumatic/Dead-Weight Consolidation Systems are available in two different load capacities. Both instantaneously apply and maintain pneumatic loads for precision consolidation testing and feature a dead-weight mechanism for application of small loads from 100—3,200psf (4.8—153.2kPa). All necessary weights are included. Applied loads are maintained by a precision pressure regulator. The self-contained system includes a digital readout and pressure transducer with a linearity of ±0.1%. Small footprint saves valuable bench space.

The 1in (25.4mm) thick aluminum platforms have adjustable centering pads and hold any consolidation ring less than 7.25in (184mm) diameter. Platform clearance is 8.25x7.75in (210x197mm), WxH. Stainless steel vertical rods support the cross-head and dial gauge. Sturdy, enamel-coated steel cabinets protect the unit. **Product Dimensions:** 20x14.5x20.5in (508x368x521), WxDxH.

Fixed or floating ring consolidation cells must be ordered separately for each consolidation frame. The 2.5in (63.5mm) dia. Consolidation Rings include a stainless steel base, load pad, and two porous stones. For propes loading in HM-354 and HM-355 Conbel® Consolidometers, HMA-81 Loading Ball is required. The MA-333 0.5x0.0001in Dial Indicator is also required. Other accessories available are the HMA-745 2.5in dia. Stainless Steel Cutting Ring and the HMA-88 Stainless Steel Calibration Disc. Stated systems maximum load capacities are based on use of 2.5in (63mm) dia. Consolidation Ring.

HM-353 shown with HMA-83

HM-354 shown with HMA-83 & MA-333

HMA-83 shown with HMA-81

KAROL-WARNER CONSOLIDATION TEST SYSTEMS	
Lever-Loaded Consolidation Frame	HM-353
CONBEL® Pneumatic Loaded Consolidation Test System 32tsf, 110V/60Hz	HM-354
220V/50Hz	HM-354F
CONBEL® Pneumatic Loaded Consolidation Test System 48tsf, 110V/60Hz	HM-355
220V/50Hz	HM-355F
Accessories	
2.5in Fixed Ring Consolidation Cell	HMA-83[1]
2.5in Floating Ring Consolidation Cell	HMA-84[1]
Loading Ball for Consolidation Cells	HMA-81
Dial Indicator, 0.5in x 0.0001in	MA-333
2.5in Stainless Steel Cutting Ring	HMA-745
Calibration Disk	HMA-88
Load Frame Stand for HM-353	HMA-89
Sensitive Weight Set	HMA-723
32kg Weight Set, Maximum Load 320kg	HMA-730
64kg Weight Set, Maximum Load 640kg	HMA-725
88kg Weight Set, Maximum Load 880kg	HMA-731
8tsf Weight Set, Maximum Load 545lbs	HMA-727
16tsf Weight Set, Maximum Load 1,091lbs	HMA-732
32tsf Weight Set, Maximum Load 2,182lbs	HMA-729
Consolidation Software	HMA-753

[1]Inquire for other sizes of consolidation cells.

DEAD-WEIGHT DIRECT/RESIDUAL SHEAR MACHINE
ASTM D3080; AASHTO T 236

- **Self-contained unit with practical design uses dead-weight loading.**
- **Simple operation and precise controls.**
- **Basic system includes fixtures for 2.5in samples.**
- **Options for data collection via PC.**

The Dead-Weight Direct/Residual Shear Machine by Karol-Warner is a motorized dead-weight testing machine for direct and residual shear testing of undisturbed and remolded soil samples. This compact, self-contained unit is built for harsh laboratory environments and requires little floor space.

The HM-380R uses a 10:1 beam loading device to control confining pressures. A load cell with digital readout displays shear force, and analog dial indicators measure vertical and shear displacement. A stepper motor drive controls the strain rate within 1% from 0.0001—0.3in/min (0.0025—7.62mm/min), and is easily adjustable using digital thumb wheel controls. Maximum shear displacement is 0.8in (20.3mm). Travel is set with limit switches. Vertical load capacity is 1,411lb (640kg) and maximum horizontal shear force is 1,500lbf (6,672N).

Digital horizontal and vertical displacement transducers are available to provide output to a PC, and must be connected to the HM-418 Two-Channel, or HM-419 Four-Channel Digital Readout, also purchased separately. The HM-419 provides a channel to direct force measurements to a PC. The HM-738 Horizontal Displacement Transducer has 0.6in (15.2mm) range with 0.0001in (0.0025mm) resolution, and the HM-739 Vertical Displacement Transducer has 1in (25.4mm) range and 0.0001in (0.0025mm) resolution. HMA-756 GEO-DAS Data Acquisition Software is designed for data collection from HMA-418 or HMA-419 Digital Readouts. Test data is displayed and calculations are performed in real-time. Data is displayed and reported in graphical or tabuler format.

A solid 1-1/4in (32mm) base for the Shear Box assembly is mounted on a sturdy steel cabinet, with heavy-duty casters for easy mobility. The basic system includes a stainless steel shear ring, porous stones, drainage plates, loading block, and a water chamber of Teflon coated anodized aluminum to test 2.5in (63.5mm) specimens. See accessories for other popular shear rings and boxes, inquire for other sizes not listed. Cutting rings and extrusion tools are available as accessories. Selection of one weight set is required. Choose from US or Metric weight sets. Contact Gilson for individual weights. **Product Dimensions:** 36x14.5x54in (914x368x137mm), WxDxH.

HM-380R

HMA-735, HMA-745 & HMA-765

GILSON COMPANY, INC.
Manufactured in cooperation with
KAROL•WARNER

DEAD-WEIGHT DIRECT/RESIDUAL SHEAR MACHINE

Direct/Residual Shear Machine, 115V/60Hz	HM-380R
230V/50Hz	HM-380RF

Accessories

32kg Weight Set, Maximum Load 320kg	HMA-730
64kg Weight Set, Maximum Load 640kg	HMA-725
88kg Weight Set, Maximum Load 880kg	HMA-731
8tsf Weight Set, Maximum Load 545lbs	HMA-727
16tsf Weight Set, Maximum Load 1,091lbs	HMA-732
32tsf Weight Set, Maximum Load 2,182lbs	HMA-729
Horizontal Displacement Transducer, 0.6 x 0.0001in (15.2 x 0.0025mm)	HM-738
Vertical Displacement Transducer, 1 x 0.0001in (25.4 x 0.0025mm)	HM-739
Two-Channel Digital Readout	HM-418
Four-Channel Digital Readout	HM-419
GEO-DAS Direct Shear Software	HMA-756

Accessories

Specimen Sizes	Shear Rings & Boxes	Cutters	Extruders
2.42in dia. x 1in	HMA-734	HMA-744	HMA-764
2.5in dia. x 1in	HMA-735	HMA-745	HMA-765
4in dia. x 1in	HMA-736	HMA-746	HMA-766
60mm dia. x 25mm	HMA-734M	HMA-744M	HMA-764M
60 x 60 x 25mm	HMA-734S	HMA-744S	HMA-764S
4 x 4 x 1in	HMA-736S	HMA-746S	HMA-766S
100 x 100 x 25mm	HMA-737S	HMA-747S	HMA-767S

PNEUMATIC DIRECT/RESIDUAL SHEAR MACHINES
ASTM D3080; AASHTO T 236

Gilson Pneumatic Direct/Residual Shear Machines are tabletop units built by Karol-Warner. Direct and residual shear values give important information for evaluating the strength and stability of soils. The test is performed on a variety of soil types with either undisturbed or remolded samples. The specimens are carefully trimmed into a Direct Shear Box, which is split to allow individual movement of the upper and lower halves. A vertical confining load is applied to the specimen, and a horizontal shear force is applied to the lower half of the shear box, while the upper half remains stationary. After shear failure has been measured, the force direction is reversed to determine residual shear values.

Gilson's Pneumatic Direct/Residual Shear Machines use Karol-Warner's proven CONBEL® loading system to apply vertical confining pressures to the specimen. Confining loads are applied pneumatically using a small, rolling diaphragm piston for light loads of 4—100lbf (0.018—0.44kN) and a larger diameter piston for loads up to 1,500lbf (6.67kN). This design increases the sensitivity and accuracy of the light load system. Loading is controlled using the precision regulator with included calibration chart. Load settings are displayed digitally and are accurate to ±0.25%. Both pneumatic shear machines are completely self-contained, and the need for loading weights is eliminated.

A stepper motor drive controls strain rates to ±1% from 0.0001—0.3in/min (0.0025—7.62mm/ min), and is easily set with digital thumbwheels. Total shear capacity is 1,500lbf (6.67kN). HMA-735, 2.5in (63.5mm) diameter stainless steel shear ring, porous stones, drainage plates and a water chamber constructed of Teflon coated, anodized aluminum for corrosion resistance are included. See table for popular shear rings and boxes, inquire for other sizes not listed. Cutting rings and extrusion tools are also available as accessories. Rolling Cart for Pneumatic Shear Machines sturdy all-steel construction offers easy portability in the lab.

HM-381 Standard Pneumatic Shear Machine includes a load cell with digital readout to measure shear loads. Consolidation and shear displacement are measured using analog dial indicators. **Product Dimensions:** 36x14.5x54in (914x368x137mm), WxDxH.

HM-382 Digital Pneumatic Shear Machine also includes a load cell with digital readout for shear load measurement. Consolidation and shear displacement are measured with horizontal and vertical displacement transducers instead of dial indicators. RS-232 data output transfers data to user's PC in ASCII format. HMA-756 GEO-DAS Software collects, calculates, and reports data for direct shear testing. Test values are displayed in real-time in graphical or tabular format. Both units require 90psi (6.2bar) user-supplied compressed air source. **Product Dimensions:** 36x14.5x54in (914x368x137mm), WxDxH.

Manufactured in cooperation with KAROL•WARNER

HM-381

PNEUMATIC DIRECT/RESIDUAL SHEAR MACHINES	
Standard Pneumatic Shear Machine, 110V/60Hz	HM-381
220V/50Hz	HM-381F
Digital Pneumatic Shear Machine, 110V/60Hz	HM-382
220V/50Hz	HM-382F

Accessories	
GEO-DAS Direct Shear Software	HMA-756
Rolling Cart for HM-381 and HM-382	HMA-95

Accessories

Specimen Sizes	Shear Rings & Boxes	Cutters	Extruders
2.42in dia. x 1in	HMA-734	HMA-744	HMA-764
2.5in dia. x 1in	HMA-735	HMA-745	HMA-765
4in dia. x 1in	HMA-736	HMA-746	HMA-766
60mm dia. x 25mm	HMA-734M	HMA-744M	HMA-764M
60 x 60 x 25mm	HMA-734S	HMA-744S	HMA-764S
4 x 4 x 1in	HMA-736S	HMA-746S	HMA-766S
100 x 100 x 25mm	HMA-737S	HMA-747S	HMA-767S

DIGITAL LOAD & DISPLACEMENT INDICATORS

HM-430D

HM-740 MA-366

HM-419

HM-416

DIGITAL LOAD & DISPLACEMENT INDICATORS			
Description	**Type**		**Model**
Load Cells are machined of stainless or nickel alloy plated steel and are designed to determine compression or tension measurements. Loads are measured to an accuracy of less than 0.0300% strain. The "S" type load cells are available in seven different capacities ranging from 500—20,000 lbf. Load cell dimensions range from 2.4x2.0in—3.9x 2.9in, WxH depending on capacity of the load cell. Threaded mounting holes on top and bottom of the load cells vary in size; 1/2in—20 threads per inch for 500—2,000lbf load cells, 3/4in—16 threads per inch for 5,000—10,000lbf load cells and 1in—14 threads per inch for the 20,000lbf load cell.	500lbf Load Cell 1,000lbf Load Cell 1,500lbf Load Cell 2,000lbf Load Cell 5,000lbf Load Cell 10,000lbf Load Cell 20,000lbf Load Cell		HM-421D HM-422D HM-424D HM-425D HM-428D HM-430D HM-438D
Linear Digital Displacement Transducers are available in three different sizes, 0.5in, 1in and 2in. The linear displacement transducers are constructed using anodized aluminum housing, stainless steel actuating shaft with anti-rotation device and includes the industry proven double bearing system on both the actuator shaft and spring to reduce side load errors. Each transducer has a repeatability of 0.002mm, and includes two fixing clamps, screws and gauging head with hardened ball point.	1/2in Displacement Transducer 1in Displacement Transducer 2in Displacement Transducer		HM-738 HM-739 HM-740
Digital Dial Indicators are in/mm switchable, and include a "hold" feature which allows the user to lock peak readings on the digital display. All are supplied with batteries designed to provide 250 hours of use. Order Extended Contact Points and Magnetic Gauge Holder separately.	**Range:** 0.25in 0.25in 0.6in 0.6in 1.0in 1.0in	**Resolution:** 0.0001in 0.00005in 0.0001in 0.00005in 0.0001in 0.00005in	 MA-360 MA-361 MA-363 MA-364 MA-366 MA-367
Digital Display Readout Boxes are available with two or four channels. Each are self-contained units with large real-time, illuminated display. A separate analog to digital (A/D) converter for each channel produces simultaneous readings without time-delay errors. A data port for the user's PC is included. A simple program is included to export data to an Excel® spreadsheet for review and plotting of graphs.	Two-Channel Readout Box Four-Channel Readout Box		HM-418 HM-419
Load and Displacement Readout Kits include; Two-Channel Digital Readout Box, Load Cell, and Linear Displacement Transducer.	1,000lbf Load Cell and 2in Displacement Transducer Kit 2,000lbf Load Cell and 2in Displacement Transducer Kit 5,000lbf Load Cell and 2in Displacement Transducer Kit 10,000lbf Load Cell and 2in Displacement Transducer Kit		HM-413 HM-414 HM-415 HM-416
Geotechnical Data Acquisition Suite (GEO-DAS) of software applications is custom-designed for data collection from Gilson's Karol-Warner HM-418 two-channel or HM-419 four-channel digital readouts with load cells or linear strain transducers connected, and can be used with existing Karol Warner Readouts. Individual applications share basic performance and design features. Test parameters, specimen and project data is input through simple, interactive menus, with online help available. Test data is displayed and calculations are performed in real time in graphical or tabular format, allowing on-the-spot monitoring of test progress. Data is easily switched between metric and imperial units and is saved automatically. Applications can be purchased directly, or contact Gilson Customer Service for a free 30-day trial copy.			
CBR/LBR Software		ASTM D1883	HMA-751
Unconfined Compression Software		ASTM D2166	HMA-752
Consolidation Software		ASTM D2435	HMA-753
Unconsolidated Undrained Triaxial Software		ASTM D2850	HMA-754
Consolidated Undrained/Consolidated Drained Triaxial Software		ASTM D4767	HMA-755
Direct Shear Software		ASTM D3080	HMA-756
Asphalt Marshall Test Software		ASTM D6927	HMA-757

MA-334

HMA-338

HM-430

ANALOG, LOAD & DISPLACEMENT INDICATORS

ANALOG, LOAD & DISPLACEMENT INDICATORS			
Description	**Type**		**Model**
Mechanical Dial Indicators have 2.25in diameter, continuous clockwise dial with one hundred divisions per revolution and a revolution counter. Low friction mechanisms react instantly with contact pressure. Backs rotate 90° to adapt to horizontal and vertical mounting. "B" models feature brake to hold maximum position and are recommended for most applications. Order Extended Contact Points and Magnetic Gauge Holder separately.	**Range:** 0.2in 0.2in 1.0in 1.0in 25mm 25mm	**Resolution:** 0.0001in 0.0001in 0.001in 0.001in 0.01mm 0.01mm	 MA-330 MA-330B MA-334 MA-334B MA-346 MA-346B
Dial Indicator Accessories: Magnetic Gauge Holder uses a powerful Alnico magnetic base for secure fastening of dial indicators to round and flat surfaces. Thumb screw allows easy zeroing of indicators once positioned. Extended contact points adapt dial indicators to various configurations.	Magnetic Gauge Holder 1/2in Ext. Contact Points 1in Ext. Contact Points 1-1/2in Ext. Contact Points 2in Ext. Contact Points		HMA-338 MAA-70 MAA-72 MAA-74 MAA-76
Load Rings are machined from high strength aluminum alloy plate. Rings are designed for compression measurement only and allow for repeatable elastic deformation under varying loads. Loads are measured with an accuracy of ±0.5% using the included mechanical dial indicator (0.0001in resolution). Measurements are plotted on a calibration chart prior to shipment. The load rings are available in seven different ranges varying in capacity from 250—10,000lbf. Ring dimensions are 6.25in high x 1.0—2.0in thick depending on capacity of the ring. Mounting holes are 1/2in—20 threads per inch.	250lbf Load Ring 500lbf Load Ring 1,000lbf Load Ring 1,500lbf Load Ring 2,000lbf Load Ring 6,000lbf Load Ring 10,000lbf Load Ring		HM-420 HM-421 HM-422 HM-424 HM-425 HM-428 HM-430

helpfulhint

For accuracy, reliability and convenience, the new generation of digital dial indicators, displacement transducers, load cells, and displays are hard to beat. They are easy to set-up and use, and their data output options simplify documentation in the lab.

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HM-384

GILSON COMPANY, INC.
Manufactured in cooperation with
KAROL-WARNER

Geotextile Platform

Compaction Table
shown with Shear Boxes

HIGH CAPACITY GEOSYNTHETIC DIRECT SHEAR MACHINE
ASTM D5321, D6243

The High Capacity Direct Shear Machine is specifically designed to measure the total resistance to shear of large, 12in (305mm) square soil samples or within a soil/geosynthetic specimen. These devices feature the exclusive Karol-Warner CONBEL® system for loading the large soil or soil/geosynthetic samples. The specimens are mounted in a two-piece shear ring assembly, divided in half horizontally. The bottom half is held securely in place and a vertical confining force is applied. Horizontal force is then directed against the upper half of the ring to shear the specimen.

Shear loads are applied using two pneumatic pistons. Initial loads are applied using a small diameter rolling diaphragm piston, for greater accuracy and sensitivity of lighter loads, up to 454kgf (1,000lbf) of force. The larger piston generates loads up to 45kN (10,000lbf), or 90kN (20,000lbf) depending on unit selected. Horizontal shear rate from 0.0508—5.08mm (0.002—0.2in) per minute is easily set with digital thumbwheels on the control panel. Limit switches control the home position and limit total horizontal displacement to 102mm (4in). Vertical loading is controlled through a precision regulator, using the included calibration chart to set the required pressure. Loads are displayed to two decimal places on the digital readout, and are accurate to ±0.25%. Consolidation and shear displacement are measured by Linear Displacement Transducers. Shear load is measured from a load cell attached to the water chamber. The four-channel readout displays all these values while directing data in ASCII format through the RS 232 serial port to the user's PC. The included software imports data onto spreadsheets such as Excel® for analysis and reporting. Displayed values on the readout can be viewed at anytime.

Loading and unloading the specimen and shear ring assembly to and from the water chamber is simplified using the Compaction Table. Pulling the loaded shear rings onto the convenient table rollers allows the entire assembly to slide easily into and out of the chamber. Sample compaction, geotextile placement, and specimen preparation can be performed on the table, before placing the assembly directly into the water chamber with little effort.

HM-384 and HM-385 High Capacity Direct Shear Machines are capable of applying maximum piston loads of 45kN (10,000lbf), and 90kN (20,000lbf) respectively. Both are are ruggedly designed for harsh lab environments. All steel parts are powder-coated, and hard-coat anodized aluminum components resist corrosion. Casters on the machine and Compaction Table make for easy portability in the lab. Compaction Table and Top and bottom Shear Rings are included. Top ring is 12x12x4in (305x305x102mm), and bottom ring is 12x16x4in (305x406x102mm). Software and data cable is also included. A 120psi (827kPa) source of clean, dry, compressed air is required for operation. Operates on 110V/60Hz. For units operating on 220-240V/50Hz, add "F" suffix to model number. Weight is 840lb (381kg). **Product Dimensions:** 43x23x40in (1,090x584x1,020mm), WxDxH.

HIGH CAPACITY GEOSYNTHETIC DIRECT SHEAR MACHINE	
High Capacity Geosynthetic Direct Shear Machine, 45kN, 110V/60Hz	HM-384
High Capacity Geosynthetic Direct Shear Machine, 90kN, 110V/60Hz	HM-385

HM-514

HM-516

HM-524

SAMPLE EJECTORS

Gilson Sample Ejectors quickly and easily extrude compacted soil or asphalt specimens from 4in and 6in (102mm and 152mm) soil-density or Marshall molds. Accessories allow soil samples from short lengths of thin-walled (Shelby) tubes of 2, 2.5 or 3in (51, 64, or 76mm) diameter to also be extruded.

A 12,000lbf (53.4kN) capacity hydraulic jack with 5in (127mm) stroke is mounted in a robust three-column reaction frame constructed of plated steel. Molds are positioned vertically over the piston on a load platform that prevents the emptied mold from falling back over the jack. Daylight opening of the frame is adjustable for mold lengths up to 11.75in (279mm). Specimens longer than 5in are extracted by repositioning the Adapter Ring after maximum piston travel. The spring-loaded piston automatically returns to the start position when the stainless steel knob for the release valve is opened. Adapter Rings are quickly changed with just two wing-nuts, and Extruder Discs rest in place on top of the piston. Accessories for smaller-diameter specimens will fit either model. **Product Dimensions:** 9.5x10x24in (241x254x610mm), WxDxH.

HM-514 Sample Ejector is equipped to handle 4in (102mm) soil compaction or Marshall asphalt molds.

HM-516 Combination Sample Ejector extrudes either 4in (102mm) or 6in (152mm) soil or asphalt specimens.

SAMPLE EJECTORS	
Sample Ejector, 4in	HM-514
Combination Sample Ejector, 4in & 6in	HM-516
Accessories	
Adapter Ring & Extruder Disc, 2in dia.	HMA-219
Adapter Ring & Extruder Disc, 2.5in dia.	HMA-220
Adapter Ring & Extruder Disc, 3in dia.	HMA-221

HYDRAULIC SAMPLE EXTRUDER

The Hydraulic Sample Extruder uses powerful hydraulic force to eject undisturbed soil samples from full size thin-walled samplers (Shelby Tubes). Smooth extrusion action in one continuous stroke prevents damage to delicate structures of sensitive soils, and makes it easier to divide and preserve small strata sections for later testing and analysis. A sample receiving trough (not shown) is included to support the entire length of the specimen, insuring minimal disturbance during extrusion and logging operations. Samples for Consolidation, Triaxial, Shear, and other tests are easily cut to length and prepared for testing in one step.

The piston stroke is ergonomically controlled from a convenient height when mounted to a bench top. The extruder is set up for 3in (76mm) diameter tubes of 30in or 36in (762mm or 914mm) length, but easily processes 2in (51mm) diameter tubes using the HMA-282 adapter.

The powerful 1hp electric drive motor, 1.7gpm (6.4lpm) hydraulic pump, and 2.5gal (47L) hydraulic oil reservoir are mounted to a rugged solid steel frame, along with the horizontally mounted piston. Hydraulic hoses and fittings are industrial grade, heavy duty. Up to 5,600lbf (24.9kN) of force ejects even the most stubborn samples. **Product Dimensions:** 84x23x18in (2,134x584x457mm), WxDxH.

HYDRAULIC SAMPLE EXTRUDER	
Hydraulic Sample Extruder, 115V/60Hz	HM-524
230V/50Hz	HM-524F
Accessories	
2in Tube Adapter	HMA-282

HM-231

HM-266

ADJUSTABLE SOIL TRIMMER

ASTM D2166, D2435, D2850, D3080, D4186, D4546, D4767, D 5084; AASHTO T 208, T 216, T 236, T 258, T 296, T 297

The Adjustable Soil Trimmer trims cylindrical soil samples to any desired diameter from 1—3in (25—76mm), and up to 7.5in (190mm) in length. Top platens for the most common diameters of 1.4in and 2.8in are included. Order others as needed. In use, the sample is positioned on the 3in (76mm) diameter pedestal, and the top platen bearing assembly is lowered and locked into place. The trimming guide is then positioned to the exact diameter required, and a wire saw or trimming knife is used to remove a small slice of soil. Sample is then rotated to present another face for trimming.

The sturdy frame is attached to a 6in (150mm) square aluminum base on non-skid rubber feet. The pedestal is centered on a steel post and turns on a low-friction, bearing. Interchangeable upper platens fit onto a sealed cartridge bearing at the end of the height adjustment rod. Smooth rotation with no side-play is assured, allowing precise dimensioning. The height adjustment rod, pedestal and platens have short specimen holding pins to prevent displacement of sample during trimming. Inquire for special model trimmers for up to 4in (102mm) diameter. Order HM-266 Wire Saw (not shown) for trimming.

ADJUSTABLE SOIL TRIMMER	
Soil Trimmer	HM-231
Wire Saw	HM-266
Accessories	
Top Platen, 1.0in (25.4mm) dia.	HMA-850
Top Platen, 1.4in (35.6mm) dia.	HMA-851
Top Platen, 1.875in (47.6mm) dia.	HMA-852
Top Platen, 2.0in (50.8mm) dia.	HMA-853
Top Platen, 2.5in (63.5mm) dia.	HMA-854
Top Platen, 2.8in (71.1mm) dia.	HMA-855
Top Platen, 3.0in (76.2mm) dia.	HMA-856

HM-228

HM-229

SOIL CEMENT APPARATUS

ASTM D1632, D1633

Soil Cement Apparatus is used for preparation of specimens for compressive strength testing. A predetermined mass of soil-cement mixture is consolidated into the mold assembly, first using a tamping rod, and then finished by repeated blows of a dropping-weight compactor until the required length dimension is achieved.

HM-229 Compression Test Mold Set consists of a 2.8x9in (71x229mm) IDxL seamless steel mold, a 6in (152mm) mold extension with collar, top and bottom pistons, a split spacer clip, and two aluminum 1/16in (1.54mm) separating discs. Extra HMA-122 Molds are recommended for more efficient specimen preparation and curing.

HM-228 Dropping-Weight Compactor uses a 15lb (6.8kg) falling weight on a 3/4in (19mm) shaft guide to strike the top piston of the mold set for final dynamic consolidation of the specimen. The Compactor base features a locating pin, assuring precise centering of the Test Mold Set. Drop height is controlled by a clip on the compactor shaft guide.

HMA-125 Tamping Rod is 1/2x 20in (12.7x508mm) DxL, and required for initial consolidation of specimens. HM-516 Sample Ejector (listed separately) or equivalent is recommended for extraction of specimens from molds.

SOIL CEMENT APPARATUS	
Compression Test Mold Set	HM-229
Dropping-Weight Compactor	HM-228
Accessories	
9in Mold only	HMA-122
9in Mold with 6in Extension	HMA-123
Top & Bottom Piston Set	HMA-124
Tamping Rod, 1/2in x 20in	HMA-125

HM-530

HMA-120

HMA-110

HMA-111

MECHANICAL SOIL COMPACTORS

ASTM D558, D559, D560, D698, D1557, D1558; AASHTO T 99, T 134, T 135, T 136, T 180, T 220

HM-530 Mechanical Soil Compactor automatically counts the number of hammer blows and shuts off when a preset number is reached. The Mechanical Soil Compactor brings big improvements in functional accuracy, ease of use, reliability, and safe operation to your laboratory. The HM-530 Compactor eliminates the repetitive operation of manual compaction hammers. Hammer blows are accurately counted and evenly distributed for each soil lift placed in the compaction mold. Automatic indexing of the turntable positions the mold for each new hammer drop. The simple and efficient chain-drive lift system employs a compensating mechanism to adjust hammer drop for soil thickness in the mold during compaction. Hammer mass is concentrated near the bottom for better transfer of energy to the soil specimen. This unit is a safe and efficient method for processing moisture-density samples, assuring uniform compaction and accurate, repeatable test results.

The Compactor can be used with the 4in (102mm) ID molds, 5.5lb (2.5kg) weight with 12in (305mm) drop. The HM-530 also accomodates the 6in (152mm) ID molds using either the standard 5.5lb (2.5kg) weight with 12in (305mm) drop or the modified 10lb (4.5kg) weight with 18in (457mm) drop. The standard 2in (51mm) hammer can be replaced by one of the same 3.14in² area, but with pie-shaped face to cover entire sample surface with 6in molds. The free-fall hammer adjusts easily from 5.5—10lb by addition of a surcharge weight.

The HM-530 includes a 2in (51mm) round, 5.5lb (2.5kg) hammer, a pie-faced hammer for use with 6in molds, and a surcharge weight to increase total hammer weight to 10lbs (4.5kg). 4in (102mm) and 6in (152mm) standard compaction molds, and a digital automatic counter with start/stop switching are also included. Electronic safety interlock automatically shuts down operation if the door is opened. **Product Dimensions:** 12.5x29.5x56in (318x749x1,422mm), WxDxH.

HM-531 Mechanical Soil Compactor for California Method 216 is similar to HM-530, but is supplied with 2in (51mm) round 10lb hammer only. Order special 16x2-7/8in (406x73.2mm), HxID Model HMA-119 Calif. 216 mold separately. Required piston and rod are included as parts of the machine. **Product Dimensions:** 12.5x29.5x56in (318x749x1,422mm), WxDxH.

HMA-120 Calibration Kit is ordered separately to comply with ASTM D2168 Method B requirements and includes lead deformation apparatus, a micrometer, and fifty lead cylinders. Replacement lead cylinders are available as HMA-121.

MECHANICAL SOIL COMPACTORS	
Mechanical Compactor, 115V/60Hz	HM-530
230V, 50/60Hz	HM-530F
Mechanical Compactor for Calif. 216, 115V/60Hz	HM-531
230V, 50/60Hz	HM-531F

Accessories	
Compaction Mold, 4in (102mm) Std., 1/30	HMA-110
Compaction Mold, 4in (102mm) Split, 1/30	HMA-111
Compaction Mold, 6in (152mm) Std., 1/13	HMA-116
Compaction Mold, 6in (152mm) Split, 1/13	HMA-117
Special Calif. 216 Mold	HMA-119
CBR Mold	BRA-60
LBR Mold	BRA-59
Stainless Steel Straightedge	HMA-135
Calibration Kit	HMA-120
Lead Calibration Cylinders, pkg.100	HMA-121

HM-550 HM-551

HMA-135

MANUAL COMPACTION HAMMERS

ASTM D558, D559, D560, D698, D1557, D1558 AASHTO T 99, T 134, T 135, T 136, T 180

These sliding drop hammers are used to compact soil samples for moisture-density relationship (Proctor) testing. Gilson Hammers are constructed from rust-resistant plated steel and have a 2in (51mm) circular face. Hammer masses are enclosed in guide sleeves with vent holes to insure unrestricted free-fall.

HM-550 Standard Compaction Hammer has 5.5lb (2.5kg) mass with 12in (305mm) drop. **Product Dimensions:** 21x2.2in (533x55mm) LxDia.

HM-551 Modified Compaction Hammer has 10lb (4.5kg) mass and 18in (457mm) drop. **Product Dimensions:** 31x2.2in (787x55mm) LxDia.

Inquire for old-style U.S. Army Corps of Engineers compaction hammers.

MANUAL COMPACTION HAMMERS	
Standard Compaction Hammer, 5.5lb	HM-550
Modified Compaction Hammer, 10.0lb	HM-551

also available

Gilsons BRA-60 and BRA-59 CBR and LBR Molds are compatible with our HM-530 Mechanical Soil Compactor.

STAINLESS STEEL STRAIGHTEDGE

Gilson's Stainless Steel Straightedge is used in a number of soil, aggregate and concrete testing applications for leveling and trimming specimens in molds or containers. The straightedge has an electro-polished finish and one side features a beveled cutting edge. **Product Dimensions:** 11.8x1.6x0.12in (300x40x3mm) LxWxH.

STAINLESS STEEL STRAIGHTEDGE	
Stainless Steel Straightedge	HMA-135

HMA-110

HMA-111

HMA-117

BRA-60

BRA-59

SOIL DENSITY MOLDS

Gilson's rugged steel soil molds comply with numerous specifications and are plated for maximum rust resistance. The molds are available as complete assemblies with base, mold and collar, or as separate components.

SOIL DENSITY MOLDS

Description	Model	Mold Size in (mm) HxI.D.	ASTM/ AASHTO/ Other
Soil Density Molds are used for various methods of soil moisture-density relationship (Proctor) tests. Split molds partially separate longitudinally for easier sample removal. Solid molds require use of sample ejectors. Compaction molds are 4.584in (116.4mm) in height with detachable extension collar and base, and are clear-zinc plated for rust resistance. 4in diameter Molds have volume of 1/30ft³ (941cm³), and 6in diameter Molds are 1/13ft³ (2,124cm³) volume. Gilson Soil Density Molds fit our HM-530 Mechanical Soil Compactors, and can also be used with manual soil compaction hammers.			D558, D559, D560, D698, D1557, D1558 / T 99, T 134, T 135, T 136, T 180
4in Solid Soil Density Mold, Complete	HMA-110		
4in Split Soil Density Mold, Complete	HMA-111		
Mold Only, 4in Solid	HMA-110M	4x4.548	
Mold Only, 4in Split	HMA-111M	(102x116.4)	
Collar Only for 4in Molds	HMA-110C		
Base Only for 4in Molds	HMA-110B	———	
6in Solid Soil Density Mold , Complete	HMA-116		
6in Split Soil Density Mold, Complete	HMA-117	6x4.584	
Mold Only, 6in Solid	HMA-116M	(152x116.4)	
Mold Only, 6in Split	HMA-117M		
Collar Only for 6in Molds	HMA-116C		
Base Only for 6in Molds	HMA-116B		
California Bearing Ratio (CBR) Molds are heavy clear-zinc plated steel molds with 2-3/8in (60mm) collar, and a base perforated with twenty eight 1/16in (1.59mm) holes. See separate listing for a complete selection of CBR equipment. CBR Molds are designed to fit HM-530 Mechanical Soil Compactors.			D1883/ T 193
California Bearing Ratio Mold, Complete	BRA-60	6x7	
CBR Mold Only	BRA-60M	(152x178)	
Collar Only for 6in Molds	BRA-60C		
Base Only for CBR Molds	BRA-60B		
Limerock Bearing Ratio (LBR) Molds for Florida FM 5-515 tests have 2-3/8in (60mm) collar. Base is perforated with twenty eight 1/16in (1.59mm) holes. See separate listing for a complete selection of LBR equipment. LBR Molds are designed to fit HM-530 Mechanical Soil Compactors.			- / T 220/ Florida FM 5-515
Limerock Bearing Ratio Mold, Complete	BRA-59	6x6	
LBR Mold Only	BRA-59M	(152x152)	
Collar Only for 6in Molds	BRA-60C		
Base Only for LBR Molds	BRA-59B		

HM-375

RELATIVE COMPACTION EQUIPMENT
CALIFORNIA 216

Relative Compaction Test Set is used for determination of the maximum wet density of soils and aggregates by the California impact method. Relative compaction is the ratio of in-place wet density to test maximum wet density of the same soil or aggregate. In-place wet density is determined in the field using sand volume apparatus.

A 10lb (4.54kg) tamper is dropped from 18in (457mm) to compact samples to about 10—12in (254—305mm) in a 36in (914mm) long, 2-7/8in (73mm) diameter split mold. The special steel mold has a removable base and three hinged clamps for easy sample removal. Also included in the set are a metal leveling piston and a piston handling rod. Density is easily determined after compaction, based on a reading from the graduated scale on the shaft of the tamper. HM-375 is designed for manual use only.

RELATIVE COMPACTION EQUIPMENT	
Relative Compaction Test Set	HM-375

HM-315

HMA-60

HM-317

RELATIVE DENSITY APPARATUS
ASTM D4253, D4254

Apparatus determines relative density of granular soils which do not respond well to Proctor moisture-density tests. Maximum density is determined by placing granular soil in 0.1 or 0.5ft³ (2.83 and 14.2L) molds and densifying using a vibrating table and surcharge. Minimum index density is determined by loose placement in the molds using special pouring funnels, scoop, or shovel, depending on size of soil particles.

HM-315 Vibratory Table has a cushioned steel 30x30in (762x762mm) vibrating deck activated by electromagnetic vibrator with over 100lb (45.5kg) actuator. The table has 750lbs (341kg) load capacity and requires 800 Watts, 12 amps at 230V. Table height is 21in (533mm). Vibration rate is 3,600VPM (3,000 at 50Hz) and amplitude adjusts in accordance with ASTM requirements. The solid state circuitry allows precise amplitude control even with fluctuating voltage supplies. **Product Dimensions:** 30x30x21in (762x762x533mm), WxDxH.

HM-317 and HM-318 Cylindrical Mold Sets for 0.1 and 0.5ft³ (2.83 and 14.2L) capacity have attached carrying handles and guide brackets for the Gauge Set. They come complete with detachable guide sleeve with clamp assembly, surcharge base plate with removable handle, and surcharge weight with handle. Mold included with HM-317 Set is 6in (152.4mm) ID x 6.112in (155.2mm) IH; surcharge weight plus base plate has 56.5 ±0.5lb (25.5 ±0.2kg) total weight. Larger mold with HM-318 Set is 11in (279.4mm) ID x 9.092in (230.9mm) IH with 190 ±2lb (86.2 ±0.9kg) total weight of base plate with surcharge weight.

HM-319 Gauge Set fits guide brackets of either Mold Set to measure distance from top of mold to top of base plate after densification (to compute volume change). Set includes a Dial Indicator, with 2in (50.8mm) travel and 0.001in (0.025mm) graduations, and a special holder to fit molds. A metal 3x12x1/8in (76x305x3.2mm) calibration bar is also included.

HMA-60 Accessory Pouring Funnel Set is required for loose placement of 3/8in (9.5mm) and finer soil in HM-317 mold set. Set includes two 6in (152mm) diameter x 12in (305mm) long metal cylinders, each with funnel and 6in (152mm) long delivery spout attached to one end. Spouts are 1in (25.4mm) and 1/2in (12.7mm) in diameter.

RELATIVE DENSITY APPARATUS	
Vibrating Table, 230V/60Hz	HM-315
230V/50Hz	HM-315F
Mold Set, 0.1ft³ (3L)	HM-317
Mold Set, 0.5ft³ (14L)	HM-318
Gauge Set, Complete	HM-319
Pouring Funnel Set	HMA-60

SA-60

SA-61

SA-62

SAA-10P

SAA-8

SA-65

ATTERBERG LIMITS
ASTM D4318; AASHTO T 89, T 90

Liquid Limit is the water content at which soil changes from liquid to plastic state. It is arbitrarily defined as that point where two halves of a soil sample flow together when jarred 25 times in a specified manner using a Liquid Limit machine.

Gilson offers motorized or hand-crank operated machines with automatic impact counter, and a budget hand-crank model without counter. All models consist of a brass cup suspended from a carriage designed to control its drop exactly 1cm onto a hard rubber base. Height of drop is adjusted by a nut at the rear of the cup carriage using the gauge at one end of the plastic Casagrande grooving tool (SAA-10P) included. Order separate SAA-8 grooving tool for testing to AASHTO T 89. The cup attaches to the carriage by a pin allowing easy removal for cleaning and inspection. All mechanical parts are machined from solid brass. Rubber feet isolate base from work surface. One SAA-10P included with all Liquid Limit Machines. Additional SAA-10 and SAA-10P Casagrande metal grooving tools are available.

Motorized SA-60 with counter is most accurate with use of a special geared motor assuring proper operating speed of 1.9—2.1 drops per second. An on-off switch is provided. Hand operated SA-61 is 6.5x6x5in (165x152x127mm), LxWxH; Hand operated SA-62 with counter is 6.5x7x5in (165x178x127mm), LxWxH. **Product Dimensions:** 12x7.5x6in (305x191x152mm), LxWxH.

Plastic Limit is defined as the water content at which a soil can no longer be deformed by hand rolling to 1/8in (3.2mm) diameter threads without crumbling.

Main items needed for this test are SA-66 Glass Plate and SC-400 Aluminum Containers, both included in SA-65 Accessory Set, or available separately.

SA-65 Atterberg Limit Accessory Set provides items necessary to perform liquid and plastic limit tests in accordance with ASTM D4318, including MA-278 evaporating/mixing dish, SA-66 ground Glass Plate 12x12x3/8in (305x305x10mm) with seamed edges, 24 aluminum containers 2in dia. x 0.9in H (51x22mm) with snug-fitting lids, SC-77 wash pan, HMA-10 wooden-handled spatula with stainless steel blade 3/4in x4in (19x102mm), WxL, and an HMA-24 250ml polyethylene squeeze wash bottle.

ATTERBERG LIMITS	
Liquid Limit Machine Motorized, with Counter, 115V/60Hz	SA-60
230V/50Hz	SA-60F
Liquid Limit Machine Hand Operated	SA-61
Liquid Limit Machine Hand Operated, with Counter	SA-62
Accessories	
Grooving Tool, AASHTO	SAA-8
Grooving Tool metal, Casagrande ASTM	SAA-10
Grooving Tool plastic, Casagrande ASTM, pkg. 10	SAA-10P
Brass Cup with Mounting Holes	SAA-11
Brass Cup with Holder	SAA-12
Liquid & Plastic Limits Set	SA-65
Glass Plate	SA-66

SA-18

NEW PRODUCT

SA-19

SC-74

SAA-15

SA-56

PLASTIC LIMIT ROLLER
ASTM D4318; AASHTO T 90; TEXAS 105-E

Patented Plastic Limit Roller for soils is a unique time saving device designed to produce consistent results by an easily-repeatable manual technique.

Traditional methods call for repetitive rolling by hand between the palm or fingers and a glass plate while visually estimating the 1/8in (3.2mm) diameter stopping point. Results are highly dependent on technique and judgment of individual operators. The SA-18 Plastic Limit Roller device consists of top and bottom roller plates separated by 1/8in (3.2mm) side rails. Contact surfaces of the plates are covered with sheets of special adhesive-backed absorbent paper that adds no fiber to soil samples. Soil samples are rolled by moving the top plate over the fixed bottom plate. Soil thread diameters are reduced by back and forth action until the top plate contacts the 1/8in (3.2mm) side rails, preventing further thread size reduction.

SA-18 includes top plate with integral handle, bottom plate, 50-sheet pad of adhesive paper, and instructions. The bottom 3/16in and top 3/8in (4.8-9.5mm) acrylic plates measure 8x4.5x1.25in (203x114x32mm), LxWxH.

PLASTIC LIMIT ROLLER	
Plastic Limit Roller	SA-18
Accessories	
Adhesive Paper, pad of 50 sheets	SAA-9
Adhesive Paper, case of 20 pads	SAA-9C

SHRINKAGE LIMIT SET
ASTM D4943

The shrinkage limit of cohesive soils is defined as the water content at which further loss of moisture will not cause a decrease in volume. ASTM recommends this new method as an alternative to the original D427 test method, which was withdrawn due to its use of mercury for volume determinations. This procedure uses similar apparatus for preparation of a soil pat, but requires coating the pat in melted wax. Prior to immersion in water for mass determination.

Samples for shrinkage limit tests are usually taken from a larger sample prepared for liquid and plastic limit tests. A soil specimen with moisture content above the liquid limit is placed in the shrinkage dish and struck off with the straightedge. The sample is then oven dried. After coating in wax, volume of the soil pat is computed by weighing in water and noting the difference from its weight in air.

The SA-56 Shrinkage Limit Set includes a special Monel shrinkage dish, a metal straightedge, fine thread to suspend the soil pat, a glass calibration plate and a tube of petroleum jelly, used when calibrating the dish. The SA-19 Wax Melting Pot is purchased separately. SAA-15 microcrystalline wax is available in 5lb (2.3kg) quantities. The Melting Pot has a 2qt (1.9L) capacity and a thermostat to control temperatures between 50°—250°F (10°—120°C). Electrical requirements are 600 Watts at 115V/60Hz. Other available accessories are the HMA-10 Spatula for mixing and handling and the SC-74 1.3qt Pan for use as a water bath for immersion weighing.

SHRINKAGE LIMIT SET	
Shrinkage Limit Set	SA-56
Accessories	
Wax Melting Pot	SA-19
Monel Shrinkage Dish	SA-55A
Microcrystalline Wax, qty. 5lb	SAA-15
Spatula, 4.75x0.75in Blade	HMA-10
Stainless Steel Pan, 1.3qt	SC-74

HM-109

HM-111

MORTAR & PESTLE
ASTM D421, D4318; AASHTO T 87, T 146

Mortars and Pestles are widely used to manually break up samples of soil prior to sieving or other testing procedures. The HM-109 heavy porcelain Mortar with glazed exterior is 5in (127mm) dia. x 2.5in (64mm) high with 320ml capacity and includes porcelain pestle. The HM-111 wooden handled Soil Pestle is 8in (203mm) long with rubber tip to avoid fracturing individual particles.

MORTAR & PESTLE	
Mortar & Pestle	HM-109
Soil Pestle	HM-111

SA-45

SOIL GRINDER

The Soil Grinder quickly prepares dry soil samples for Atterberg limits, particle-size analysis, and other standard laboratory tests. It is an efficient method for reducing agglomerations of caked soil to individual grains, and less labor intensive than manual mortar and pestle operation. The SA-45 Soil Grinder is designed to preserve the true grain size for accurate and repeatable test results. Most soil types are processed completely in less than 30 seconds per pint.

The hopper has a capacity of 1 pint (0.6L) and features a manually operated gate to control feed rate to the grinding chamber. Operation is simple, just load the hopper, start the grinder and use the gate to control material feed. A #10 (2.0mm) perforated stainless steel plate is included to retain oversize particles. #4 and #35 stainless steel perforated plates can be purchased separately.

Rugged stainless steel contact parts reduce sample contamination. The grinding unit is driven by a powerful and reliable 1/3hp direct drive motor, and mounted on a sturdy painted steel tripod stand. A stainless steel lid covers the hopper during operation. **Product Dimensions:** 12x15x19 (305x381x483) WxDxH.

SOIL GRINDER	
Soil Grinder, 115V/60Hz	SA-45
Accessories	
#4 Perforated Plate	SAA-22
#10 Perforated Plate	SAA-23
#35 Perforated Plate	SAA-24

SA-1 & SA-2

SA-5

HYDROMETER TEST COMPONENTS
ASTM D422; AASHTO T 88

Tests for complete particle size distribution in soils require sedimentation methods to determine silt and clay fractions. Soil specimens are mixed in a solution of water and sodium hexametaphosphate. Hydrometers are used to measure suspended solids in sedimentation cylinders over time periods of up to twenty four hours.

HYDROMETER TEST COMPONENTS	
ASTM 151H Soil Hydrometer is graduated to read specific gravity, with a range of 0.995 to 1.038 in 0.001 divisions at 68°F (20°C).	
Soil Hydrometer ASTM 151H	SA-1
ASTM 152H Soil Hydrometer measures in grams per liter (g/L) of suspension and has a range of -5 to +60 g/L, in 1g/L divisions at 68°F (20°C). Both models have 280mm total length.	
Soil Hydrometer ASTM 152H	SA-2
1000ml Sedimentation Cylinder (hydrometer jar), is required for each sample. Cylinders are heavy-wall clear glass with a stable base, scribed at 1,000ml mark. Product Dimensions: 18x2.5in (457x64mm) HxDia.	
1000ml Sedimentation Cylinder	SA-5
Stirring Apparatus thoroughly mixes soil samples using a stirring apparatus with special mixing blade and a baffled dispersion cup. The Apparatus has selectable 13,000/16,000/18,000rpm speeds and an aluminum housing with 5ft (1.5m) cord. The Stirring Apparatus can be purchased by itself, or as the SA-12 set, which includes the Baffled Dispersion Cup. Additional Stainless Steel Dispersion Cups are available separately to improve sample preparation efficiency.	
Stirring Apparatus with Dispersion Cup	SA-12
Stirring Apparatus, 115V, 50/60Hz	SA-10
Dispersion Cup alone	SA-16
Replacement Blade for SA-10	SAA-2
Sodium Hexametaphosphate is available in dry powder form as a dispersing aid when mixing soil sample solutions. Use is required in the test method and prevents clay platelets from sticking together in the sedimentation solution.	
Sodium Hexametaphosphate, 1lb	SA-20
Constant Temperature Bath is an option when conducting the Hydrometer Test, and maintains temperature at a uniform 68°F (20°C) ±0.5°C with gentle, thorough circulation. Built-in brackets hold eight SA-5 Sedimentation Cylinders. Bath has stainless steel interior parts; exterior is enameled steel. An over-temperature safety cutoff is provided. Product Dimensions: 50x12x18in (1,245x356x965mm), LxWxD; Internal Product Dimensions: 38x8x15.5in (1,270x305x457mm), LxWxD.	
Constant Temperature Bath, 120V, 50/60Hz	SA-25
230V, 50/60Hz	SA-25F

SA-12

SA-20

SA-25

SA-80

SLAKE DURABILITY DEVICE
ASTM D4644

Slake durability is a simulated weathering test to determine abrasion resistance during wetting and drying cycles of shale and similar soft rocks as used in embankments and other construction-related applications. Samples are alternately tumbled in mesh drums through a water medium and oven-dried for two cycles. The percent loss of mass is referred to as the slake durability index.

The SA-80 apparatus consists of a base-mounted, double-ended motor drive unit which rotates two 140mm dia. x 100mm (5.5x3.9in) sturdy wire mesh drums at twenty revolutions per minute in included water tanks. The water tanks have built-in, quick-release drive units. Corrosion resistant drums are constructed of 2mm opening mesh with solid end plates. The unit is capable of turning four drums simultaneously at the specified rpm, and is mounted on a 4ft (1,219mm) long base suited to the addition of the added drums in series with the first two. An additional set of two mesh drums and two water tanks are available as SAA-30. To facilitate sample preparation, order additional mesh drums as SAA-31. **Product Dimensions:** 48x14x9.25in (1,219x355x235mm), LxWxH.

SLAKE DURABILITY DEVICE	
Slake Durability Device, 115V/60Hz	SA-80
230V/50Hz	SA-80F
Accessories	
Water Tank Assembly	SAA-30
Wire Mesh Drums, qty. 2	SAA-31

HM-534

PIN HOLE DISPERSION DEVICE
ASTM D4647

The pinhole test identifies the dispersive characteristics of clay soils used in construction of earth embankments and dams by modeling the action of flowing water along a crack in a soil mass. Failures of earthen structures have been attributed to colloidal erosion along cracks or other flow channels formed in dispersive clays. This test evaluates clay soils by directing water through a small hole drilled through the compacted specimen.

An evaluation of effluent cloudiness and final size of the pinhole is used to qualitatively classify soils into categories of dispersiveness. Additional computations of water flow rate may also be required. Comparison of results with other tests indicates that the pinhole test has the best correlation with the actual erosion characteristics of clay soils.

The stainless steel mold is held to the base with a unique clamping ring while the specimen is compacted. Chamber and end-caps, screens, base stand, a constant-head reservoir, tubing, pipet, and a tool for drilling the pinhole are included. The end cap has a pilot hole for drilling the 1.0 mm (.040in) hole through the sample. All aluminum parts are anodized for corrosion resistance.

PIN HOLE DISPERSION DEVICE	
Pin Hole Dispersion Device	HM-534

HM-562

EXPANSION INDEX CONSOLIDOMETER
ASTM D4829

The Expansion Index test is a simple and effective method for predicting swelling potential of compacted soils. A soil specimen is moisture conditioned to 50% saturation, and compacted into a 4in (102mm) diameter mold. After a confining load is applied, the specimen is immersed in water, and volumetric swell is recorded for up to 24 hours. The expansion index, or EI, is calculated from these measurements. A high EI value indicates a need to design structures and pavements for expansive soils.

Karol-Warner's unique, self-contained design does not require a separate consolidometer loading device to mount, load, and saturate the specimen for testing. After compaction into the 4x1in (101.6x25.4mm) IDxH stainless steel ring, the specimen is placed in the HM-562 Consolidometer with a closely fitting, air-dry porous stone at each end and loaded with the stainless steel weight. After consolidating for ten minutes, the assembly is immersed in distilled water to initiate the test.

All immersed parts are either stainless steel or anodized aluminum for durability and corrosion resistance. Included are an anodized aluminum base and collar with stainless steel hold-down rods, stainless steel specimen ring, 12.6lb (5.7kg) loading weight, and porous stones. MA-333 0.5in range x 0.0001in resolution dial indicator is required for the test, but purchased separately. Additional Porous Stones, Stainless Steel Specimen Rings, and Loading Weights may be purchased for more efficient sample preparation. **Product Dimensions:** 6x11in (152x279mm) Dia.xH.

EXPANSION INDEX CONSOLIDOMETER	
Expansion Index Consolidometer	HM-562
Accessories	
0.5x0.0001in Dial Indicator	MA-333
Porous Stones, 3.990x0.5in Dia.xH	HMA-663
Stainless Steel Specimen Ring	HMA-665
Stainless Steel Loading Weight	HMA-667

HM-66

HM-100

HM-98

VOLUVESSEL
ASTM D2167

The Voluvessel is used to determine in-place density of soil when testing compacted earth fills. The unit is a water-filled, calibrated vessel fitted with a hand-operated pump to pressurize the chamber. A thin, flexible membrane on the bottom displaces under pressure to fill a void. Using the base plate as a template, a hole is dug in the surface and the excavated soil is retained as a specimen. To determine the volume of the hole, the Voluvessel is mounted on the plate, the membrane (balloon) is pumped into the hole, and fluid displacement from the vessel is noted. In-place density is computed easily by dividing weight of the retained soil by the measured volume of the hole. A portion of the retained specimen is used to determine moisture content. This method is not suitable for very soft, easily deformed soils or in a hole which will not maintain constant volume. Water volume is read from the double-graduated scale on the high-strength clear plastic cylinder. Graduations are .00025ft³ or 7cm³.

Selection of Voluvessel model is determined by top-size of soil particles. 1/20ft³ HM-66 model is used for soils with 1/2in (13mm) maximum particle size and 1/13ft³ HM-67 model is for soils with particle size up to 1in (25mm). Each unit includes double-graduated cylinder, base plate, pressure/vacuum pump assembly with quick-coupler, ten balloons, and an integral gauge for controlling pressure during calibration and testing. Extra Balloons are available in packs of ten. MA-26 Aqua-Check for moisture determinations and HMA-8 In-Place Density Accessory Kit are recommended accessories.

VOLUVESSEL	
Voluvessel, 1/20ft³	HM-66
Voluvessel, 1/13ft³	HM-67
Accessories	
Balloons, pkg. 10	HMA-5

SAND CONE DENSITY 6-1/2IN
ASTM D1556; AASHTO T 191

The sand cone density test is a proven method to measure in-place density of soils with maximum particle sizes up to 2in (51mm) using test hole volumes of approximately 0.1ft³ (2.8L).

HM-100 Sand Cone Density Apparatus is a 1gal (3.8L) threaded plastic jar with detachable cone fitting. The metal cone is flanged to 6-1/2in (165mm), with a cylindrical valve of 1/2in (12.7mm) dia. orifice. Valve has stops to prevent rotating past completely open or closed positions. Model with all-brass cone and value assembly is available as HM-100B.

HM-104 Density Plate is 12x12in (305x305mm) aluminum alloy with 1/2in (12.7mm) high edge walls to contain soil sample that is dug using 6-1/2in (165mm) center hole of plate as a guide. After test hole is prepared, flange of cone fits plate opening for filling hole with special Density Sand.

HM-106 Density Sand is clean, dry, uniform, uncemented, durable, and free-flowing. Few particles pass No.200 (75µm) or are retained on No.10 (2mm) sieves. Bulk density varies less than 1%. 50lb (22.7kg) packing bag is heavy and reinforced.

SAND CONE DENSITY 6-1/2IN	
Sand Cone Density Apparatus	HM-100
Brass Cone Density Apparatus	HM-100B
Accessories	
Replacement Plastic Jar	HM-102
Density Plate	HM-104
Density Sand	HM-106

SAND CONE DENSITY 12IN

Large 12in (305mm) diameter sand cone apparatus is used for density determinations in gravels and coarse soils where a larger hole is necessary for accurate results. The unit has two identical cones with a valve in the center. A metal cylinder attached to the top cone has a clear plastic end for viewing sand flow, and handles for carrying. A circular density plate is included.

SAND CONE DENSITY 12IN	
Sand Cone Density	HM-98

HMA-8

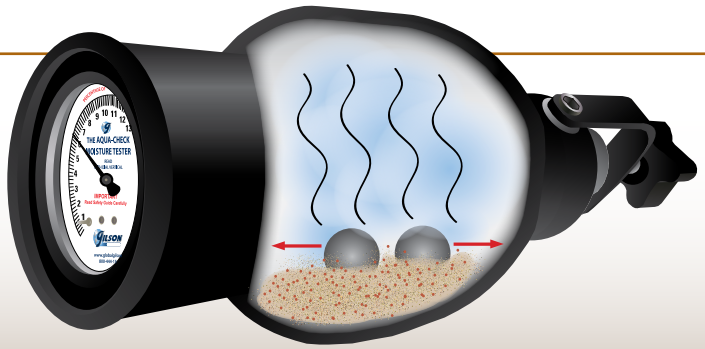
IN-PLACE DENSITY ACCESSORY KIT

In-Place Density Accessory Kit, Model HMA-8, has all items necessary for field tests with either the Voluvessel or Sand Cone Density apparatus. Kit includes SC-103 poly sample bags, qty. 100, MA-102 25°—125°F pocket dial thermometer, TSA-170 bristle brush, HMA-302 1in steel chisel, HMA-304 stainless steel spoon, and HMA-300 rubber mallet. See individual listings elsewhere for full descriptions.

IN-PLACE DENSITY ACCESSORY KIT	
In-Place Density Accessory Kit	HMA-8

GAS PRESSURE MOISTURE TESTERS

The gas-pressure method for moisture determination has long been in use and is widely accepted for accurate field testing of soils, aggregates, coal, abrasives and other materials. These devices are essentially pressure vessels and depend on the formation of gas when the calcium carbide reacts with moisture in the sample. A precision gauge in the sealed chamber measures pressure for relative readings, and results are easily correlated to laboratory results for enhanced accuracy.



MA-26X

MAA-45

MA-26X additional views

GILSON *AQUA-CHECK* MOISTURE TESTER
ASTM D4944; AASHTO T 217; FLORIDA FM 5-507

Gilson *Aqua-Check* is made in the USA, and an affordable choice for rapid, accurate, and reliable moisture tests on sand, aggregates, ores, coal, soils, and other materials with particle size up to 20mm. Samples can be quickly tested on-site, eliminating risk of moisture loss during transport. Portable units are easy to use, and meet ASTM, AASHTO and Florida DOT requirements. The Gilson *Aqua-Check* was evaluated by the Florida DOT and verified to meet FM5-507 DOT requirements.

A pre-weighed 20g sample is placed in the test chamber, along with a measured quantity of calcium carbide reagent. When the chamber is sealed and agitated for one to three minutes, free moisture in the test sample reacts with the reagent to produce acetylene gas. The integral pressure gauge registers 0—20% moisture by weight in 0.2% graduations. Moisture range can be doubled by halving the pre-weighed sample weight.

MA-26X *Aqua-Check* has a rugged, die-cast aluminum body with a tough, wear-resistant coating and includes a 0—20x0.2% pressure gauge, with certificate of calibration. Also included; electronic digital balance, two 1.25in (32mm) dia. steel pulverizing balls, reagent measuring scoop, brush, and instructions in a heavy-duty, waterproof plastic case. Approximate pressure chamber dimensions: 14x5.5in (356x140mm), LxDia. Recalibration of existing *Aqua-Check* gauges is available as MAA-53, inquire. Calcium Carbide Reagent is available separately in 10lb (4.5kg) cans as MAA-44. These bulk containers can be used to refill smaller containers for field use. Repair parts are normally in stock. The pressure gauge and all accessories are compatible with both *Aqua-Check* and Speedy-brand Moisture Testers.

MAA-45 *Aqua-Check* 0—20% Replacement Pressure Gauge includes a certificate of calibration, and is also compatible with Speedy-brand MA-21A and MA-25 Moisture Testers. Due to shipping restrictions, additional reagent is sold in 10lb (4.5kg) cans. Material from these larger cans can be used to replenish smaller containers for field use. **Product Dimensions:** 20x17x9in (508x431x228mm), WxDxH.

GILSON *AQUA-CHECK* MOISTURE TESTER	
Gilson *Aqua-Check* Moisture Tester, without Reagent	MA-26X
Accessories	
Calcium Carbide Reagent, 10lb can	MAA-44
Empty 1lb Metal Can for Reagent	MAA-43
Aqua-Check 0—20% Pressure Gauge	MAA-45
Recalibration of MAA-45 Pressure Gauge	MAA-53
Electronic Balance, 200 x 0.1g	OB-205
1.25in (32mm) Steel Balls, pkg. 2	MAA-47
Sample Cup	MAA-52
Long-Handle Reagent Scoop	MAA-48
Large, Coarse Clean-Out Brush	MAA-51
Small, Fine-Bristle Brush	MAA-50
Heavy-Duty Waterproof Plastic Case	MAA-46

technote

Gilson Company, Inc. now offers a repair service for the MA-26X *Aqua-Check* Moisture Tester. Please call **800.444.1508** for pricing or to schedule repairs.

MA-25C

HM-536

SPEEDY 2000 MOISTURE TESTERS
ASTM D4944; AASHTO T 217; FLORIDA FM 5-507

The Speedy is widely accepted for rapid, accurate, and reliable moisture tests on all kinds of materials–sand, aggregates, ores, coal, soils, ceramics, abrasives, and other powders. Units are portable, easy to use and do not require a power supply. Samples can be tested on-site, eliminating risk of moisture loss during transport.

Selection of four available models is based on particle size, percent moisture range, and gauge accuracy desired. Standard Models MA-20A and MA-21A are used for sand, grains, clays and fine powders. Large MA-25 and MA-25C handle soils, aggregates, coal and ores. Moisture range may be doubled by using 1/2 specimen weight and multiplying gauge reading by two.

All units have tough, die-cast polished aluminum body (pressure chamber) with integral dial. Place weighed sample in the tester with measured quantity of calcium carbide reagent and seal with cap. Upon agitation, free moisture in test sample reacts with calcium carbonate to form acetylene gas. Pressure gauge reads directly in percent moisture by weight within 1—3 minutes.

Each Speedy 2000 Kit includes an electronic digital balance, reagent measuring scoop, brush, cleaning cloth, and instructions in a heavy-duty, waterproof plastic case. MA-25 and MA-25C include two steel balls to pulverize samples. Due to shipping restrictions, calcium carbide reagent is sold separately in 10lb (4.5kg) cans. Material from these larger cans can be used to replenish smaller containers for field use.

MA-20A and MA-21A Product Dimensions: 12x4in (305x102mm), LxDia. **MA-25 and MA-25C Product Dimensions:** 14x 5.5in (356x140mm), LxDia.

SPEEDY 2000 MOISTURE TESTERS

Model	Description	Max. Particle Size	Moisture Range[1]	Specimen Weight
MA-20A	Standard Speedy	10mm	0—10 x 0.1%	12g
MA-21A	Standard Speedy	10mm	0—20 x 0.2%	6g
MA-25	Large Speedy	20mm	0—20 x 0.2%	20g
MA-25C	Large Speedy	20mm	0—50 x 0.5%	8g

Accessories

Calcium Carbide Reagent, 10lb can[2]	MAA-44
Empty 1lb Metal Can for Reagent	MAA-43
Aqua-Check 0—20% Pressure Gauge	MAA-45
Electronic Balance, 200 x 0.1g	OB-205
1.25in (32mm) Steel Balls, pkg. 2	MAA-47
Sample Cup	MAA-52
Long-Handle Reagent Scoop	MAA-48
Large, Coarse Clean-Out Brush	MAA-51
Small, Fine-Bristle Brush	MAA-50
Heavy-Duty Waterproof Plastic Case	MAA-46

[1] Moisture range may be doubled by using 1/2 specimen weight. [2] Due to shipping restrictions, calcium carbide reagent is sold in 10lb (4.5kg) cans. Material from these larger cans can be used to replenish smaller containers for field use.

CALCIUM CARBONATE CONTENT CHAMBER
ASTM D4373

Calcium carbonate (CacO3) content of soils can be determined rapidly with this simple, portable test. The test is often used as an index to the presence and quantity of calcium carbonate in marine soil specimens, expressed as the percent calcite equivalent.

The method involves treating a one gram soil specimen with hydrochloric acid (HCl) in an enclosed reactor vessel. Carbon dioxide gas is generated from the reaction between the acid and carbonates in the specimen when the chamber is tilted and agitated, and the resulting pressure is measured. The 10 psi (69kPa) Bourdon-tube pressure gauge is pre-calibrated with reagent grade calcium carbonate. The 2.5x5.5in (63.5x140mm) IDxH clear acrylic chamber assembly is sealed to the anodized aluminum end caps with o-rings, and secured by threaded rods and knobs. It is supplied with the pressure gauge, bleed valve, and a 20ml cup with handle.

CALCIUM CARBONATE CONTENT CHAMBER

Calcium Carbonate Content Chamber HM-536

HM-500

HMA-15

HM-504A

HM-502

POCKET PENETROMETER

Lightweight, direct-reading penetrometer gives instant information for classification of cohesive soils on site or in the lab. Use is required by OSHA for trenching and excavation inspection. The spring-operated device has a 1/4in (6.4mm) dia. loading piston that is pushed into the soil up to a calibration groove machined on the piston 1/4in from the end. The permanent scale on the piston barrel reads approximate unconfined compressive strength in tsf^2 or kg/cm^2. An indicator sleeve retains reading after piston is released. Spring is calibrated and plated for rust resistance. Complete penetrometer weighs only 2oz (57g); dia. is 3/4in (19mm) and length is 6in (152mm). Adapter Foot Attachment of 1in dia. has sixteen times the piston area to improve approximations of unconfined compressive strength readings in soft soils.

POCKET PENETROMETER

Pocket Penetrometer HM-500

Accessories

Adapter Foot Attachment HMA-15

POCKET SHEAR VANE SET

The Shear Vane Set rapidly measures approximate shear strength of cohesive soils in the field or lab. Set includes all-metal driver, three vanes of different shear strength ranges, and a carrying case with belt loop. In use, the blades of the vane are pressed into the soil, and the knob is turned slowly until failure. Maximum reading is retained by the indicator needle. Values using the standard vaned foot are read directly on the dial from 0—1kg/cm^2 in 0.05kg/cm^2 divisions (1 kg/cm^2 is approximately equal to 1tsf^2). Readings can be interpolated to 0.01kg/cm^2 and are multiplied by 0.2 and 2.5 when using the large (sensitive) and small (high-capacity) vanes. Total range is 0—2.5kg/cm^2. Extensive laboratory testing has indicated close correlation with undrained shear strengths. The tester can be used on any flat 2in (51mm) diameter surface.

POCKET SHEAR VANE SET

Pocket Shear Vane Set HM-504A

POCKET GEOTESTER

The Pocket Geotester dial penetrometer set is ideal for on-site measurement of soil strength. It gives estimated unconfined compressive strength directly in tsf or kg/cm^2 when used with the standard 1/4in dia. plunger. In addition, readings with four other plungers of 10, 15, 20 and 25mm dia. give strengths over a wide range of cohesive soil types.

The plunger is pressed into the soil to the calibration notch. The maximum value is retained on the dial until released by a push button. Inner dial scale is 0—6.0 x 0.1 divisions in tsf or kg/cm^2. Outer scale gives total force over 0—11kg range x 0.1kg divisions, and this reading is used with charts provided to estimate bearing capacities depending on plunger used and soil type.

Geotester has large 2.5in (63mm) dial and sturdy noncorrosive construction. Dial is user-calibrated using register plates provided and any reliable scale of 10—15lb capacity. Penetrometer is complete with stainless steel Plungers in carrying case with instructions, Data Tables, and Register Plates. Net Wt. is 13oz (369g); length is 5.4in (138mm).

POCKET GEOTESTER

Pocket Geotester HM-502

HM-97

SOIL CLASSIFICATION SET

The Soil Classification Set provides a full range of gauges, charts, and instruments for field evaluation and classification of various soil characteristics. The convenient carrying case contains tools for visual classification, particle size estimation, and for estimating shear strength, density, and bearing capacity.

Set includes:
HM-500 Pocket Penetrometer
HMA-15 Adapter Foot for HM-500
HM-504A Pocket Shear Vane Set
HM-930 Soil Density Volumeter
HM-513 Sand Gauge
HM-519 Munsell Soil Color Chart Set
HMA-65 Munsell Tropical Soil Color Chart
3in (76mm) Diameter all-stainless steel sieves, 1 ea. #4, #10, #40, #100, #200, Pan, and Cover, Sturdy Plastic Carrying Case

Complete descriptions for individual components can be found under their respective model numbers.
Product Dimensions: 16x8.4x8in (406x213x203mm) WxDxH.

SOIL CLASSIFICATION SET	
Soil Classification Set	HM-97

MA-78

KELWAY SOIL ACIDITY/MOISTURE METER

Unique, dual-purpose Kelway Field Testing Meter gives accurate soil pH (3.5—8.0 range) and moisture (0—100% relative saturation) measurements in three minutes or less. Simply insert pointed end to achieve good soil contact. Readings from scales on top dial are based on measured electrical potential between two dissimilar metal plates. No batteries, electrodes, or buffer solutions are needed, and the meter is durable and insensitive to normal temperatures. Meter is supplied complete with belt-loop carrying case, two 3x4in (76x102mm) conditioning film sheets, and instructions. Conditioning film is used to clean electrode plates prior to use. Not for use with liquids. Meter is 6.5in (165mm) long with 1.5in (38mm) diameter dial; net wt. is 8oz (0.2kg).

KELWAY SOIL ACIDITY/MOISTURE METER	
Kelway Soil Acidity/Moisture Meter	MA-78
Accessories	
Conditioning Film, pkg. 12	MAA-116

HM-560

PROCTOR PENETROMETER SET
ASTM D1558

The Penetrometer Set measures penetration resistance of fine grained soils. The penetrometer consists of a spring dynamometer with a scale on the stem of the handle graduated from 10—130lbf (45—580N) in increments of 2lbf (9N). A sliding ring on the stem gives shear strength obtained in the test. Model HM-560 basic set includes interchangeable threaded needles with areas square inches (square centimeters); 1 (6.45), 3/4 (4.84), 1/2 (3.23), 1/3 (2.15), 1/5 (1.29), 1/10 (0.65), 1/20 (0.32), 1/30 (0.22) and 1/40 (0.16). Replacement needles are available. Set comes in attractive foam-lined wooden box with carrying handle.

PROCTOR PENETROMETER SET	
Proctor Penetrometer Set	HM-560

HM-930

SOIL DENSITY VOLUMETER

The Soil Density Volumeter utilizes a calibrated cylinder to make rapid measurements of density of cohesive soils. With the stem of the piston completely retracted, a 30cm^3 capacity cylinder with cutting edge is pushed into the soil. After squaring off the bottom of the core, soil volume in the Volumeter is read to 0.05cm^3 via a scale on the piston stem and a fine-reading vernier scale on the top face of the cylinder. The sample is then extracted for weighing by screwing in the piston. Density is easily computed. The Volumeter is all stainless steel and measures 3.75in (95mm) long by 2in (51mm) maximum diameter.

SOIL DENSITY VOLUMETER	
Soil Density Volumeter	HM-930

SF-20

HM-559A

DYNAMIC CONE PENETROMETERS (DCP)
ASTM D6951

Dynamic Cone Penetrometers (DCP) provide quick field determinations of soil shear strengths at depths up to 6ft (1.8m), with extensions. This accurate and portable field equipment measures soil properties that can be related to CBR or Resilient Modulus laboratory values. Original design by United States Army Corps of Engineers meets ASTM requirements. The DCP bridges the gap between laboratory pavement design and construction quality assurance.

Penetration resistance from the sliding hammer is measured in blows per millimeter. Cone diameter of the point is larger than the rod to ensure driving energy is not lost to skin friction on the rods. The driven points are available as multi-use Hardened Steel or single-use Disposable Cones. The Disposable Cones are abandoned in place and often used when points would be difficult to extract. Both cones have a maximum diameter of 0.790in (20.1mm) tapering at a 60° angle to a point. Rods assemble easily with quick-connect pin fittings and can be driven to a depth of about 28¼ in (71.8cm). Extension rods with threaded connections can be purchased separately for testing to greater depths.

SF-20 Dual-Mass Dynamic Cone Penetrometer is effective in soils with CBR values from 0.5 to 100. Penetration of higher-strength soils is assisted using the exclusive Dual-Mass Hammer Assembly. This 8kg (17.6lb) Hammer assembly is constructed of stainless steel. For better test values in weaker soils with CBR values of ten or less, the hammer quickly converts to a 4.6kg (10.1lb) unit. The kit includes a crush resistant Pelican case with transport wheels, the Dual-Mass Hammer assembly, 30in (76.2cm) Drive rod, and twenty five disposable cones with an adapter. Also included are a vertical scale, hardened point, T-handled hex wrench, 3-in-1 oil, and Loctite. The user's manual contains software with an Excel® template for use as a DCP data reduction aide. Additional disposable cones, cone adapters, and hardened points are available separately.

SF-10 Dynamic Cone Penetrometer measures shear strength in soils with CBR values from 10 to 100. This kit is ideal for occasional use in areas where very weak soils are not common. The single-mass 8kg (17.6lb) structural steel hammer is standard. 2" depth rings are marked on the 37.75in (95.9cm) Drive Rod. Also included is one SFA-22 hardened point, manual & CD, and 3-in-1 oil. The Manual provides look-up tables for to correlate blow counts with CBR and unit weight values. The SF-10 is not supplied with a field carrying case. Disposable cones, Adapters, and additional Hardened Points, are sold separately.

DYNAMIC CONE PENETROMETERS (DCP)	
Dual-Mass Dynamic Cone Penetrometer	SF-20
Dynamic Cone Penetrometer	SF-10
Accessories	
Disposable Cones, pkg. 25	SFA-20
Disposable Cone Adapter	SFA-21
Hardened Steel Cone	SFA-22
Lower Drive Rod, 12in (305mm)	SFA-24
Extension Rod, 24in (610mm)	SFA-25

STATIC CONE PENETROMETER

Designed for evaluating soil consistency, compaction, and bearing capacity of foundations and pavement subgrades, the Static Cone Penetrometer yields accurate results, especially from fine-grained, soft soils. Gravel and rocks in the soil can cause misleading readings.

Operation involves pressing the Penetrometer into the soil 6in (152mm), taking a reading, pulling back until the gauge reads zero pressure, advancing another 6in (152mm), taking another reading. Continue in this manner until the entire depth is evaluated.

The Penetrometer is constructed of two rods. The inner rod is connected to the cone tip and is independent of the outer rod. Friction of soil along the shaft of the outer rod does not affect the inner rod's function. The load on the cone is transferred via the inner rod to the hydraulic load cell in the head assembly. The pressure gauge reads the cone stress directly.

Outer rod is high strength chrome alloy tubing. Inner rod is ground 316 stainless steel. Shaft assembly is designed for a maximum of 250lbf axial force. The Penetrometer includes the 0—70kgf/cm^2 gauge, T-handle and 2ft starter rod. HMA-271A 2ft extension rods can be added as necessary to achieve greater depth capability.

Maximum area of the 60° cone is 1.5cm^2. Halve the readings when the 3cm^2 cone is used.

STATIC CONE PENETROMETER	
Static Cone Penetrometer	HM-559A
Accessories	
2ft Extension Rod	HMA-271A
2ft Starter Rod	HMA-276A
3cm^2 Cone	HMA-272
1.5cm^2 Cone	HMA-277


SP-254


SP-258


SP-261


SP-274


SP-284


SP-138


SPA-256

SOIL SAMPLERS

SOIL SAMPLERS			
Description		**Carbon Steel**	**Stainless Steel**
Standard Augers are the best for a wide range of soil types. Open bit design allows larger particles to pass through for recovery. Suplied with quick-connect fittings. Inquire for augers with threaded connectors.			
	3in (76mm)	SP-254	SP-258
	4in (102mm)	SP-256	SP-259
Clay Augers have an open bit design and windows machined in sides that make sample viewing and recovery easier in cohesive soils. Length is 18in (457mm). Supplied with quick-connect fittings. Inquire for augers with threaded connectors.			
	3in (76mm)	SP-261	SP-264
	4in (102mm)	SP-262	SP-266
Sand Augers have partially closed bodies and closed bits that aid sample retention in loose, granular soils. Length is 18in (457mm). Suplied with quick-connect fittings. Inquire for augers with threaded connectors.			
	3in (76mm)	SP-268	SP-271
	4in (102mm)	SP-269	SP-272
Mud (Dutch) Augers have a unique, open design that is ideal for cutting in mucky, boggy, root-bound soils. Sample recovery and clean-up are easier. Available in 3in (76mm) diameter only. Length is 12in (305mm). Suplied with quick-connect fittings. Inquire for augers with threaded connectors.		SP-274	SP-278
Handles & Extensions 16in (406mm) T-Handles are fitted with comfort-grip padding for ease of use. Extensions are high-strength 1in tubing, permanently marked with 6in (152mm) increments. Supplied with quick-connect fittings. Inquire for handles and extensions with threaded connectors.			
	2ft (610mm)	SP-284	SP-289
	3ft (914mm)	SP-285	SP-290
	4ft (1,219mm)	SP-286	SP-291
	5ft (1,524mm)	SP-287	SP-292
	T-Handle	SP-288	SP-293
Adapters allow our Quick-Connect Augers to be used on older extensions with 5/8in-11 NC threaded connections. A locking pin is included.		SPA-255	—
Quick-Connect Pins 1/4x1-1/4in pins have spring retention clips.		SPA-256	SPA-257
One-Piece Soil Samplers T-Handle samplers take 3/4in (19mm) diameter cores in tubes with replaceable hardened tips. Welded high-quality plated steel construction. SP-140 has a footstep to assist insertion in the soil.			
	One-Piece Soil Sampler, 19in (482mm) Long, 14in (360mm) Open Tube	—	SP-138
	One-Piece Soil Sampler, 36in (914mm) Long, 11in (279mm) Open Tube	—	SP-140

technote

Systems using 5/8-11NC threaded connectors and stainless steel systems for environmental sampling applications are available.

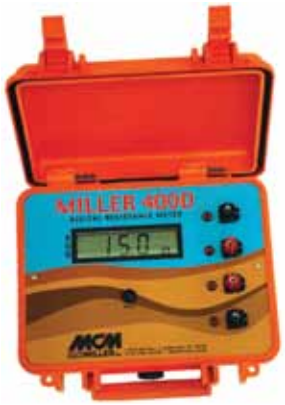
helpfulhint

Soil Samplers are a fast, accurate way to profile soil layers and obtain samples for classification and testing. Gilson Augers and Extensions use precision quick-connect fittings of high-strength steel. One-piece pins are used to secure the components.This system is faster, more robust and easier to use than conventional threaded systems. Heat-treated super alloy bits can be rebuilt when worn. Call for a quotation.

HM-940

HM-942

MA-267



HM-944

HMA-672

SOIL RESISTIVITY APPARATUS
ASTM G57

This Soil Resistivity equipment utilizes the four electrode method developed by the National Bureau of Standards known as the Wenner 4-pin Method. The test determines the average resistivity of the soil to a depth equal to the spacing between electrodes (soil pins). This kit is designed for the maximum pin spacing of 20ft (6.1m) recommended for a standard survey.

HM-940 Soil Resistivity Kit consists of the Soil Resistivity Reel with four color-coded lead wires harnessed together, four Heavy Duty Soil Pins, and a Soil Box with leads for laboratory testing, housed in a sturdy, foam-lined plastic case. Lead wires plug into the reel hub and terminate with spring-loaded clamps at the opposite end. Soil Pins are 18x3/8in (457x9.5mm) stainless steel with T-handles. The plexiglas Soil Box for laboratory testing has removable potential pins of brass and current plates of stainless steel. Inside dimensions are 9x2.5x1.5in (229x64x38mm), LxWxD. Set of 4 Soil Box Lead wires are 24in (610mm) in length. HM-942 or HM-944 Soil Resistance Meters are purchased separately.

HM-942 Analog Soil Resistance Meter is used together with the HM-940 kit, and allows soil resistance values to be read directly from the analog dial without performing additional calculations. The wide-range, high-sensitivity meter has a large dial for easy readability and 8 ranges from 0.1 Ohms to 1.1 Mega-Ohms. Powered by conventional C-cell alkaline batteries. Rugged, weatherproof plastic case is IP67 rated and is12x10x5in (310x250x125mm).

HM-944 Digital Soil Resistance Meter is used with the HM-940 Resistivity Kit. There is no need to select ranges or adjust dials when using this meter. Resistance readings display instantly with the push of a button, or log them directly to a Bluetooth-enabled Windows™ PC or PDA device (not included) using the included ProCP Soil Resistivity software. Logged readings can be automatically date/time stamped with positioning when integrated with GPS feature in user's handheld device. The HM-944 has a total range from 0.01 Ohms to 10 Mega-Ohms. Powered by conventional D-cell replaceable alkaline batteries. Rugged, weatherproof plastic case is IP67 rated and is12x10.5x5.8in (310x267x147mm).

SOIL RESISTIVITY APPARATUS	
Soil Resistivity Kit	HM-940
Analog Soil Resistance Meter	HM-942
Digital Soil Resistance Meter	HM-944
Accessories	
Soil Resistivity Reel w/four Lead Wires	HMA-670
Heavy Duty Soil Pin	HMA-671
Soil Box for Laboratory Testing	HMA-672
Leads for Soil Box, set of four	HMA-673

PORTABLE TURBIDITY METER KIT
USEPA 180.1

The amount of suspended particles in water is quickly determined with the Portable Turbidity Meter Kit. This easy-to-use hand-held instrument accurately measures turbidity by intensity of reflected light. Values are proportional to the quantity of suspended particles in the sample. The MA-267 meets EPA specifications for testing drinking water and is useful for measuring clarity of aqueous solutions in general.

Range selection is automatic over a total range of 0—4,000 NTU (Nephelometric Turbidity Units) with accuracies of ±0.05 NTU from 0—2.5 NTU, ±2% from 2.5—100 NTU, and ±3% above 100 NTU. Resolution is 0.01—1.0 NTU, dependent upon range. Other features include IP67 waterproof construction, tungsten light source, six line backlit LCD display, 500 point data-logging, and auto shut-off. Meter carries the CE mark. SmartLink 3 software can be purchased separately for data transfer to PC.

MA-267 Portable Turbidity Meter includes meter, 0, 1, and 10 NTU Calibrating Standards, sample bottle, four sample tubes, USB cable with wall plug adapter, and waterproof carrying case. Power is provided by a built-in 3.7V Lithium ion battery, rechargeable via included USB cable or 115V AC wall adapter. A 12VDC Car Charger is optional. **Product Dimensions:** 7.5x3.5x2.5in (191x88x64mm), LxWxH.

PORTABLE TURBIDITY METER KIT	
Portable Turbidity Meter	MA-267
Accessories	
Calibration Standard, 0 NTU	MAA-240
Calibration Standard, 1 NTU	MAA-241
Calibration Standard, 10 NTU	MAA-242
Calibration Standard, 100 NTU	MAA-243
SmartLink 3 Software	MAA-247
Car Charger, 12 V.	MAA-248

MA-257

MA-260

HM-128

PEN PH METERS
ASTM D4972; AASHTO T 289

Pen pH meters from Ohaus provide accurate, straightforward operation at an affordable price. Units show pH measurements in the 0 to 14pH range on the large, easy to read LCD display. The pocket-size meters are constructed with a durable ABS housing, a protective cap to safeguard the sensor, and automatic shutdown feature that preserves battery life. Starter pen meters endure prolonged use in rugged environments and feature IP67 waterproof design to prevent water damage when dropped in liquid. A wrist strap is included. The meters operate for approximately 200 hours on four included AG13 button-cell batteries. Working Environment for both units is 50°F to 104°F (10°C to 40°C) and 85%RH, non-condensing. **Product Dimensions:** 1.8x7.3x1.5in (45x185x38mm) WxLxH

Economy Pen pH Meter has range of 0 to 14x0.1 pH and accuracy of ±0.1pH. The built-in electrode is factory calibrated with no need for use of Buffer Solution, and the meter is not equipped with temperature measurement or compensation functions. Single-line LCD display.

Standard Pen pH Meter range is 0 to 14 x0.01ph with ±0.05pH accuracy. The built-in electrode features 3-point calibration using 4.01, 7.00, and 10.01 buffers. This meter has temperature compensation with range of 0 to 99.0°C (32.0 to 210.2°F). Dual display shows pH and temperature values.

PEN PH METERS	
Economy Pen pH Meter	MA-257
Standard Pen pH Meter	MA-258
Accessories	
pH Electrode Storage Solution	MAA-190
Buffer Solution, pH 4.01, 250ml	MAA-192
Buffer Solution, pH 7.00, 250ml	MAA-194
Buffer Solution, pH 10.01, 250ml	MAA-196

PORTABLE PH METER
ASTM D4972; AASHTO T 289

Versatile Ohaus Portable pH Meter is rugged, reliable and easy to use in the lab or field. With an IP54-rated protective ABS plastic casing shielding the meter from water and dust damage, the compact and ergonomic design is adaptable for a wide array of environments. Automatic and manual temperature compensation ensures accurate readings while a data library stores up to thirty measurements for future reference. Large, easy to read LCD display.

The auto buffer recognition stores calibration data and helps avoid errors during the calibration process. A maintenance-free 3-in-1 non-refillable plastic gel pH electrode with integrated temperature probe is included. Measurement range of the meter as equipped with supplied probe is 0 to 13x0.01pH. Accuracy is ±0.01pH. Temperature measurement is 0° to 80°C (32° to 212°F)x0.1°. The meter also reads -1999 to +1999x1mv. MA-260 includes the pH electrode, a meter stand, wrist strap, pH buffer packets (4.01, 7.00, and 10.01pH) and carrying bag. Working Environment 41° to 104°F (5° to 40°C), 80%RH, non-condensing. Operates approximately 500 hours on four included AAA batteries. **Product Dimensions:** 3.5x6x1.4in (90x150x35mm).

PORTABLE PH METER	
Portable pH Meter	MA-260
Accessories	
Buffer Solution, pH 4.01, 250ml	MAA-192
Buffer Solution, pH 7.00, 250ml	MAA-194
Buffer Solution, pH 10.01, 250ml	MAA-196
Replacement 3-in-1 pH Gel Electrode, Non-Refillable	MAA-196

DOUBLE-RING INFILTROMETER
ASTM D3385

The Double-Ring Infiltrometer is used for field measurement of infiltration rate of water or other liquid into fine-grained soils. Infiltration rates give data for studies of liquid waste disposal, leaching, drainage, irrigation requirements, canal or reservoir leakage, etc.

12in and 24in (305mm and 610mm) diameter rings are 20in (508mm) high. Both are driven into the soil in a concentric arrangement using the special driving cap provided. The rings are filled with water and the level is maintained by constant-head Mariotte cylinders. Velocity of liquid passing to the soil from the inner ring is equivalent to the infiltration rate. Water between the two rings promotes one-dimensional vertical flow beneath the inner ring.

HM-128 Double-Ring Infiltrometer includes two stainless steel rings with reinforced top band and beveled bottom edge, a 1/2in (13mm) thick hard alloy aluminum driving cap with centering pins that also serves as a cover, 3,000ml and 10,000ml constant-head calibrated plastic Mariotte cylinders with support stand and rubber splash guards.

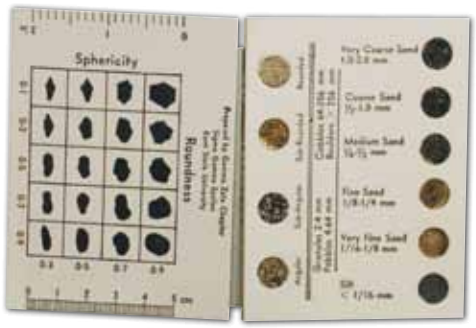
HMA-635 Infiltrometer Field Set provides essential tools for setting-up and running the test. The set includes a small sledge hammer, rubber mallet, water bucket, carpenter's level, dial thermometer, pH paper, 2x4in (54x102mm) wooden driving block, and shovel.

DOUBLE-RING INFILTROMETER	
Double-Ring Infiltrometer	HM-128
Accessories	
Infiltrometer Field Set	HMA-635

technote

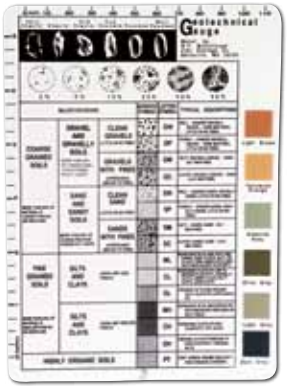
Inquire for the full Ohaus line of Pen and Portable meters and electrodes for pH, Total Dissolved Solids (TDS), Dissolved Oxygen (DO), Oxidation Reduction Potential (ORP) and Salinity.

HM-519



HM-510

HM-513



HM-512 Front

HM-512 Back

GEOTECHNICAL CLASSIFICATION CHARTS

GEOTECHNICAL CLASSIFICATION CHARTS

Munsell Soil Color Charts were developed with the U.S. Soil Conservation Service for classifying soil color, but may also be used for rocks, archeological specimens, and other natural products. Munsell Charts are a standard tool for geologists, civil engineers, and soil scientists. The tabbed charts include 10R, 7.5R, 5R, 2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y and 10Y-5GY color ranges. Charts for tropical and semitropical soils, and for Australia, SE Asia are now included. A two page Gley Chart for submerged soils covers weak chromas and neutrals of blue and green hues. A white page is used to describe carbonate, silica, gypsum, soluble salt participates and more. Openings between chips allow easy visual comparison with soil samples. Illustrations of soil grain structures, charts for estimating proportions of mottles and coarse fragments, color name diagrams, and instructions are furnished. Color chips are mounted on neutral gray, 7.25x4.25in (184x108mm) water resistant pages in an 8x6in (203x152mm) loose-leaf binder.	HM-519
Grain Size Chart is widely used by field geologists for describing samples. It is handy, economical and pocket-sized with recessed die-cut sample cavities filled with precision sieved sedimentary particles permanently mounted to the chart, classed according to the Wentworth grading system.	HM-510
Geotechnical Gauge is a water-resistant 5x8in (127x203mm) plastic card on a lanyard and has a wealth of information for classification of soils. Six color chips, four patches of sized grains, and four tables assist in classifying: • Soils by particle size using the Unified Soils Classification System. • Coarse and fine grained soils into fifteen descriptive categories from gravels and sands to silts and clays. • Sand by type from very loose to very dense. • Clays from very soft to hard. Categories are defined by appearance, by handling properties, or by ranges of field and laboratory test results. Edges of the card have separate 0—6in and 0—110mm scales.	HM-512
Sand Gauge has nine granule patches which are firmly attached to the handy 3.5x2.5in (89x64mm) water-resistant plastic card to assist in defining roundness and size of particles from 2mm very coarse sand to 1/16mm silt. A checklist is included to assist in making field notes and defining bed thickness. Flip side of chart has tables of geologic age and carbonate classification information. Model HM-513 has a 0—50mm scale on one edge and an attached lanyard.	HM-513

How to select the oven that best meets your requirements:

Step 1: Decide on gravity or forced convection airflow.

Step 2: Choose desired temperature range.

Step 3: Determine appropriate dimensions and capacity.

Having trouble deciding? Call a Gilson representative to discuss your application.

OVEN SELECTION GUIDE

OVEN SELECTION GUIDE

Model	Temperature Max. °F (°C)	Uniformity	Chamber Dimensions, in (cm) W	D	H	Product Dimensions, in (cm) W	D	H	Capacity ft³ (L)	Electrical[1] Volts	Amps	Page Number
GRAVITY CONVECTION												
BO-10R	450 (232)	±3°C	12 (30)	10 (25)	10 (25)	14 (36)	12 (30)	17 (43)	0.7 (20)	115	5.2	181
BO-20R	450 (232)	±3°C	13 (33)	13 (33)	13 (33)	15 (38)	15 (38)	21 (53)	1.3 (37)	120	6.3	181
BO-30R	450 (232)	±3°C	18 (46)	12 (30)	16 (41)	20 (51)	14 (36)	25 (64)	2.0 (57)	120	10.5	181
BO-40	450 (232)	±3°C	18 (46)	14 (36)	21 (53)	20 (51)	16 (41)	30 (77)	3.0 (85)	120	12.5	181
PO-23[2]	550 (288)	Not-Rated	33 (84)	22 (55)	7.5 (19)	41.5 (105)	27 (69)	61 (155)	12.6 (357)	—	—	183
FORCED CONVECTION												
OT-2	105 (41)	Not-Rated	35.8 (91)	22.5 (57)	64 (163)	36 (92)	29.8 (76)	78 (198)	30.0 (850)	115	20	184
BO-250	300 (149)	±2.5°C	26 (66)	24 (61)	20 (51)	33 (84)	36 (91)	24 (61)	7.0 (198)	115	9.2	180
BO-250ER	300 (149)	±2°C	26 (66)	24 (61)	20 (51)	33 (84)	36 (91)	24 (61)	7.0 (198)	115	9.2	180
BO-60[3]	400 (204)	±2°C	50 (127)	30 (77)	54 (137)	70 (178)	46 (117)	80 (203)	46.9 (1,328)	230/460	43/22	183
BO-62[3]	400 (204)	±2°C	56 (142)	30 (77)	60 (152)	76 (193)	46 (117)	86 (218)	58.3 (1,651)	230/460	65/33	183
BO-64[3]	400 (204)	±2°C	68 (173)	30 (77)	66 (168)	88 (224)	46 (117)	92 (234)	77.9 (2,206)	230/460	87/43	183
DOL-24A	400 (204)	±3°C	18 (46)	18 (46)	12 (31)	24 (61)	24.5 (63)	26 (67)	2.3 (66)	120/240	11.6/5.8	182
DOL-69A	400 (204)	±3°C	30 (77)	18 (46)	22 (56)	36 (92)	24.5 (63)	36.5 (93)	6.9 (196)	120/240	21.6/10.8	182
DOL-120A	400 (204)	±3°C	30 (77)	20 (51)	35 (89)	36 (92)	26.5 (68)	51.5 (131)	12.1 (340)	240	16.6	182
DOL-180A	400 (204)	±3°C	37 (94)	24 (61)	35 (89)	43 (110)	30.5 (78)	51.5 (131)	18.0 (510)	240	16.6	182
DOL-270A	400 (204)	±3°C	37 (94)	37 (94)	35 (89)	43 (110)	43.5 (111)	51.5 (131)	27.0 (765)	240	21.7	182
BO-323	400 (204)	±4°C	36 (91)	21 (53)	36 (91)	49 (124)	28 (71)	57 (145)	15.8 (447)	230/460	19/10	184
BO-333	400 (204)	±4°C	36 (91)	36 (91)	36 (91)	49 (124)	43 (109)	57 (145)	27.0 (764)	230/460	29/14	184
BO-343	400 (204)	±4°C	36 (91)	48 (122)	36 (91)	49 (124)	55 (140)	57 (145)	36.0 (1,019)	230/460	29/14	184
BO-110	450 (232)	±3°C	12 (30)	10 (25)	9 (22)	14 (36)	12 (30)	21 (53)	0.6 (17)	120	6.6	181
BO-120	450 (232)	±3°C	13 (33)	13 (33)	12 (30)	15 (38)	15 (38)	25 (64)	1.1 (31)	120	8.8	181
BO-130	450 (232)	±3°C	18 (46)	12 (30)	15 (38)	20 (51)	14 (36)	29 (74)	1.8 (51)	120	12.5	181
BO-140	450 (232)	±3°C	18 (46)	14 (36)	20 (51)	20 (51)	16 (41)	34 (86)	2.9 (82)	120	12.5	181
BO-350	450 (232)	±2.5°C	26 (66)	24 (61)	20 (51)	33 (84)	36 (91)	24 (61)	7.0 (198)	120	16	180
BO-350ER	450 (232)	±2°C	26 (66)	24 (61)	20 (51)	33 (84)	36 (91)	24 (61)	7.0 (198)	120	16	180
BO-355	450 (232)	±3°C	26 (66)	24 (61)	30 (76)	33 (84)	36 (91)	34 (86)	10.6 (300)	120	16	180
BO-355ER	450 (232)	±2°C	26 (66)	24 (61)	30 (76)	33 (84)	36 (91)	34 (86)	10.6 (300)	120	16	180
DOC-38	500 (260)	±2.5°C	19 (48)	18 (46)	19 (48)	28 (71)	25 (64)	35.5 (90)	3.7 (105)	120/240	16.5/9.4	182
DOC-67	500 (260)	±2.5°C	24 (61)	20 (51)	24 (61)	36 (91)	27 (69)	40.5 (103)	6.6 (187)	240	11.6	182
DOC-120	500 (260)	±2.5°C	24 (61)	24 (61)	36 (91)	36 (91)	31 (79)	52.5 (133)	12.0 (340)	240	18.3	182
DOC-180	500 (260)	±2.5°C	35 (90)	24 (61)	36 (91)	48 (122)	31 (79)	52.5 (133)	18.0 (510)	240	23.4	182
BO-550	550 (288)	±3.5°C	26 (66)	23 (58)	20 (51)	33 (84)	36 (91)	24 (61)	6.6 (187)	230	12.5	180
BO-550ER	550 (288)	±2.5°C	26 (66)	23 (58)	20 (51)	33 (84)	36 (91)	24 (61)	6.6 (187)	230	12.5	180
BO-61[3]	550 (288)	±3°C	50 (127)	30 (77)	54 (137)	70 (178)	46 (117)	80 (203)	46.9 (1,328)	230/460	65/33	183
BO-63[3]	550 (288)	±3°C	56 (142)	30 (77)	60 (152)	76 (193)	46 (117)	86 (218)	58.3 (1,651)	230/460	87/43	183
BO-65[3]	550 (288)	±3°C	68 (173)	30 (77)	66 (168)	88 (224)	46 (117)	92 (234)	77.9 (2,206)	230/460	109/55	183

[1] Other voltages and standard accessories available. [2] PO-23 Gas Oven has four chambers of indicated size. [3] Base dimensions shown, see listing in this section for dimensions as supplied.

BO-350

BO-355ER

BENCH OVENS

Bench Ovens offer quality standard features and a wide range of low-cost options. All are forced-air convection with double-wall steel construction, corrosion resistant aluminized steel interiors and a baked hammertone exterior finish. Popular models are stocked for immediate shipment. Full-width gasketed double doors feature high-impact "cool" handles, full-length piano hinges and 2in (51mm) of high-density mineral wool insulation. Ovens hold up to 11 shelves (17 for BO-355 models), adjustable on 1.5in centers, with capacity of 80lb (36kg) per shelf. Two standard shelves and a grounded 6ft (1.8m) cord with plug are included. Additional shelves are available as BOA-1.

"ER" series Bench Ovens feature a PID Microprocessor Controller with digital display for greater uniformity, repeatability and resolution. This precise microprocessor with a J-type thermocouple holds set temperatures accurately to ±1° F or C with improved chamber uniformity. Control features include large easy-to-read dual LED display in °C or °F units, showing both set and process temperatures. Autotune feature optimizes PID oven performance for various loads and applications. A versatile On/Off control mode allows fast recovery times and processing of batch-style loads.

A hydraulic thermostat controls standard models. A high/low heat switch controls heating and recovery rates for BO-350 and BO-550. Incoloy-sheathed heating elements have low watt density and large 7/16in diameter for long life. UL listed and CSA approved electrical components are 50/60Hz, single phase. Inquire for other electrical configuration.

Long-lasting stainless steel interior is factory-installed, and ordered by adding "S" to the model number. Bench Ovens can be stacked or mounted on matching BOA-3 Floor Stand or BOA-2 Floor Cabinet. BOA-5 Timer accessory shuts off oven at up to twelve hours and has continuous "hold" feature.

: PRODUCT SPOTLIGHT ::::::::::::

POPULAR ACCESSORIES FOR BENCH OVENS

Heavy-Duty Oven Shelf	BOA-1
Stainless Steel Oven Shelf	BOA-155
Floor Cabinet with 2 Sliding Shelves	BOA-2
Floor Stand with 1 Fixed Shelf	BOA-3
Exhaust Adapter for 3in (76mm) Pipe	BOA-4
12 Hour Timer	BOA-5[1]
Spirit Thermometer with Grommet	BOA-7[2]

[1] Also fits Lab Ovens, except BO-10R and BO-110. [2] Fits all Bench and Lab Ovens.

BENCH OVENS

Model	Uniformity	Max. Temp. °F (°C)	Chamber Capacity, ft³ (L)	Chamber Dimensions WxDxH, in (cm)	Product Dimensions WxDxH, in (cm)	Electrical Volts/Amps
BO-250	±2.5°C	300 (150)	7.0 (198)	26x24x20 (66x61x51)	33x36x24 (84x91x61)	115/9.2
BO-250ER	±2°C	300 (150)	7.0 (198)	26x24x20 (66x61x51)	33x36x24 (84x91x61)	115/9.2
BO-350	±2.5°C	450 (232)	7.0 (198)	26x24x20 (66x61x51)	33x36x24 (84x91x61)	120/16
BO-350ER	±2°C	450 (232)	7.0 (198)	26x24x20 (66x61x51)	33x36x24 (84x91x61)	120/16
BO-355	±3°C	450 (232)	10.6 (300)	26x24x30 (66x61x76)	33x36x34 (84x91x86)	120/16
BO-355ER	±2°C	450 (232)	10.6 (300)	26x24x30 (66x61x76)	33x36x34 (84x91x86)	120/16
BO-550	±3.5°C	550 (287)	6.6 (187)	26x23x20 (66x58x51)	33x36x24 (84x91x61)	230/12.5
BO-550ER	±2.5°C	550 (287)	6.6 (187)	26x23x20 (66x58x51)	33x36x24 (84x91x61)	230/12.5

BO-10R

BO-40

BO-140

LAB OVENS

Lab Ovens with gravity or forced convection models are competitively priced and offer exceptional value and reliability. Well-crafted and versatile, they are used for drying, testing, sterilizing, evaporating, heat treating and annealing. Their compact size means more efficient operation and smaller footprint. Models have temperature range to 450°F (232°C).

BO-10R and BO-110 have bimetallic thermostat controllers; others have hydraulic thermostats. Gravity convection models employ a special perforated heat shield which absorbs radiant heat and distributes it more evenly and include BOA-7 Spirit Thermometers for precise temperature monitoring. Forced air models maintain more uniform temperature via a special fan and air transfer plenum.

Forced air models also include a dual range °F/°C dial thermometer mounted in the door. Energy efficient, low-watt density Incoloy-sheathed elements are engineered into a compact design for quick run-up and recovery times.

Cabinet exteriors are painted light gray with a durable, scratch-resistant hammer-tone finish. Doors open with high impact thermoplastic handles. Cabinets have heavy steel double-wall construction. Interiors are made of corrosion-resistant aluminized steel, and insulated from the outer cabinet with one inch of high density mineral wool. Ovens are supplied with one fixed and two adjustable shelves. Extra shelves are available as accessories.

Quality UL and CSA recognized components are used in all models. The control panels feature an illuminated On/Off rocker switch and a heat/cycle pilot light. Standard models are equipped to operate 120V/60Hz electrical supplies and are supplied with cords and plugs. Lab Ovens can be ordered for 230V/50Hz operation by adding "F" to the model number.

LAB OVENS

Type	Model	Uniformity	Max. Temp. °F (°C)	Chamber Capacity, ft³ (L)	Chamber Dimensions WxDxH, in (cm)	Product Dimensions WxDxH, in (cm)	Electrical Volts/Amps	Shelf
Gravity Convection Lab Ovens	BO-10R	±3°C	450 (232)	0.7 (20)	12x10x10 (30x25x25)	14x12x17 (36x30x43)	115/5.2	BOA-30
	BO-20R	±3°C	450 (232)	1.3 (36)	13x13x13 (33x33x33)	15x15x21 (38x38x53)	120/6.3	BOA-31
	BO-30R	±3°C	450 (232)	2.0 (57)	18x12x16 (46x30x41)	20x14x25 (51x36x64)	120/10.5	BOA-32
	BO-40	±3°C	450 (232)	3.0 (85)	18x14x21 (46x36x53)	20x16x30 (51x41x77)	120/12.5	BOA-33
Forced Convection Lab Ovens	BO-110	±3°C	450 (232)	0.6 (17)	12x10x9 (30x25x22)	14x12x21 (36x30x53)	120/6.6	BOA-30
	BO-120	±3°C	450 (232)	1.1 (32)	13x13x12 (33x33x30)	15x15x25 (38x38x64)	120/8.8	BOA-31
	BO-130	±3°C	450 (232)	1.8 (52)	18x12x15 (46x30x38)	20x14x29 (51x36x74)	120/12.5	BOA-32
	BO-140	±3°C	450 (232)	2.9 (81)	18x14x20 (46x36x51)	20x16x34 (51x41x86)	120/12.5	BOA-33

DOL-270A

DOC-38 & DOC-120

DESPATCH ELECTRIC BENCH OVENS

All Despatch laboratory bench ovens feature digital microprocessor controllers, open-coil heater elements, and a five year warranty. Double-wall construction with glass fiber insulation and silicone door gaskets minimize heat loss. Exterior surfaces have scratch-resistant baked enamel coating and stainless steel interiors. Shelves are adjustable and can be repositioned every 2in (52mm). Two shelves are included.

Standard DOL series forced-convection ovens have single setpoint digital proportioning controller and rocker switches for power and heat. Maximum temperature is 400°F (204°C). Models with capacity 6.9ft³ (200L) and larger are supplied with two chamber doors. Forced air circulation from top mounted fan and side plenums allow rapid and effective heat distribution, permitting higher-density work loads. Chamber temperature uniformity is ±3° at 150°C. DOBA-2 Count-Down Timer for Standard DOL series shuts down heater at the end of each cycle time. Count-Down Timer range is 99.9 hours; range can be changed to 999, 9.99, or .999 hours or minutes.

Deluxe DOC series ovens have superior thermal uniformity and a forced-air convection system with an adjustable damper. They also feature the exclusive Despatch Protocol 3™ microprocessor controller system. This controller has self-diagnostic and calibrating capabilities, two levels of password security to protect program parameters and a recovery system for controlled responses to power failures. Oven can be set to operate at a single setpoint temperature, in timed cycles, or up to 255 total ramp and soak profile segments in up to 64 programs. Additional options allow control of multiple units from a remote PC. Large LED temperature display and 32-character LCD display of oven status and setpoints are easy to read and simplify programming. Control stability after calibration is ±0.5°C at 25°C. Oven uniformity is ±1° at 100°C.

Stands and Extra Shelves are available for bench ovens. Matching enameled-steel 22in (559mm) high stands allow placement of ovens on floor instead of bench tops. Stands have a support frame with one open shelf. Stacking Hardware is available to stack two similar ovens. DOL-24A model includes two standard shelves with 50lb (22kg) capacity. All other DOL series ovens include two heavy-duty shelves with 200lb (90kg) capacity. DOC series ovens include two standard-duty shelves with 50lb capacity. Inquire for heavy-duty reinforced shelves for DOC series models. Operates on 50Hz or 60Hz power supply. Some units are available in either 120V or 240V. 240V ovens will operate on a 208V electrical supply with approximately 25% reduction in heating output. Specify the voltage when ordering.

DESPATCH ELECTRIC BENCH OVENS

Type	Model	Max. Temp. °F (°C)	Uniformity	Chamber Capacity, ft³ (L)	Chamber Dimensions WxDxH, in (cm)	Product Dimensions WxDxH, in (cm)	Electrical Volts/Amps	Shelf	Base Stand
Standard	DOL-24A	400 (204)	±3°C	2.3 (66)	18x18x12 (46x46x31)	24x24.5x26 (61x63x67)	120 or 240[1]/11.6 or 5.8	DOLA-20	—
	DOL-69A	400 (204)	±3°C	6.9 (196)	30x18x22 (77x46x56)	36x24.5x36.5 (92x63x93)	120 or 240[1]/21.6 or 10.8[2]	DOLA-30A	DOLA-82
	DOL-120A	400 (204)	±3°C	12.1 (340)	30x20x35 (77x51x89)	36x26.5x51.5 (92x68x131)	240/16.6	DOLA-40A	DOLA-85
	DOL-180A	400 (204)	±3°C	18.0 (510)	37x24x35 (94x61x89)	43x30.5x51.5 (110x78x131)	240/16.7	DOBA-40A	DOLA-83
	DOL-270A	400 (204)	±3°C	27.7 (784)	37x37x35 (94x94x89)	43x43.5x51.5 (110x111x131)	240/21.7	DOBA-50A	DOLA-84
Deluxe	DOC-38	500 (260)	±2.5°C	3.7 (105)	19x18x19 (48x46x48)	28x25x35.5 (71x64x90)	120 or 240[1]/16.5 or 9.4	DOCA-20	DOCA-70
	DOC-67	500 (260)	±2.5°C	6.6 (187)	24x20x24 (61x51x61)	36x27x40.5 (91x69x103)	240/11.6	DOCA-30	DOCA-71
	DOC-120	500 (260)	±2.5°C	12.0 (340)	24x24x36 (61x61x91)	36x31x52.5 (91x79x133)	240/18.3	DOCA-40	DOCA-72
	DOC-180	500 (260)	±2.5°C	18.0 (510)	35x24x36 (90x61x91)	48x31x52.5 (122x79x133)	240/23.4[2]	DOCA-50	DOCA-73

[1] Specify desired voltage. [2] Oven is not supplied with cord and plug, and must be hard-wired into electrical supply.

BO-60EB

PO-23

LARGE CABINET OVENS

- **High Volume Gas or Electric Ovens.**
- **Capacities up to 78ft³ (2.206L)**
- **Ovens supplied in 230V or 460V.**
- **Temperatures up to 400°F (204°C) or 550°F (288°C).**

Extra-large 47—78ft³ capacity Cabinet Ovens have convenient double-door access to 30in (762mm) deep shelves. The exterior depth is 46in (1,168mm) for efficient use of floor space. Choose models with operating temperatures to 400°F (204°C) or 550°F (288°C) maximum. Control accuracy is ±0.3% and uniformity is ±2°C (±4°F) for 400°F models and ±3°C (±6°F) for 550°F models. All have forced horizontal air flow. Two reinforced 100lb (45.5kg) capacity nickel-plated wire shelves are supplied, and the 6in (152mm) support centers accommodate eight to ten shelves depending on model. An LED indicating temperature controller is provided.

Cabinet Ovens have 4in (102mm) of insulation between type 304 stainless steel interior walls and enameled steel exterior. The UL-listed side access control panel houses the digital controller, blower control push-button, On/Off heat switch, adjustable over-temperature control and pilot lights. Heaters are shut off if blower fails, and the 1hp blower can be run without the heater for cooling.

Construction includes explosion-venting latches, silicone rubber door gaskets, adjustable air intake and exhaust dampers, adjustable interior ductwork louvers to balance air flow and built-in baffles to prevent radiant heat. Order Model BOA-46 Shut-Down Timer accessory to turn off ovens at a preset time. Model BOA-48 Operation Timer rings bell at end of preset time until door is opened or timer is reset. Specify 1, 5, 10, or 30 hour range when ordering either timer accessory.

To specify operating voltage for Electric Ovens, add "EB" to model number for 230V/three phase, or "EC" for 460V/three phase. All units operate on 60Hz current. Inquire for 50Hz models. For Gas Ovens, add "GB" to model number to specify 230V/three phase or "GC" for 460V/three phase.

LARGE CABINET OVENS

Model	Max. Temp. °F (°C)	Uniformity	Chamber Capacity, ft³ (L)	Chamber Dimensions WxDxH, in (cm)	Product Dimensions[1] WxDxH, in (cm)	Shelf
BO-60	400 (204)	±2°C	46.9 (1,328)	50x30x54 (127x77x137)	70x46x80 (178x117x203)	BOA-70
BO-62	400 (204)	±2°C	58.3 (1,651)	56x30x60 (142x77x152)	76x46x86 (193x117x218)	BOA-71
BO-64	400 (204)	±2°C	77.9 (2,206)	68x30x66 (173x77x168)	88x46x92 (224x117x234)	BOA-72
BO-61	550 (288)	±3°C	46.9 (1,328)	50x30x54 (127x77x137)	70x46x80 (178x117x203)	BOA-70
BO-63	550 (288)	±3°C	58.3 (1,651)	56x30x60 (142x77x152)	76x46x86 (193x117x218)	BOA-71
BO-65	550 (288)	±3°C	77.9 (2,206)	68x30x66 (173x77x168)	88x46x92 (224x117x234)	BOA-72

[1] Add 10in width to allow for blower and control panel on right side. For Gas models, add additional 15in to left side for burner.

PEERLESS GAS OVEN

The PO-23 Peerless Gas Oven is a four-deck unit with 120°—288°C (250°—550°F) range for drying of large samples. The oven is for use with natural or LP gas (specify at time of order), and has 60,000Btu/HR input for fast, efficient operation. Included Low Temperature System device allows accurate temperature control in the 66°—260°C (150°—500°F) range for sensitive materials.

Construction includes steel doors, enameled exterior, sturdy steel shelf decks and aluminized interior liners. Oven is supplied for natural gas with 5in (127mm) direct vent connection. If directly venting, order POA-10 Flue Diverter. This unit may also be vented under a canopy hood. **Product Dimensions:** 41.5x27x61in (1,054x686x1,549mm), WxDxH. **Chamber Dimensions:** 33x22x7.5in (838x559x191mm), WxDxH for each chamber.

PEERLESS GAS OVEN

Peerless Gas Oven PO-23

Accessories

Flue Diverter..... POA-10

BO-333

OT-2

BUDGET HI-CAPACITY OVENS

Budget Hi-Capacity Ovens offer unusually high capacity and efficient operation at affordable prices. These forced convection electric bench ovens operate to 400°F (204°C) with ±0.5% control accuracy and ±4°C (±8°F) uniformity for rapid drying of large sample loads. Ovens may be used on the bench or ordered with a 24in (610mm) high Stand Kit for most convenient working height. Two 50lb (23kg) capacity nickel-plated wire shelves fit any of ten support channels on 3in centers; order extra shelves as needed. Smallest model BO-323 is designed to fit through a 30in (762mm) wide door.

All Budget Hi-Capacity models have double doors and 2in (51mm) rockwool insulation between type 304 stainless steel interior walls and enameled steel exterior. The UL-listed side access control panel has a thermocouple-actuated temperature controller, blower controls, On/Off heat switch, adjustable oven-temperature controller and pilot lights. Heaters shut off if blower fails, and the 1/3hp blower can be run without the heater for cooling. Adjustable air intake and exhaust dampers are provided. Construction includes explosion venting latches, silicone rubber door gaskets and incolloy-sheathed tubular heating elements with built-in baffle to prevent radiant heat.

The BOA-46 Shut Down Timer accessory turns off oven at a preset time and has "hold" feature for continuous operation. The BOA-48 Operation Timer rings bell at end of preset time until door is opened or timer is reset. When ordering BOA-46 or BOA-48 timers specify 1, 5, 10, or 30 hour. Extra shelves are also available. Stand Kits are shipped separately and require assembly; other accessories are factory installed.

BUDGET HI-CAPACITY OVENS

Model[1]	Chamber Capacity, ft³ (L)	Chamber Dimensions WxDxH, in (cm)	Product Dimensions[2] WxDxH, in (cm)	Stand Kit	Shelf
BO-323	15.8 (447)	36x21x36 (91x53x91)	49x28x57 (124x71x145)	BOA-40	BOA-50
BO-333	27 (764)	36x36x36 (91x91x91)	49x43x57 (124x109x145)	BOA-41	BOA-51
BO-343	36 (1,019)	36x48x36 (91x122x91)	49x55x57 (124x140x145)	BOA-42	BOA-52

[1] Add letter suffix to model number to specify electrical characteristics desired: "A" suffix, 230V/60Hz/single phase; "B" suffix, 230V/60Hz/three phase; "C" suffix, 460V/60Hz/three phase. Other electrical characteristics quoted on request. [2] Dimensions include 10in (25cm) for blower motor on top of case, and 9in (23cm) control panel on right side.

AIR DRYING OVEN

ASTM D197, D421, D558, D559, D698, D2013, D3302, E605; AASHTO T 87, T 99, T 146, T 180

Designed originally for coal drying, the OT-2 Air Drying Oven has proven useful for drying soil and fire-proofing samples as well as other procedures calling for air drying at lower temperatures. While the 105°F (41°C) maximum oven temperature is below 140°F (60°C) allowed for some other soil procedures, drying is still rapid and efficient because of the high air flow of 1 to 4 air changes per minute.

The large 30ft³ chamber measures 35.75x22.5x64in (908x572x1,626mm), WxDxH to accommodate large drying pans. The six shelves provided adjust on 2in (51mm) centers. Entering air passes over the 2,000 watt heating element to the rear plenum for distributed horizontal flow through the chamber and out the holes in the front door. Two separate 24 hour timers are included for heater and fan control, so the unit may be run with unheated air circulation if desired. The solid state temperature controller has digital chamber display with switch to read or set the setpoint temperature. Required power is 20 amps at 115V. Heat-up time is 30 minutes or less. **Product Dimensions:** 36x29.75x78in (914x756x1,981mm), WxDxH.

AIR DRYING OVEN

Air Drying Oven, 115V/60Hz OT-2
230V/50Hz OT-2F

LABORATORY MUFFLE FURNACES

Gilson Laboratory Muffle Furnaces have chamber capacities from 242—5,841in³ (3.9—95.7L). The 242in³ models have 2,350°F (1,287°C) maximum temperature; other models are 2,000°F (1,093°C). All models have chambers with minimum 2-1/2in (64mm) of refractory firebrick enclosed in heavy-gauge painted steel cases. Heating elements mounted in the firebrick are easily accessible for maintenance. All models are supplied with a cord and plug. Models with side-hinged door have a manual door latch and are UL and Canadian UL approved. MF-4A, MF-6A, and MF-8A drop-front door models have a counterweight to hold door closed. The inside surface of drop doors provides convenient space for loading/unloading. Power to heating elements is interrupted when the door is open.

Manual Control models have indicating pyrometer with a needle temperature indicator accurate to ±2% of reading. The pyrometer is supplied with a chromel-alumel thermocouple. These furnaces are ideal for single-point operation or where manual adjustments to temperature are acceptable. The percent input knob on the furnace manually adjusts output to control temperature.

Automatic Digital Control furnaces feature precise programming, control and digital display at costs well below competitive units. The electronic controller displays temperatures to the nearest degree in °F or °C. The display also provides alphanumeric prompts for easy programming and operation via the membrane keypad. Up to four programs can be stored in nonvolatile memory. The first program can store up to 18 segments, and the other three programs can store up to ten segments each. An audible temperature alarm or delayed start time can be programmed. An advanced Type K thermocouple probe with protective metal sheath senses temperatures.

MF-4A

MF-4

MF-8A

MF-2

LABORATORY MUFFLE FURNACES

Model	Max. Temp. °F (°C)	Controller	Chamber Capacity, in³ (L)	Chamber Dimensions WxDxH, in	Product Dimensions WxDxH, in	Electrical Volts/Amps/Watts
MF-2	2,350 (1,287)	Manual	242 (3.96)	6x6x6.3 (152x152x159)	11x15x18 (279x381x457)	115/12/1,440
MF-2F	2,350 (1,287)	Manual	242 (3.96)	6x6x6.3 (152x152x159)	11x15x18 (279x381x457)	230/6/1,440
MF-2A	2,350 (1,287)	Automatic Digital	242 (3.96)	6x6x6.3 (152x152x159)	11x15x18 (279x381x457)	115/12/1,440
MF-2AF	2,350 (1,287)	Automatic Digital	242 (3.96)	6x6x6.3 (152x152x159)	11x15x18 (279x381x457)	230/6/1,440
MF-4	2,000 (1,093)	Manual	673 (11)	8.5x9x8.8 (216x229x224)	14x18x20.5 (356x457x521)	115/14/1,680
MF-4F	2,000 (1,093)	Manual	673 (11)	8.5x9x8.8 (216x229x224)	14x18x20.5 (356x457x521)	230/7/1,680
MF-4A	2,000 (1,093)	Automatic Digital	673 (11)	8.5x9x8.8 (216x229x224)	14x18x20.5 (356x457x521)	115/14/1,692
MF-4AF	2,000 (1,093)	Automatic Digital	673 (11)	8.5x9x8.8 (216x229x224)	14x18x20.5 (356x457x521)	230/7/1,692
MF-6	2,000 (1,093)	Manual	1,537 (25.2)	13x13.5x8.8 (330x343x224)	18.25x22.5x20.5 (464x572x521)	230/13/3,120
MF-6A	2,000 (1,093)	Automatic Digital	1,537 (25.2)	13x13.5x8.8 (330x343x224)	18.25x22.5x20.5 (464x572x521)	230/13/3,120
MF-8A	2,000 (1,093)	Automatic Digital	5,841 (95.7)	21x21x13.3 (533x533x338)	37.5x30x23 (953x762x584)	230/30/7,200

MF-7910

MF-8020

MF-6010

MUFFLE FURNACES

Laboratory furnaces from Thermolyne are used for ashing, ignition tests, gravimetric analyses, and volatile matter determinations. For construction materials, furnaces are used for tests of soils, aggregates, and cement. All have rugged components and top quality materials to assure longest service life. Select from standard digital, single set-point, or programmable controllers.

The standard digital control displays chamber temperature until the push to set temperature button is pressed. The display then indicates set-point temperature until released. Models with single set-point control ramp directly to the set-point and dwell at that temperature. The display shows actual temperature or set-point. Furnaces with this control also feature over-temperature protection. Programmable controllers operate like single set-point controllers, except they can be programmed to ramp up or down as well as to dwell for constant temperature periods. These models also feature over-temperature protection. MF-6020 has 2-ramp/2-dwell program capability. All single set-point and programmable controllers have 0.3in (7.6mm) LED digital displays in either °C or °F.

All models have multiple elements in sides, tops, and/or bottoms. Since doors and backs have no elements, only the center two-thirds of the chamber is considered uniform in temperature and chamber size should be selected accordingly. MF-1310 and MF-1315 have ceramic fiber insulation for faster heat-up and reduction of energy consumption. All furnaces are equipped with safety interlock door switches. Power to the elements is automatically cut off when the door is opened. The MF-6020 must be hardwired on installation, all other furnaces are supplied with a cord and plug. All models operate on either 50Hz or 60Hz power supply.

also available

See our listings for the MA-196 Crucible Tongs and SE-31 Heat-Resistant Gloves listed separately in the Pans, Tools and Glassware section.

MUFFLE FURNACES

Model	Max. Temp. °F (°C)	Controller	Chamber Capacity, in^3 (L)	Chamber Dimensions WxDxH, in	Product Dimensions WxDxH, in	Electrical Volts/Amps/Watts
MF-1310	2,012 (1,100)	Digital	76 (1.2)	4x5x3.8 (102x127x97)	9x13x14 (236x330x356)	240/4.4/1,060
MF-1315	2,012 (1,100)	Digital	76 (1.2)	4x5x3.8 (102x127x97)	9x13x14 (236x330x356)	120/8.9/1,060
MF-7910	2,192 (1,200)	Digital	120 (2)	5x6x4 (127x152x102)	11.3x15.5x18.5 (287x394x470)	240/4.2/1,000
MF-7915	2,192 (1,200)	Digital	120 (2)	5x6x4 (127x152x102)	11.3x15.5x18.5 (287x394x470)	120/8.3/1,000
MF-8010	2,192 (1,200)	Digital	350 (5.7)	7x10x5 (178x254x127)	13.3x19.5x19 (338x495x483)	240/7.5/1,800
MF-8015	2,192 (1,200)	Digital	350 (5.7)	7x10x5 (178x254x127)	13.3x19.5x19 (338x495x483)	120/15/1,800
MF-8020	2,192 (1,200)	Single Set	350 (5.7)	7x10x5 (178x254x127)	13.3x19.5x19 (338x495x483)	240/7.5/1,800
MF-8025	2,192 (1,200)	Single Set	350 (5.7)	7x10x5 (178x254x127)	13.3x19.5x19 (338x495x483)	120/15/1,800
MF-6010	2,192 (1,200)	Digital	864 (14.2)	12.8x10x6.8 (325x254x173)	19.1x20.1x21 (485x510x533)	240/12.9/3,095
MF-6020	2,192 (1,200)	Programmable	864 (14.2)	12.8x10x6.8 (325x254x173)	19.1x20.1x21 (485x510x533)	240/18.3/4,400

MA-1807

MA-1827

MA-839

MA-812

MA-290

TEMPERATURE ACCESSORIES

TEMPERATURE ACCESSORIES			
Description	**Model**	**Maximum Temperature, °F (C°)**	**Dimensions in (mm)**
Thermolyne Cimarec® Hot Plates feature digital displays with settings adjustable in 5°C (9°F) increments. Microprocessor-controlled feedback maintains accurate, consistent temperatures. Hot-surface alert system warns of high temperatures regardless of On/Off status. Ceramic heating plate is easy to clean and resistant to most chemicals. Low-profile aluminum housing prevents fluid spills into electronics. Large wire-wound mica heating element assures fast, even heat up. Model with magnetic stirrer uses ceramic drive magnet and stepless control for quiet, reliable operation. Patented Stir-Trac Technology provides exceptional slow-speed stirring and immediate braking. A 2x3/8in (51x10mm) Teflon-coated stir bar is included with MA-1827. Models operate on 120V/60Hz. Add "F" suffix for models that operate on 220-240V, 50/60Hz power supplies.			
Hot Plate, 1,060 Heating Watts	MA-1807	1,004 (540)	13x8.3x3.9
Magnetic Stirring Hot Plate, 60 to1,200rpm,1,060 Heating Watts	MA-1827	1,004 (540)	13x8.3x3.9
Electric Ranges with one or two element heavy-duty burner plates are ideal for laboratory heating/drying applications where precise temperature control is not required. High quality commercial grade cast iron elements are built for long service life and stand up to daily use. Single-burner MA-838 is rated at 1,300 watts and 11amp operation for quick warm-up and heat retention. Double-burner MA-839 has one 1,300 watt and one 500 watt burner for lower temperature warming and drying with 15amp draw. Adjustable thermostatic heat controls have On and Ready indicator lights. Brushed stainless steel case and non-slip rubber feet allow safe operation and low maintenance. 120V, 60Hz.			
Electric Range, Single-Burner, 120V/60Hz	MA-838	-	11x12.25x3.25
Electric Range, Double-Burner, 120V/60Hz	MA-839	-	19.75x12.25x3.25
Propane Hot Plates are ideal for remote applications. Cast metal construction is rugged enough for reliable operation in the most demanding field conditions. Single and Double Burner Heavy-Duty models weigh 21.5 and 53lb (9.8 and 24kg) respectively, and have 35,000 BTU rating for each burner. Economy models have 15,000 btu burners and weigh 9.5 and 18lb (4.3 and 8.1kg) each. All operate on standard propane cylinders connected to the 3/8in (9.5mm) male flare fitting. Each Hot Plate requires a Low-Pressure (11in Water Column) Regulator, purchased separately with either POL or Type 1 tank connectors. Regulators include 5ft (1.5m) length of U.L. listed LPG hose with a 3/8in (9.5mm) female flare swivel.			
Single Burner Economy Propane Hot Plate	MA-812	-	10.5x11.5x5.75
Double Burner Economy Propane Hot Plate	MA-814	-	20.5x11.5x5.75
Single Burner Heavy-Duty Propane Hot Plate	MA-816	-	13x13x7.5
Double Burner Heavy-Duty Propane Hot Plate	MA-818	-	27x13x7.5
Low Pressure Regulator w/POL Connector	MAA-181	-	-
Low Pressure Regulator w/Type 1 Connector	MAA-182	-	-
Heat Gun Driers are industrial-duty and ideal for use on soil and aggregate samples. Versatile design allows hand-held or bench-top operation on a nonslip, removable base. Heating elements are reinforced mica-insulated ceramic and the housing is sturdy die-cast aluminum. The 1.19in (30mm) diameter heat nozzle rotates and locks over 90°. Maximum air volume is 23cfm (651L/min) at 3,000ft/min (914m/min) velocity. An adjustable air intake shutter controls air temperature. Models operate on 120V/60Hz power supply and are UL listed and CSA approved. Add "F" suffix for models that operate on 220-240V/50Hz.			
Standard Dryer, 600Watts	MA-290	300 (149)	10x5.25x9.5
High-Temperature Dryer, 1,440 Watts	MA-291	500 (260)	10x5.25x9.5

TEMPERATURE ACCESSORIES

MAA-90

MA-234

MA-324

TEMPERATURE ACCESSORIES				
Description	**Model**	**Range**	**Division**	**Dimensions in (mm)**
Thermometer Well provides temperature stability when checking and calibrating laboratory ovens. The solid aluminum block with machined internal well protects 1/4in (6.4mm) dia. glass thermometers, transfers heat efficiently, and maintains constant temperature when oven doors are opened. The large square cross-section is stable on most oven shelves.	MAA-90	—	—	4x0.75 (105x19)
Traceable® Printing Thermometer This thermometer provides permanent, hard copy documentation and full-time monitoring for today's stringent quality-control requirements. Automatic printing for the two channels may be programmed to print date, time and temperature in any interval from 3 seconds to 24 hours. Exclusive alarm feature sounds when temperature exceeds set points and may be set up to trigger an external device. Dual inputs display temperatures for probe 1, probe 2, or the differential between 1 and 2. Thermometer accepts Type J, K, T or E probes. Minimum, maximum and average temperature memories may be displayed or cleared at any time with the touch of a button. An individually serial numbered NIST traceable certificate is provided from an A2LA accredited calibration laboratory. Supplied with two 48in (1.2M) Type K beaded sensors, six AAA batteries, two thermal paper rolls and ABS plastic case. MAA-176 AC Adapter allows for continuous AC operation.		-328°—2,431°F (-200°—1,333°C)	0.1°	8x1.25x3.5 (203x32x89)
Traceable® Printing Thermometer	MA-234			
Replacement Printing Paper Rolls, pkg. 6	MAA-175			
AC Adapter, 115V/60Hz	MAA-176			
4-Channel Data Logging Thermometer displays data from four probes simultaneously in °C or °F. Uses any standard Type K thermocouple. Features automatic shut-off, auto ranging, Max/Min and hold functions. Up to 16,000 data points can be downloaded to PC with included RS-232 cable and software. Includes foam-lined case, two beaded-wire probes, and 9V battery. MAA-227 AC adapter allows for continuous AC operation. A plastic, water-resistant pouch and bench-top mounting tripod are also available. For NIST traceable certificate, add "C" to the model number. Accuracy is ±0.5% of reading +1°C/2°F.		Temperature -328°—2,498°F (-200°—1,370°C)	0.1° below 200°F and 1° above 200°F	2.5x1.25x7.25 (64x30x184)
4-Channel Data Logging Thermometer	MA-324			
AC Adapter, 115V/60Hz	MAA-227			
Water-Resistant Pouch	MAA-228			
Bench-Top Tripod	MAA-229			

SCALE & BALANCE SELECTION GUIDE (120G—12,000G)

SCALE & BALANCE SELECTION GUIDE (120g—12,000g)

Capacity g / lb	Readability g / lb	RS-232	Weigh-Below	Brand	Model	Page
ELECTRONIC						
120	0.0001/—	•	•	Ohaus	OBX-124	194
120	0.01/—	OPT	—	A&D	AD-122	196
150	0.005/—	•	•	Adam	CP-301	196
210	0.01/—	OPT	—	A&D	AD-202	196
220	0.0001/—	•	•	Ohaus	OBX-224	194
220	0.001/—	•	•	Ohaus	OBX-223	194
220	0.001/—	•	•	Ohaus	OBD-223	195
300	0.01/—	•	•	Adam	CP-303	196
310	0.01/—	OPT	—	A&D	AD-302	196
320	0.0001/—	•	•	Ohaus	OBX-324	194
410	0.01/—	OPT	—	A&D	AD-402	196
420	0.001/—	•	•	Ohaus	OBX-423	194
600	0.01/—	•	•	Adam	CP-306H	196
600	0.02/—	•	•	Adam	CP-306	196
610	0.01/—	OPT	—	A&D	AD-602	196
620	0.001/—	•	•	Ohaus	OBX-623	194
620	0.01/—	•	•	Ohaus	OBD-622	195
1,000	0.01/—	•	•	Adam	CP-310	196
1,100	0.001/—	•	•	Ohaus	OBX-911	194
1,200	0.1/—	•	OPT	Adam	AD-1200E	195
1,500	0.01/—	OPT	OPT	A&D	AD-154	196
1,500	0.05/—	•	•	Adam	CP-315	196
1,520	0.01/—	•	•	Ohaus	OBD-152	195
2,000	0.1/—	•	OPT	Adam	AD-2000E	195
2,100	0.01/—	OPT	OPT	A&D	AD-214	196
2,200	0.01/—	•	•	Ohaus	OBX-922	194
3,000/6	0.01/0.00002	•	•	Ohaus	OB-132H	190
3,000/6	0.05/0.0001	•	•	Ohaus	OB-132	190
3,000	0.1/—	•	OPT	Adam	AD-3000E	195
3,000	0.1/—	•	•	Adam	CP-330	196
3,100	0.01/—	OPT	OPT	A&D	AD-314	196
4,000/8	0.1/0.0002	•	OPT	Adam	CP-36	192
4,100	0.01/—	OPT	OPT	A&D	AD-414	196
4,200	0.01/—	•	•	Ohaus	OBX-942	194
4,200	0.01/—	•	•	Ohaus	OBD-421	195
4,200	0.1/—	•	•	Ohaus	OBD-422	195
6,000/15	0.02/0.00005	•	•	Ohaus	OB-133H	190
6,000/15	0.1/0.0002	•	•	Ohaus	OB-133	190
6,000	1.0/—	•	OPT	Adam	AD-6000E	195
6,000/13	2.0/0.005	•	—	Adam	CP-6	193
6,000/13	2.0/0.005	•	—	Adam	CP-7	192
6,100	0.01/—	OPT	OPT	A&D	AD-614	196
6,200	0.01/—	•	•	Ohaus	OBX-961	194
6,200	0.1/—	•	•	Ohaus	OBX-962	194
8,000/16	0.2/0.0005	•	OPT	Adam	CP-312	192
8,200/16	0.1/—	•	•	Ohaus	OBD-821	195
10,000/25	1.0/0.002	•	—	Ohaus	OB-505	191
10,200	0.01/—	•	•	Ohaus	OBX-101	194
10,200	0.1/—	•	•	Ohaus	OBX-102	194
12,000/26	0.1/0.0005	•	OPT	A&D	AD-12KA	190
12,000/26	0.1/0.0005	•	•	Ohaus	OBX-512	192
12,000	1.0/—	•	OPT	A&D	AD-12KE	195

OPT= Optional

SCALE & BALANCE SELECTION GUIDE (15,000G—300,000G)

SCALE & BALANCE SELECTION GUIDE (15,000g—300,000g)

Capacity g / lb	Readability g / lb	RS-232	Weigh-Below	Brand	Model	Page
ELECTRONIC						
15,000/30	0.2/0.005	•	•	Ohaus	OB-134	190
15,000/30	0.1/0.0002	•	•	Ohaus	OB-134H	190
15,000/33	5.0/0.01	•	—	Adam	CP-15	193
15,000/33	5.0/0.01	•	—	Adam	CP-16	192
16,000/35	0.5/0.001	•	OPT	Adam	CP-335	192
21,000/46	0.1/0.0005	•	OPT	A&D	AD-20KA	190
24,000/52	0.1/0.0005	•	•	Ohaus	OBX-524	192
25,000/50	2.0/0.005	•	—	Ohaus	OB-510	191
30,000/66	5.0/0.01	•	—	Ohaus	OB-60	191
31,000/68	0.1/0.0005	•	OPT	A&D	AD-30KA	190
30,000/60	2.0/0.005	OPT	—	A&D	AD-60PA	193
30,000/60	2.0/0.005	OPT	—	A&D	AD-61P	193
32,000/70	1.0/0.002	•	OPT	Adam	CP-365	192
35,000/70	0.1/0.002	•	•	Ohaus	OB-135H	190
35,000/70	0.5/0.001	•	•	Ohaus	OB-135	190
35,000/77	0.1/0.0005	•	•	Ohaus	OBX-535	192
35,000/75	10.0/0.02	•	—	Adam	CP-35	193
35,000/75	10.0/0.02	•	—	Adam	CP-46	192
41,000/90	0.5/0.002	•	OPT	A&D	AD-40KA	190
48,000/100	2.0/0.005	•	OPT	Adam	CP-3100	192
50,000/100	5.0/0.01	•	—	Ohaus	OB-515	191
60,000/132	10.0/0.02	•	—	Ohaus	OB-160	191
60,000/132	10.0/0.02	•	—	Ohaus	OB-160L	191
60,000/150	5.0/0.01	OPT	—	A&D	AD-150PA	193
60,000/150	5.0/0.01	OPT	—	A&D	AD-151P	193
61,000/134	1.0/0.005	•	OPT	A&D	AD-60KA	190
75,000/165	20.0/0.05	•	—	Adam	CP-75	193
75,000/165	20.0/0.05	•	—	Adam	CP-76	192
100,000/250	10.0/0.02	•	—	Ohaus	OB-520	191
101,000/222	1.0/0.05	•	OPT	A&D	AD-101KA	190
150,000/300	10.0/0.02	OPT	—	A&D	AD-300PA	193
150,000/300	10.0/0.02	OPT	—	A&D	AD-301P	193
150,000/300	20.0/0.05	•	—	Ohaus	OB-300	191
150,000/300	20.0/0.05	•	—	Ohaus	OB-300L	191
150,000/330	50.0/0.1	•	—	Adam	CP-150A	193
150,000/330	50.0/0.1	•	—	Adam	CP-151	192
200,000/400	10.0/0.02	OPT	—	A&D	AD-401P	193
200,000/440	50.0/0.1	•	—	Adam	CP-200	193
200,000/440	50.0/0.1	•	—	Adam	CP-201	192
250,000/500	20.0/0.05	•	—	Ohaus	OB-525	191
300,000/660	50.0/0.01	•	—	Ohaus	OB-600	191
MECHANICAL						
310	0.01/—	—	—	Ohaus	OB-310	198
311	0.01/—	—	—	Ohaus	OB-311	198
610[1]	0.1/—	—	•	Ohaus	OB-760	197
610[1]	0.1/—	—	•	Ohaus	OB-1650	197
3,000[2]	10.0/—	—	•	Marcy	CS-10	198
3,000[2]	10.0/—	—	•	Marcy	CS-10W	198
16,000	5.0/—	—	—	Ohaus	OB-2400M	198
—/36	—/0.1	—	—	Ohaus	OB-2400P	198
20,000	1.0/—	—	—	Ohaus	OB-1119	197
—/60	—/0.1	—	•	Pelouze	CS-60	198

[1] Expandable to 2,610g. [2] Pulp Density Scale range = 1.2—7.8 specific gravity. OPT = Optional

AD-12KA
Swing-Arm Up

AD-12KA
Swing-Arm Down

A&D INDUSTRIAL HIGH CAPAPCITY BALANCES

This unique high-capacity line is rugged enough for industrial use, yet has precision laboratory balance accuracy. As a bench scale, the swing-arm display pivots instantly for reading at eye level from bench-top level. The large platform size, weighing capacities, and sturdy base permit alternate use as a floor model since the display pivots up and safely away from loading/unloading activities.

Construction includes die-cast aluminum body with 13.5x15.1in (344x384mm), WxD stainless steel platform. Digital displays are vacuum fluorescent and easily readable in any light. The entire balance is washdown IP-65/NEMA4 rated. Features automatic self-calibration with internal calibration mass. Twelve weighing unit modes are possible. All models are ISO 9000 certified. Built-in WinCT™ data collection software is included with the balance. For weigh-below applications, order the Hook accessory indicated in the table below.

A&D INDUSTRIAL HIGH CAPACITY BALANCES

Model	Capacity x Readability g (lb)	Precision (Std. Dev.), g	Weigh-Below Hook
AD-12KA	12,000 x 0.1 (26 x 0.0005)	±0.1	ADA-4A
AD-20KA	21,000 x 0.1 (46 x 0.0005)	±0.1	ADA-4A
AD-30KA	31,000 x 0.1 (68 x 0.0005)	±0.1	ADA-4A
AD-40KA	41,000 x 0.5 (90 x 0.002)	±0.5	ADA-4A
AD-60KA	61,000 x 1.0 (134 x 0.005)	±0.7	ADA-6A
AD-101KA	101,000 x 1.0 (222 x 0.005)	±1.0	ADA-6A

NEW! Ship Weight Index

The Estimated Ship Weight for every product is easy to find in the NEW Ship Weight Index!

OB-132

OB-134

OHAUS RANGER® 7000 COMPACT BENCH SCALES

Ohaus Ranger® 7000 series Compact Bench Scales are built for demanding industrial applications and feature a wide range of capacities and advanced weighing applications, as well as a choice between standard and high-resolution models. Functions for weigh-below density, percent weighing, differential weighing, filling and more reduce the need for manual calculations. Column-mounted display, rechargeable lithium battery and printer add to the versatility of these sturdy models.

Easy to operate controller/display features a keypad with controls for data input and functions and a 4.3in (109mm) graphic display with bright backlighting. Display has stability and overload indicators. Operation is configured with just a few button presses and is powered by exclusive Ohaus SmarText 2.0 software. Standard weighing units include pounds, ounces, grams and kilograms. Level indicator and adjustable leveling feet make set up fast and easy. A weigh-below hook for suspended weights is standard. Data ports for both USB and RS232 connections are also included, insuring quick and easy transfer of data to PC or printer. The base and indicator housing are rugged die-cast metal and the platform is stainless steel. Ranger 7000 models with "H" suffix have higher resolution for greater sensitivity as well as the exclusive Auto-Cal function, to automatically recalibrate the balance daily or when a significant temperature change is detected.

OHAUS RANGER® 7000 COMPACT BENCH SCALES

Model	Capacity x Readability g (lb)	Precision (Std. Dev.), g	Platform Size in (mm)
OB-132	3,000 x 0.05 (6 x 0.0001)	±0.1	11x11 (280x280)
OB-133	6,000 x 0.1 (15 x 0.0002)	±0.2	11x11 (280x280)
OB-134	15,000 x 0.2 (30 x 0.005)	±0.4	14.8x12.2 (377x311)
OB-135	35,000 x 0.5 (70 x 0.001)	±1.0	14.8x12.2 (377x311)
OB-132H	3,000 x 0.01 (6 x 0.00002)	±0.02	11x11 (280x280)
OB-133H	6,000 x 0.02 (15 x 0.00005)	±0.04	11x11 (280x280)
OB-134H	15,000 x 0.1 (30 x 0.002)	±0.2	14.8x12.2 (377x311)
OB-135H	35,000 x 0.1 (70 x 0.002)	±0.2	14.8x12.2 (377x311)

Accessories

Rechargeable Battery	OBA-42
Impact Printer	OBA-44
Column Kit for Display	OBA-46

OB-525

OB-60

OHAUS DEFENDER™ 5000 SQUARE BENCH SCALES

Gilson offers electronic Ohaus Defender™ 5000 Square Bench Scales in five different capacities ranging from 25—500lb (10—250kg) and three different platform sizes to best match your application.

The Defender 5000 series features the Ohaus T51P indicator in ABS plastic housing with 1in (25.4mm) LCD display and backlight for increased readability. This display operates on six alkaline C batteries or the included AC adapter. Multiple weighing modes include counting, percent, dynamic (animal), check-weighing and display hold. Standard units displayed are kg, g, lb, oz, lb:oz, and tonnes. The indicators have a bidirectional RS-232 interface and four-key membrane keypad.

The rugged painted steel base frames with stainless steel pans have 150% safe overload capacity. The scales are easily set by user to conform to NTEP requirements. All are factory calibrated. On-site calibration is recommended at installation and regularly thereafter.

These models operate on 100—240V, 50 or 60Hz, universal AC power supply. Inquire for printers, cables and other data accessories. Gilson recommends Calibration Mass, Class F cast iron with handles for lifting.

OHAUS DEFENDER™ 5000 SQUARE BENCH SCALES

Model	Capacity x Readability kg (lb)	Precision (Std. Dev.), g	Platform Size in (mm)
OB-505	10 x 0.001 (25 x 0.002)	±1.0	12x12 (305x305)
OB-510	25 x 0.002 (50 x 0.005)	±2.0	12x12 (305x305)
OB-515	50 x 0.005 (100 x 0.01)	±5.0	18x18 (457x457)
OB-520	100 x 0.01 (250 x 0.02)	±10.0	18x18 (457x457)
OB-525	250 x 0.02 (500 x 0.05)	±20.0	24x24 (610x610)

OHAUS DEFENDER™ 3000 BENCH SCALES

The Ohaus Defender™ 3000 series Bench Scales are ideal for general weighing and simple applications. Six models in four capacities and three different platform sizes are available to best match your application. The rechargeable internal battery, sturdy tubular base, and indicator housed in rugged ABS plastic assure reliable operation in a variety of environments. A built-in RS-232C port allows communication for printing and data transfer.

Weighing units in lb, oz, kg, or g are selectable and there is also a parts-counting mode. The column-mounted digital indicator with auto-off features tactile keys and can be remotely mounted using the OBA-160 Wall-Mount Bracket. It is powered with the included 115VAC adapter or by the internal rechargeable battery with approximately 100 hour life. Inquire for other AC adapter voltages. The back-lit LCD display has six 1in (25mm) high digits and the RS-232C port is bi-directional.

The 304 stainless steel weighing pan resists corrosion and protects the load cell from spills and dust. Overload protection to 125% of capacity on the weighing mechanism also prevents damage to the load cell. Adjustable non-slip rubber feet and externally visible leveling bubble make set up quick and easy.

OHAUS DEFENDER™ 3000 BENCH SCALES

Model	Capacity x Readability kg (lb)	Precision (Std. Dev.), g	Platform Size in (mm)
OB-60	30 x 0.005 (66 x 0.01)	±5.0	12x14 (305x355)
OB-160	60 x 0.01 (132 x 0.02)	±10.0	12x14 (305x355)
OB-160L	60 x 0.01 (132 x 0.02)	±10.0	16.5x21.6 (420x550)
OB-300	150 x 0.02 (330 x 0.05)	±20.0	16.5x21.6 (420x550)
OB-300L	150 x 0.02 (330 x 0.05)	±20.0	19.7x25.6 (500x650)
OB-600	300 x 0.05 (660 x 0.01)	±50.0	19.7x25.6 (500x650)

OBX-512

OBX-512-535

OHAUS EXPLORER® PRECISION HIGH CAPACITY BALANCES

Explorer® Precision High Capacity Balances feature three robust top-loading models with capacities of 12, 24, and 35kg. All have 0.1g readability and detachable modular display with 5ft (1.5m) cable. Generous size of the stainless steel platform (12.2x14.8in (311x377mm), LxW) allows easy weighing of large items. Full-color 5.7in (145mm) VGA graphic touch screen display optimizes viewing and menu navigation. Exclusive Ohaus SmarText™ 2.0 software features AutoCal™ for fast automatic internal calibration, as well as statistical quality control, parts counting, percent weighing, animal/dynamic weighing, differential weighing, density determination, filling, statistics, and more.

RS-232 and USB ports allow communication with user's PC or printer. Two touchless sensors on the base allow hands-free operation of zero, tare, and calibration functions. The rugged, die-cast metal base is designed to prevent damage from shock and the enclosure is IP54 rated for protection against spills, debris, and humidity. A weigh-below hook for density determinations is included. OBA-709 Column Kit allows convenient mounting of display at eye level. Balances operate on 100/120V or 220/240V, 50/60Hz electrical supplies. Inquire for rechargeable battery accessory. **Product Dimensions:** 14.8x17.4x4.7in (377x443x120mm), WxDxH.

OHAUS EXPLORER® PRECISION HIGH CAPACITY BALANCES

Model	Capacity x Readability, kg (lb)	Precision (Std. Dev.), g
OBX-512	12,000 x 0.1 (26 x 0.0005)	±0.1
OBX-524	24,000 x 0.1 (52 x 0.0005)	±0.1
OBX-535	35,000 x 0.1 (77 x 0.0005)	±0.1

Accessories

Display Column Kit OBA-709

ADAM SHSA CRANE SCALES

Rugged suspension scales are ideal for rapid weight determinations of bulk field samples and other large items difficult to position on conventional platform scales. The CE-marked scales feature robust design with die-cast metal frame and a 360° rotary safety hook. Overload is rated to 150% of total capacity with full-range taring. Weighing units are selectable in pounds or kilograms and there is a peak hold feature to retain maximum weights. These simple, user-friendly units need only a sturdy connection to an overhead supporting member that will safely support the total capacity. The large red LED display with 5/8in (15mm) digits is easy to read from a distance, and the included remote control allows safe operation for selecting units, hold functions and zeroing. Rechargeable Lithium batteries operate up to 20 hours continuously, making the units ideal for field use. A 100-240V/50-60Hz battery charger is included. Standard AA batteries can also be used for operation. **Product Dimensions for all models:** 5.8x2.6x11.6in (148x65x295mm) WxDxH.

ADAM SHSA CRANE SCALES

Model	Capacity x Readability, kg (lb)	Precision (Std. Dev.), g
CP-52	50 x 0.1 (100 x 0.02)	±10
CP-54	150 x 0.2 (300 x 0.05)	±20
CP-56	300 x 0.5 (600 x 0.1)	±50

CP-36

CP-46

ADAM CBK BENCH SCALES

Adam Equipment CBK Bench Scales are compact, affordable units with large capacity and high resolution. The durable, high-accuracy load cell and rechargeable battery pack allow for portable use and extended service life. All models are switchable between kg, g, lb, and oz, and have a large backlit LCD display with capacity tracker. Features include full numeric keypad, selectable maximum and minimum presets, cumulative recall weighing, zero tracking and check-weighing with LED indicators. These models also have percent weighing and parts counting functions. Automatic external calibration (separate calibration mass required) and a bi-directional RS-232 port are standard.

Units are powered by AC adapter or internal rechargeable power supply with battery life up to 90 hours; both are included. Tough, chemical resistant ABS housings and large 8.9x10.8in (225x275mm) stainless steel platforms are standard. These bench series scales can be factory configured for weigh-below capability as model number CPA-33. **Product Dimensions:** 12.4x14.4x4.3in (315x355x110mm), WxDxH.

ADAM CBK BENCH SCALES

Model	Capacity x Readability, g (lb)	Precision (Std. Dev.), g
CP-36	4,000 x 0.1 (8 x 0.0002)	±0.1
CP-312	8,000 x 0.2 (16 x 0.0005)	±0.2
CP-335	16,000 x 0.5 (35 x 0.001)	±0.5
CP-365	32,000 x 1.0 (70 x 0.002)	±1.0
CP-3100	48,000 x 2.0 (100 x 0.005)	±2.0

Accessories

Weigh-Below Option CPA-33

ADAM CPW PLUS BENCH SCALES

CPW Plus Bench Scales from Adam Equipment are an affordable solution for everyday weighing in the lab. Simple four-button operation and capacities from 6—200kg (13—440lb) allow fast, accurate weight determinations. A special hold button allows weight readings to be displayed continuously on the backlit display. Large stainless steel platforms mounted on splash-proof steel bases are easy to keep clean and add stability for weighing of large containers. The remote indicator with gross, net, zero and stable functions can be mounted to a vertical surface with the included wall-bracket.

Weighing units are displayed in 1in (25.4mm) high LCD characters and are selectable between lb, kg, oz, and lb:oz. Full-capacity tare range and a bi-directional RS-232 data interface are standard features. An AC adapter is also included, or for portable applications, the scales can be operated with six AA batteries (purchased separately). All models have low battery indicators and auto-sleep functions. Models with post-mounted indicators are also available. **Product Dimensions:** 11.8x11.8x2in (300x300x50mm), WxDxH.

ADAM CPW PLUS BENCH SCALES

Model	Capacity x Readability, Kg (lb)	Precision (Std. Dev.), g
CP-7	6 x 0.002 (13 x 0.005)	±2.0
CP-16	15 x 0.005 (33 x 0.01)	±5.0
CP-46	35 x 0.01 (75 x 0.02)	±10.0
CP-76	75 x 0.02 (165 x 0.05)	±20.0
CP-151	150 x 0.05 (330 x 0.1)	±50.0
CP-201	200 x 0.05 (440 x 0.1)	±50.0

CP-75 shown with HM-30 Air Meter Base

AD-150PA

AD-61P

COMPACT FIELD SCALES
ASTM C29, C138; AASHTO T 19, T 121

The Gilson Compact Field Scale is the portable and affordable solution for weighing concrete, soil and asphalt samples in remote locations. With capacities ranging from 6—200kg (13—440lb), these units enable quick, accurate weight determinations in an easily transportable package. A special hold function feature allows the user to press the hold button and keep weight reading on the display. All models meet ASTM C29, C138 and AASHTO T 19, T 121 concrete specifications. The CP-75 is perfect for field use with any 0.25ft³ (7.08L) unit weight containers.

The large stainless steel platform adds stability when weighing large containers and is easy to keep clean. Base is sturdy steel. Remote mountable indicator comes with a wall bracket and has gross, net, zero and stable functions displayed in 1in (25.4mm) high LCD characters. Weighing units are selectable between lb, kg, oz, lb:oz and all models feature full capacity tare range. Includes a standard RS-232 interface to connect to PC or printer and an aluminum carrying case with fitted foam interior with AC adapter. Scale can also be operated with six AA batteries. **Base Dimensions:** 11.8x11.8x2in (300x300x50mm), WxDxH.

COMPACT FIELD SCALES

Model	Capacity x Readability kg (lb)	Precision (Std. Dev.), g
CP-6	6 x 0.002 (13 x 0.005)	±2.0
CP-15	15 x 0.005 (33 x 0.01)	±5.0
CP-35	35 x 0.01 (75 x 0.02)	±10.0
CP-75	75 x 0.02 (165 x 0.05)	±20.0
CP-150A	150 x 0.05 (330 x 0.1)	±50.0
CP-200	200 x 0.05 (440 x 0.1)	±50.0

A&D BENCH/PLATFORM SCALES

These rugged, lightweight scales can take the punishment of daily industrial use, field travel, and harsh environments. Heavy-duty high resolution models provide basic weighing in pounds (lb) or Kilograms (kg), but exclude other seldom-used features. Scales are powered by an AC adapter (included) or four "C" size batteries that allow for up to 150 hours of work. Model numbers with "P" suffix are supplied with a display column; "PA" suffix models are supplied without display column. All models are supplied with a 3ft cable; a 17ft cable is available as model ADA-34A for remote mounting of indicator. The indicators rotate and tilt for easy viewing. All scale platforms are 12x15in (305x381mm) stainless steel. The ADA-33A Carrying Handling accessory adapts scales for easy portability. Inquire for available NTEP approved scales. RS-232C interface is available as ADA-30A. Convenient wall mount kit is also available as ADA-32A.

A&D BENCH/PLATFORM SCALES

Model	Capacity x Readability kg (lb)	Precision (Std. Dev.), g
AD-60PA	30 x 0.002 (60 x 0.005)	±5.0
AD-150PA	60 x 0.005 (150 x 0.01)	±10.0
AD-300PA	150 x 0.01 (300 x 0.02)	±20.0
AD-61P	30 x 0.002 (60 x 0.005)	±5.0
AD-151P	60 x 0.005 (150 x 0.01)	±10.0
AD-301P	150 x 0.01 (300 x 0.02)	±20.0
AD-401P	200 x 0.01 (400 x 0.02)	±20.0

Accessories

RS-232 Cable For Bench /Platform Scale	ADA-30A
Wall Mount Kit for A&D Bench/Platform Scales	ADA-32A
Carrying Handle for A&D Bench/Platform Scales	ADA-33A
17ft Extension Cable for Bench/Platform Scales	ADA-34A

OBX-922

OBX-423

OBX-124

OHAUS EXPLORER® PRECISION BALANCES

Explorer® Precision balances incorporate the latest technology for better functionality and efficiency. Intuitive software and practical features add up to a more advanced, accurate and easier to use balance.

Icon driven software controls fourteen different weighing functions, including density, differential weighing, check weighing, and percent weighing. The library function makes it easy to store and recall applications. Intelligent calibration automatically calibrates the balance daily or at any temperature change significant enough to affect accuracy. The Explorer® features fast stabilization time, improved vibration filtering, and optimized linearity and repeatability specifications.

All models feature a 5.7in (145mm), full color touch-screen display with large digits that separates easily from the base for remote mounting. Ohaus Smartext™ 2.0 graphical software allows easy data input with QWERTY and numeric keypad. Four touch-free programmable sensors offer hands-free control of calibration, tare, print, or other selectable commands. The standard bidirectional RS-232 and USB ports allow fast data transfer to a printer or directly into Microsoft Excel®. A weigh-below hook is included.

Inquire for accessories like data cables, display mounting tower, additional data ports and printers. Explorer® Precision balances operate on AC power supplies from 100—240V, and 50—60Hz. Models with 0.001g readability feature an included Draftshield with large sliding side doors and flip-open top for easy placement of oversize specimens. Height with Draftshield: 13.8in (350mm). **Product Dimensions:** 9.1x15.5x3.9in (230x393x98mm), WxDxH.

OHAUS EXPLORER® PRECISION BALANCES

Model	Capacity x Readability g	Precision (Std. Dev.), g	Platform Size in (mm)
OBX-223	220 x 0.001	±0.001	5.1 (130) Dia.
OBX-423	420 x 0.001	±0.001	5.1 (130) Dia.
OBX-623	620 x 0.001	±0.001	5.1 (130) Dia.
OBX-911	1,100 x 0.001	±0.001	5.1 (130) Dia.
OBX-922	2,200 x 0.01	±0.01	7.5 x 7.9 (190 x 200)
OBX-942	4,200 x 0.01	±0.01	7.5 x 7.9 (190 x 200)
OBX-961	6,200 x 0.01	±0.01	7.5 x 7.9 (190 x 200)
OBX-962	6,200 x 0.1	±0.1	7.5 x 7.9 (190 x 200)
OBX-101	10,200 x 0.01	±0.01	7.5 x 7.9 (190 x 200)
OBX-102	10,200 x 0.1	±0.1	7.5 x 7.9 (190 x 200)

OHAUS EXPLORER® ANALYTICAL BALANCES

New Explorer® Analytical balances are redesigned with the latest technology for better functionality and efficiency. Faster performance, intuitive software and practical features streamline operation. Icon driven software controls eleven weighing units and fourteen different weighing functions, including density, differential weighing, check weighing, and percent weighing. The memory function stores and recalls applications. AutoCal™ intelligent calibration automatically calibrates the balance daily or at any significant temperature change. The Explorer® features fast stabilization time, improved vibration filtering, and optimized linearity and repeatability specifications.

Included frameless draftshield with large sliding side doors has flip-open top for easy placement of oversize specimens. The 5.7in (145mm), full color touch-screen display module separates easily from the base for remote wall or tower mounting. Large digits and clear icons ensure optimum viewing and easy operation. Ohaus Smartext™ 2.0 graphical software allows easy data input with QWERTY and numeric keypad for full control of functions and weighing units. Two touch-free programmable sensors are mounted on the base, with two more sensors on the display module, for hands-free control of calibration, tare, print, or other selectable commands.

The standard RS-232 and USB ports allow fast data transfer to a printer or directly into Microsoft Excel®. Pan size is 3.5in (90mm) diameter and a weigh-below hook is included. Inquire for accessories like data cables, display mounting tower, and printers. Balances operate on AC power supplies from 100—240V, and 50—60Hz. **Product Dimensions:** 9.1x15.5x13.8in (230x393x350mm), WxDxH.

OHAUS EXPLORER® ANALYTICAL BALANCES

Model	Capacity x Readability g	Precision (Std. Dev.), g
OBX-124	120 x 0.0001	±0.0001
OBX-224	220 x 0.0001	±0.0001
OBX-324	320 x 0.0001	±0.0001

OBD-223

OBD-822

AD-12KE

OHAUS ADVENTURER PRECISION BALANCES

The new Adventurer Precision balances from Ohaus feature high-resolution models for laboratory, industrial and educational applications. This series is designed for stability, accuracy and fast response time. The new 4.3in (109mm) full color LCD touch screen makes control of all application modes easy, even with laboratory gloves on. Six additional keys control routine operations for tare, zero, print, and calibration.

Each model features nine time-saving application modes, including density determinations using the weigh-below hook, check-weighing and percent weighing. Multiple weighing units include milligrams, grams, ounces, pounds and twelve others, including custom units. Routine calibrations are performed with external calibration masses. Dual USB ports allow data to be downloaded to a flash drive or quick connection to user's PC. Standard features include weigh-below capability, protective in-use cover, integral security bracket, stability indicator, and RS-232 interface. OBD-223 model includes a draftshield with wide-entry, glass panel doors.

Adventurer Precision balances have a sealed front panel and molded spill ring, large stainless steel platforms, and leveling feet for quick setup. Models operate on 100 to 240V/50 to 60Hz power supplies with the included AC Adapter. Inquire for Models conforming to National Type Evaluation Program (NTEP) Standards and Models with internal calibration. **Product Dimensions:** 9.1x13.9x3.9in (230x354x100mm) WxDxH. Add 9.5in (241mm) for height of OBD-223 with draftshield.

OHAUS ADVENTURER PRECISION BALANCES

Model	Capacity x Readability g	Precision (Std. Dev.), g	Platform Size in (mm)
OBD-223	220 x 0.001	±0.001	5.1 dia. (130)
OBD-152	1,520 x 0.01	±0.01	6.9x7.7 (175x195)
OBD-421	4,200 x 0.01	±0.01	6.9x7.7 (175x195)
OBD-422	4,200 x 0.1	±0.1	6.9x7.7 (175x195)
OBD-821	8,200 x 0.1	±0.1	6.9x7.7 (175x195)
OBD-822	820 x 0.01	±0.01	6.9x7.7 (175x195)

A&D COMPACT BALANCES

The Compact Balances from A&D are portable and lightweight with a rugged body. The sealed key panel protects against dust and spills. The balances can be ordered with a carrying case and rechargeable battery pack.

New electronics, wide selection of capacities and resolutions, and remote-zeroing have been included in a low-profile rugged housing. RS-232C is standard with all balances. Nine built-in weighing units plus counting and percentage are possible. The balances have a large backlit LCD display that is easy to read even at wide viewing angles or in dark environments. These balances also feature auto power-off, overload protection, stainless steel weighing pan, leveling feet and bubble for accurate weighing, security ring to prevent theft and full digital calibration with user-definable mass setting. Weigh-Below Hook ADA-9 is available for AD-6000E and AD-12KE only. Inquire for printers. Pan Size: 5.2x6.7in (133x170mm).

A&D COMPACT BALANCES

Model	Capacity x Readability g	Precision (Std. Dev.), g
AD-1200E	1,200 x 0.1	±0.1
AD-2000E	2,000 x 0.1	±0.1
AD-3000E	3,000 x 0.1	±0.1
AD-6000E	6,000 x 1.0	±1.0
AD-12KE	12,000 x 1.0	±1.0

Accessories

Weigh-Below Hook	ADA-9
Carrying Case	ADA-35
Rechargeable Battery Pack	ADA-45

AD-214

CP-310

A&D NEWTON COMPACT BALANCES

New toploader balances from A&D are compact, accurate, and completely portable. All are powered by four standard AA alkaline batteries (purchased separately) and feature gram, ounce, pound, and six additional weighing units. Portable operation is rated at up to 70 hours. An AC adapter is included. Easy to read LCD display has backlight and fast 1 second response time. A five year warranty is standard. Pan size for units up to 610g is 4.3in (109mm) diameter. Larger models have 5x5.5in (127x140mm) pans.

Our Underhook attachment is available for Newton Balances with 1,500g or more capacity for specific gravity and density determinations. Software functionality for specific gravity determinations is built-in. A sturdy, fitted carrying case is also available as an option. Inquire for unidirectional USB or RS-232 data ports. Counting and percent functions are standard. Included AC adapter is 120V/60Hz, inquire for other voltages.

A&D NEWTON COMPACT BALANCES

Model	Capacity x Readability g	Precision (Std. Dev.), g
AD-122	120 x 0.01	±0.01
AD-202	210 x 0.01	±0.01
AD-302	310 x 0.01	±0.01
AD-402	410 x 0.01	±0.01
AD-602	610 x 0.01	±0.01
AD-154	1,500 x 0.1	±0.1
AD-214	2,100 x 0.1	±0.1
AD-314	3,100 x 0.1	±0.1
AD-414	4,100 x 0.1	±0.1
AD-614	6,100 x 0.1	±0.1

Accessories

Underhook for AD-154 & AD-214 ..... ADA-20
Underhook for AD-314, AD-414, & AD-614 ..... ADA-22
Carrying Case ADA-35

ADAM PORTABLE BALANCES

High precision rechargeable balances by Adam Equipment are lightweight, rugged, and suited for a wide range of everyday weighing applications. Fully equipped with USB, RS-232 interface, and a draftshield as standard equipment. These units also have automatic external and internal calibration and fifteen different weighing units. The backlit LCD display has large 0.6in (16mm) characters and capacity tracker graph.

Stainless steel platforms are 4.7in (120mm) diameter on all models. The CP-306H unit has a higher resolution than CP-306. All units have weighing, percentage weighing and parts counting functionality. A low battery indicator and auto power-off function help conserve battery life. An AC recharger and power supply is included.

Weigh-below hooks for density determinations are included. Sturdy, corrosion-proof ABS housing is suited to portability and rugged use. **Product Dimensions:** 6.7x9.6x3.1in (170x245x80mm), WxDxH.

ADAM PORTABLE BALANCES

Model	Capacity x Readability g	Precision (Std. Dev.), g
CP-301	150 x 0.005	±0.005
CP-303	300 x 0.01	±0.01
CP-306	600 x 0.02	±0.02
CP-306H	600 x 0.01	±0.01
CP-310	1,000 x 0.01	±0.01
CP-315	1,500 x 0.05	±0.05
CP-330	3,000 x 0.1	±0.1

Weighing/Handling Scoops

WEIGHING/HANDLING SCOOPS

Select from a range of sizes and capacities of scoops with pouring spouts for weighing and handling of samples. Types of construction include stainless steel (SS), aluminum (AL), polypropylene (PP). For larger samples, see TSA-162, TSA-163, and HMA-68 chute-end Handling Pans described elsewhere.

WEIGHING/HANDLING SCOOPS

Model	Description	Size, LxWxH, in	Approx. Tare, g
OBA-10783A	SS Flat Bottom	11.9 x 7.38 x 1.7	190
OBA-1101	PP Footed	12 x 6 x 2.8	125
OBA-171[1]	AL Flat Bottom with Tab	3 x 2.3 x 0.8	9
OBA-170[1]	AL Flat Bottom with Tab	2 x 1.5 x 0.4	4
OBA-126A	SS Flat Bottom	17.2 x 11 x 3.4	800

[1] Includes counterweight.

OB-760

OBA-703S

OB-1650 shown with OBA-707

OB-1119

OHAUS TRIPLE BEAM & DIAL-O-GRAM BALANCES

The reliable Ohaus Triple Beam and Dial-O-Gram Balances have 610g capacities with 0.1g sensitivity. Total capacities are easily expanded to 2,610g with the addition of the OBA-707 Attachment Weight Set. Both balances have notched poise beams of 500gx100g and 100gx10g. Weigh-below functions are possible with these units. A 225g tare poise is provided to compensate for tare weights. These rugged balances each feature a 6in (152mm) diameter stainless steel platform, self-aligning agate bearings with dust-proof covers, precision ground knives, and die-cast aluminum base. Magnetic beam damping speeds reading times. Weighing Scoops measure 12x6x2-3/4in (305x152x70mm), LxDxH. Footed polypropylene scoop and flat-bottom stainless steel scoop come with weight-matched counterweights to fit on beam end of balances. Vinyl Dust Cover protects the balances between uses. **Product Dimensions:** 18x12x9in (457x305x229mm), LxWxH.

OB-760 Triple-Beam Balance uses a third sliding-poise beam on the front for fine weight adjustments up to 10g x 0.1g.

OB-1650 Dial-O-Gram Balance has direct-reading 10gx0.1g vernier dial for fine adjustment instead of a sliding-poise.

OBA-707 Attachment Weight Set extends capacity of these balances to 2,610g by attaching to beam ends. Set includes two 1,000g and one 500g weights.

OHAUS TRIPLE BEAM & DIAL-O-GRAM BALANCES	
Triple Beam Balance	OB-760
Dial-O-Gram Balance	OB-1650
Accessories	
Attachment Weight Set	OBA-707
Stainless Steel Flat Bottom Scoop with Counterweight	OBA-703S
Polypropylene Footed Scoop with Counterweight	OBA-703

OHAUS HEAVY-DUTY SOLUTION BALANCE

With a capacity of 20kgx1g, the Ohaus Solution Balance offers improved sensitivity over smaller balances and uses loose weights for greater versatility. The unit is capable of weigh-below applications.

Ohaus end-reading design permits loading and reading from either side of balance. Unobstructed top loading platform is 11in (279mm) diameter stainless steel. Base and beam cast aluminum, and beam scales are etched stainless steel. Other features include magnetic beam damping, positive load stops, covered steel self-aligning bearings, notched beams with sliding poises, precision ground knives, and weight storage rack. A locking poise accommodates tare weights to 2,270g. **Product Dimensions:** 34x11x11in (864x279x279mm), LxWxH.

OBA-126A Stainless Scoop Product Dimensions: 17.2x11x3.4in (440x280x85mm), LxWxH.

OHAUS HEAVY-DUTY SOLUTION BALANCE	
Solution Balance	OB-1119
Accessories	
Scoop	OBA-126A

OB-311

OHAUS CENT-O-GRAM & DIAL-O-GRAM BALANCES

These economical and reliable balances are well-suited for precise weighing of small samples. Both have 0.01g sensitivity. Features include magnetic damping, agate bearings, precision-ground knives, and stainless steel pan with handle and two pouring spouts. Adjustable platform can be used for determination of specific gravity of solids. Pan is 3-5/8in (92mm) diameter. A Vinyl Dust Cover accessory protects the balance between uses.

OB-311 Cent-O-Gram has 311x0.01g capacity and four notched beams.

OB-310 Dial-O-Gram with 310x0.01g capacity has a fast-adjusting vernier dial replacing two of the fine poise beams.

OHAUS CENT-O-GRAM & DIAL-O-GRAM BALANCES	
Ohaus Cent-O-Gram	OB-311
Ohaus Dial-O-Gram	OB-310
Accessories	
Vinyl Dust Cover for OB-310 & OB-311	OBA-110

OB-2400P

OHAUS FIELD TEST SCALES

These balances are rugged for use under adverse conditions, and can be converted between metric and avoirdupois weighing systems with purchase of additional weight sets. Both have a single beam showing both 0.01lb and 5g divisions, and are supplied with slotted iron weights. Weighing platform is 11in (280mm) diameter. Heavy, cast metal base features an integral carrying handle. OBA-126A Stainless Steel Scoop is 17.2x11x3.4in (440x280x85mm), LxWxH. **Product Dimensions:** 21x12x11in (534x305x280mm), LxWxH.

OB-2400P Ohaus Field Test Scale is supplied with slotted iron avoirdupois (pound) weights for a total capacity of 36x0.01lb.

OB-2400M Ohaus Field Test Scale capacity is 16kgx5g and is supplied with metric weights.

OHAUS FIELD TEST SCALES	
Ohaus Field Test Scale, with Avoirdupois Weight Set	OB-2400P
Ohaus Field Test Scale, with Metric Weight Set	OB-2400M
Accessories	
Avoirdupois Weight Set, 36lb	OBA-137P
Metric Weight Set, 16kg	OBA-137M
Stainless Steel Scoop	OBA-126A

CS-10

CS-10W

PULP DENSITY/SPECIFIC GRAVITY SCALES

CS-10W Marcy™ Pulp Density/Specific Gravity Scale simplifies determination of pulp densities and specific gravities of pulps, liquids, and dry solids by allowing direct reading of specific gravity, percent solids, and weight in kilograms. Operator and computation errors are eliminated. Wide range covers specific gravities of dry solids ranging from 1.2 to 7.8 by selection of one of twelve included interchangeable dial faces. Scale is constructed of sturdy painted steel and has 10in (254mm) circular dial with acrylic lens. A special 1,000ml container with slotted overflow holes is required for proper operation and sold separately as CSA-25 in clear plastic or CSA-26 in stainless steel. Similar model CS-10 Scale features identical function and construction but is supplied with the CSA-25 clear plastic container.

PULP DENSITY/SPECIFIC GRAVITY SCALES	
Marcy™ Pulp Density/Specific Gravity Scale, without Container	CS-10W
Pulp Density/Specific Gravity Scale, with Clear Container	CS-10
Accessories	
1,000ml Plastic Container	CSA-25
1,000ml Stainless Steel Container	CSA-26
Set of 12 Dial Faces for CS-10W or CS-10	CSA-30

CS-60

SUSPENSION SCALE

The Suspension Scale is useful for the weighing of field samples. Full 60lb capacity with 0.1lb sensitivity is easily read on a dual-revolution 8in (203mm) diameter dial. Hooks are provided for hanging scale and suspension of container. One of two hands adjusts quickly with thumb screw for setting tare and indicating both net and gross weights. Not Legal-for-Trade. **Product Dimensions:** 8x1.63x16in (203x41x406mm), WxDxH.

SUSPENSION SCALE	
Suspension Scale	CS-60

Calibration Masses

Calibration Sets

NIST Masses

CALIBRATION MASSES FOR BALANCES

Sophisticated testing and frequent auditing of laboratory equipment has made it increasingly necessary for laboratories to calibrate their own balances. Calibration Masses check span and linearity and calibrate electronic balances. The commonly used Span Calibration method uses one-point calibration with a single mass approximately equal to the capacity of the balance. Some balances use the Linearity Calibration method which allows the user to select multiple mass settings, normally defined as zero, center (half span), and full span of the balances capacity. This method minimizes deviation throughout the balance's weighing range.

Gilson offers Calibration Masses in ASTM Classes 1 and 4, NIST Class F and Ultra Class. Ultra Class weights boast weight tolerances 40—50% tighter than ASTM Class 1 and equal to or exceeding OIML Class E2. Ultra Class and ASTM Class 1 masses are highly polished stainless steel. ASTM Class 4 weights are satin-finished stainless steel. Recessed grip handles are part of the 10kg and 20kg weights for easier handling and stacking. Individual weights from 10—4,000g include a glove and protective, foam-lined plastic case. Cases for 10kg and 20kg weights are high-impact plastic, reinforced with metal edges.

Precision Mass Sets are available in Ultra Class, ASTM Class 1 and ASTM Class 4 with ranges of 1mg—100g and 1—100g. Weights are supplied in 5-2-2-1 series as ASTM E617 specifies.

NIST Class F Calibration Masses are available for higher capacity balances and scales. Fabricated of cast iron with integral grip handles.

Traceable or NVLAP Certificates are available for all masses and sets. Traceable Certificates document traceability to NIST and compliance with ASTM or OIML specifications. They include nominal value and correction, date of calibration, accuracy class, customer name and purchase order number. NVLAP Weight Calibration Certificates should be requested by users who must provide certification to ISO, FDA, ANSI or other requirements. Report format and contents comply with NVLAP requirements. Order masses or sets with these certifications, by adding "T" for Traceable certificate or "W" for NVLAP Certificate to the catalog number.

helpfulhint

Ultra Class: For analytical and sensitive balances and applications that demand superior accuracy.

ASTM Class 1: For analytical balances and applications requiring first-order accuracy.

ASTM Class 4: For most balances less sensitive than 0.01g and applications having average accuracy requirements.

NIST Class F: For higher capacity, less sensitive balances and scales.

CALIBRATION MASSES FOR BALANCES

INDIVIDUAL MASSES

Mass	Ultra Class	ASTM Class 1	ASTM Class 4	NIST Class F
10g	OBA-201	OBA-301	OBA-401	—
20g	OBA-202	OBA-302	OBA-402	—
30g	OBA-203	OBA-303	OBA-403	—
50g	OBA-204	OBA-304	OBA-404	—
100g	OBA-205	OBA-305	OBA-405	—
200g	OBA-206	OBA-306	OBA-406	—
300g	OBA-207	OBA-307	OBA-407	—
400g	OBA-208	OBA-308	OBA-408	—
500g	OBA-209	OBA-309	OBA-409	—
1,000g	OBA-210	OBA-310	OBA-410	—
2,000g	OBA-211	OBA-311	OBA-411	—
3,000g	OBA-212	OBA-312	OBA-412	—
4,000g	OBA-213	OBA-313	OBA-413	—
10kg	OBA-214	OBA-314	OBA-414	OBA-282
20kg	OBA-215	OBA-315	OBA-415	OBA-284
25kg	—	—	—	OBA-286
50kg	—	—	—	OBA-288
100kg	—	—	—	OBA-289
250kg	—	—	—	OBA-291
25lb	—	—	—	OBA-278
50lb	—	—	—	OBA-280

SETS

1mg—100g	OBA-216	OBA-316	OBA-416	—
1g—100g	OBA-217	OBA-317	OBA-417	—

Accessories

Plastic Case for all 10kg Masses.....OBA-10
Plastic Case for all 20kg Masses.....OBA-20


LC-72


LC-37


LC-100


LC-115


LC-53


LC-88

CRUSHERS, GRINDERS, MILLS & PULVERIZERS SELECTION GUIDE

CRUSHERS, GRINDERS, MILLS & PULVERIZERS SELECTION GUIDE								
Particle Topsize, mm	Final Size mm/µm	Model	Description	Max. Feed Capacity	Grinding Elements	Element Media	Applications	Page Number
165	6.4mm	LC-24	Morse Jaw Crusher	4,000lb (1,814kg)	8 x 8in jaws	steel alloy	rock, ores, minerals	202
152	4.75mm	LC-401	Holmes Hammermill	4,000lb (1,814kg)	swing hammers	manganese steel	coal, coke	203
101	1.6mm	LC-35	Bico Chipmunk Jaw Crusher	800lb (363kg)	9 x 4in jaws	steel alloy	rock, ores, minerals	201
101	1.6mm	LC-36	Bico Chipmunk Jaw Crusher	800lb (363kg)	9 x 4in jaws	steel alloy	rock, ores, minerals	201
101	3mm	LC-37	Badger Jaw Crusher	1,300lb (590kg)	5 x 7in jaws	steel, chrome alloy	rock, ores, minerals	201
101	6.4mm	LC-22	Morse Jaw Crusher	2,500lb (1,134kg)	5 x 6in jaws	steel alloy	rock, ores, minerals	202
76	1.6mm	LC-33	Bico Chipmunk Jaw Crusher	400lb (182kg)	6 x 3in jaws	steel alloy	rock, ores, minerals	201
76	1.6mm	LC-34	Bico Chipmunk Jaw Crusher	400lb (182kg)	6 x 3in jaws	steel alloy	rock, ores, minerals	201
76	6mm	LC-20	Morse Jaw Crusher	1,200lb (545kg)	4 x 6in jaws	steel alloy	rock, ores, minerals	202
50	1.6mm	LC-201	Holmes Hammermill	1,000lb (454kg)	swing hammers	manganese steel	coal, coke	203
25	1.6mm	LC-8	Mini Crusher	20lb (9kg)	2 x 2in jaws	steel alloy, others	rock, ores, minerals	206
13	150µm	LC-80	Laboratory Disk Mill	10lb (5kg)	4 disks	iron alloy	coal, chemicals, grains	206
13	150µm	LC-82	Laboratory Disk Mill	40lb (18kg)	4 disks	iron alloy	ores, friable materials	206
13	2mm	LC-70	Marcy® Gy-Roll Lab Cone Crusher	1,770lb (803kg)	6in cone	manganese steel	hematite, quartz	203
13	2mm	LC-72	Marcy® Gy-Roll Lab Cone Crusher	3,540lb (1,610kg)	10in cone	manganese steel	magnesite, hard rock	203
13	2mm	LC-13	Marcy® Roll Crusher	3,000lb (1,361kg)	iron rollers with Ni hard facings	iron alloy, others	rocks, ores, minerals	202
13	2mm	LC-14	Marcy® Roll Crusher	8,000lb (3,629kg)	iron rollers with Ni hard facings	iron alloy, others	rocks, ores, minerals	202
13	38µm	LC-115	Cup Pulverizer	250ml/batch	puck & ring	user selectable	rocks, ores, minerals, glass & soil	204
6	75µm	LC-53	Bico Lab Pulverizer	60lb (27kg)	grinding plates	iron alloy, others	rock, ores, minerals	204
4.75	250µm	LC-500	Holmes Pulverizer	400g/min.	rotor & hammer	hardened steel	coal, coke	205
4.75	250µm	LC-502	Holmes Pulverizer	450g/min.	rotor & hammer	hardened steel	coal, coke	205
4.75	250µm	LC-350	Holmes Pulverizer	400g/min.	rotor & hammer	hardened steel	coal, coke	205
3.2	106µm	LC-7	Mini-Pulverizer	20g/batch	grinding plates	alumninum, tung. carbide	rock, ores, minerals	206
1	75µm	LC-100	Hardgrove Grindability	50g/batch	ring/ball/bowl	stainless steel	coal	205
1	1-50µm	LC-88	Benchtop Labmill	4,000ml/batch	jars/media	ziconia	ores	207
1	1-50µm	LC-91	Jar Mill	2.8L	jars/media	burundum, ziconia	paints	207
1	1-50µm	LC-92	Jar Mill	5.6L	jars/media	roalox, alumina	ceramics	207
1	1-50µm	LC-95	Jar Mill	8.4L	jars/media	stainless steel	chemicals	207

helpfulhint

Gilson offers a broad selection of accessories in many different materials for Crushers, Grinders, Mills and Pulverizers. Call our Technical Specialists today for assistance in selecting the best grinding media for your application.

LC-33

LC-37 shown with LCA-57

BICO JAW CRUSHERS

Sturdy Bico Crushers are designed for size reduction of hard rock, ores, and minerals. Capacity is exceptional with minimum power consumption. Time proven designs are effective and have long service life, and all parts accessible for cleaning and maintenance.

Electric motor starting switch is included, but must be installed on-site. Single phase motors can be configured for 110V or 220V operation. Three phase motors can be set to operate on 220V or 440V. Please specify voltage, phase, and frequency at time of order.

LC-33 and LC-34 Chipmunk Jaw Crushers have reversible jaw plates to extend life. Stationary jaw lifts easily from frame for cleaning interior parts, and both jaws are replaced easily when worn. Construction is wear-resistant alloy steel with sealed bronze bearings and alloy steel shafts. Semi-enclosed motor with mounting blocks drives four V-belt drive. Sample Pan, Feed Hopper, and Guards for belts and flywheel are included. Both the LC-33 and LC-34 Crushers have 3x6in (76x152mm) jaw size with 3x2.25in (76x57mm) opening. A handwheel on the side adjusts wedge blocks to set jaw discharge to 1/16—3/8in (1.6—9.5mm) particle size.

LC-35 and LC-36 Chipmunk Jaw Crushers have 4x9in (102x229mm) jaw size with 4x2-3/8in (102x60mm) opening, and reduction adjusts for 1/16—5/8in (1.6—15.9mm) particle size.

LC-37 Badger Jaw Crusher has the highest crushing capacity needed for labs and pilot plants. This heavy-duty unit has a jaw size of 5x7in (127x178mm) and a unique vertical/horizontal jaw action to aggressively and efficiently reduce 4x6in (102x152mm) topsize rock sample to 1/8—3/4in (3—19mm) at a rate of 1,300lb/hour (590kg). Guards for belts and flywheel and a Feed Hopper are included. Dust Collector Base with Pan is available as LCA-57.

LCA-91 Dust Enclosure Bench is designed for LC-33, LC-34, and LC-53 Pulverizers. The 47x36x35in (1,194x914x889mm), WxDxH painted sheet metal enclosure has lighted interior and a hinged cover with view panel. The removable-grate work surface is made up of 3/4in (19mm) bars. A high-capacity blower with 500—700FPM (152—213m/min) air velocity moves dust to a collector drawer with replaceable filter cartridge. An exhaust silencer controls noise. Pulverizer plates may be changed without moving the machine. Shipped fully assembled and requires no installation or special duct work. **Product Dimensions:** 65x36x60in (1,651x914x1,524mm), WxDxH.

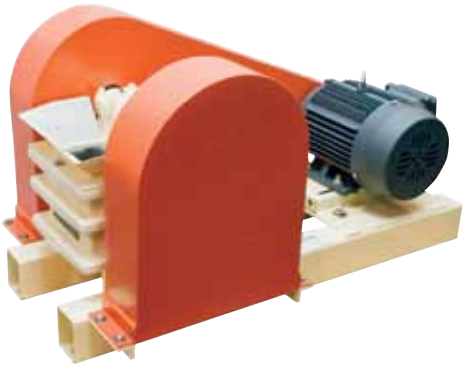
BICO JAW CRUSHERS

Model	Description	Max. Feed Size, in	Capacity[1] lb (kg)/hour	hp/phase	Dimensions LxWxH, in (cm)
LC-33	Chipmunk Jaw Crusher	2.2x3	400 (182)	2/1	25x19x30 (64x48x76)
LC-34	Chipmunk Jaw Crusher	2.2x3	400 (182)	2/3	25x19x30 (64x48x76)
LC-35	Chipmunk Jaw Crusher	2.4x4	800 (363)	3/1	28x19x32 (71x48x81)
LC-36	Chipmunk Jaw Crusher	2.4x4	800 (363)	3/3	28x19x32 (71x48x81)
LC-37	Badger Jaw Crusher	4x6	1,300 (590)	5/3	32x24x20 (81x61x51)

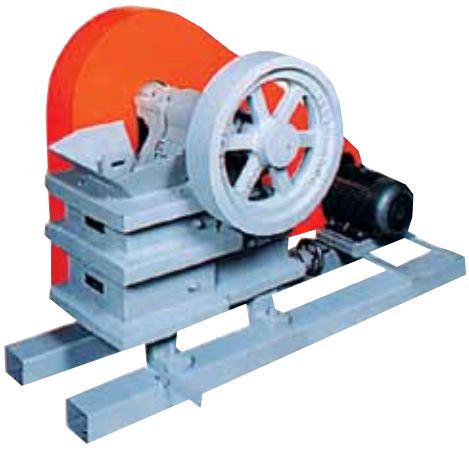
Accessories

Dust Collector Base for LC-37 ..... LCA-57
Dust Enclosure Bench, 115V/60Hz LCA-91
Replacement Filter for LCA-91 ..... LCA-92

[1] Capacity is for reduction of 7 Mohs hardness quartz to 1/4in for crusher, to No.100 for pulverizers.



LC-20



LC-22

LC-14

MORSE JAW CRUSHERS

Heavy-duty Morse Jaw Crushers are built for high throughput and oversize feed. These high horsepower units have heavy cast frames and flywheels. Guards for belts and flywheels are included. Eccentric overhead action and corrugated jaw plates work together to force-feed material and avoid back-flow or "pop out" of particles. Particle size down to 1/4in (6.4mm) minus is set via handwheel adjustment of a single toggle. Jaw plates are reversible for extended life. Crushing rates vary with hardness and size of feed.

Jaw and cheek plates are heat treated, abrasion-resistant steel alloy. Heavy-duty bronze bearing inserts may be replaced easily in the field. Cast iron alloy frame, motor guard, and feed hopper are mounted on a tubular steel frame.

Select from models with 4x6in (102x 152mm), 5x6in (127x152mm), or extra-large 8x8in (203x203mm), DxW jaw inlets, all equipped with TEFC, three phase motor. Voltage and Hz of supply must be specified with order.

MORSE JAW CRUSHERS

Model	Jaw Size in (mm)	Motor	Capacity lb (kg) / hour	Dimensions LxWxH, in (cm)
LC-20	4x6 (102x152)	3hp, 230/460V, 3 phase, 60Hz	400-1,200 (182-545)	42x24x24 (107x61x61)
LC-20F	4x6 (102x152)	3hp, 220/380/440V, 3 phase, 50Hz	400-1,200 (182-545)	42x24x24 (107x61x61)
LC-22	5x6 (127x152)	5hp, 230/460V, 3 phase, 60Hz	1,000-2,500 (454-1134)	54x30x38 (137x76x97)
LC-22F	5x6 (127x152)	5hp, 220/380/440V, 3 phase, 50Hz	1,000-2,500 (454-1134)	54x30x38 (137x76x97)
LC-24	8x8 (203x203)	10hp, 230/460V, 3 phase, 60Hz	1,500-4,000 (682-1818)	73x39x38 (185x99x97)
LC-24F	8x8 (203x203)	10hp, 220/380/440V, 3 phase, 50Hz	1,500-4,000 (682-1818)	73x39x38 (185x99x97)

helpfulhint

Make sure to determine your electrical supply and capacity before ordering. Many crushers and pulverizers are supplied with different electrical configurations. Contact one of our technical service representatives if you have any questions.

MARCY® DOUBLE ROLL CRUSHERS

Double Roll Crushers reduce intermediate size hard to medium hard materials such as rock or ore in preparation for finer reduction in a pulverizer. They also bridge the gap between laboratory and production or pilot plant capacities. Topsize is 13mm and final fineness typically passes a No.10 (2mm) opening, depending on material type. Output size is controlled by adjusting the gap between the rollers. Feed hoppers open easily for cleaning and maintenance, and feature a safety interlock that shuts off power when the hopper is lifted.

LC-13 Marcy® Double Roll Crusher features 6.5x6in (165x153mm), Dia.xW heavy 304 stainless steel rolls with Ni-Hard facings. The V-belt drive, 2hp TEFC motor produces a uniform speed throughout the crushing process, and reduces most rock-like materials of 0.5in (13mm) feed size to minus No.10 (2mm), at a capacity up to 3,000lbs/hr.

LC-14 Marcy® Double Roll Crusher features 9x12in (229x305mm), Dia.xW heavy 304 stainless steel rolls with Ni-Hard facings. The V-belt drive, 5hp TEFC motor produces a uniform speed throughout the crushing process, and reduces most rock-like materials of 0.5in (13mm) feed size to minus No.10, (2mm) at a capacity up to 8,000lbs/hr.

Each Double Roll Crusher is mounted on a heavy steel base, includes strong relief springs, and is fully-equipped with safety guards. LC-13, 2hp and LC-14, 5hp motor are configured for 230/460V, three phase power at 60Hz or 50Hz operation, specify Hz at time of ordering.

MARCY® DOUBLE ROLL CRUSHERS

Marcy® Double Roll Crusher 6.5x6in, 230/460V..... LC-13
Marcy® Double Roll Crusher 9x12in, 230/460V..... LC-14

LC-72

MARCY® GY-ROLL LAB CONE CRUSHERS

Marcy® Gy-Roll Cone Crushers reduce 1/2in (12.7mm) feed to 2mm final size, depending on material type. They are well suited for medium hard to hard materials, such as aggregate and mineral ores. These crushers are powerful and tough enough for continuous demands of pilot plant or small production applications. They can be choke-fed and stopped or started under load.

The 45° cone-shaped head, with detachable manganese steel-faced mantle is concentrically driven to crush material against a matching manganese steel concave plate, housed in the upper frame. Ball bearing mounted drive spindle is mounted in a cylinder inside the lower frame. Particle size is accurately controlled by adjusting a threaded connection to the concave plate. A feed hopper assembly is included. Both units are powered by totally enclosed, fan-cooled (TEFC) motors. 15in (381mm) high, painted-steel Base Assemblies have convenient 2/3ft^3 (18.8L) sample collection drawer and include all mounting hardware.

LC-70 Marcy® Gy-Roll 6in (152mm) model has about 300lb (136kg) per hour nominal throughput at finer settings, depending on material. Maximum capacity with coarser settings is 1,770lb (803kg) to 1,500lb (680kg). Unit is powered with 1/2hp 230/460V, 60Hz, three phase TEFC motor with V-belt drive. For units with 220/380/440V, 50Hz, three phase motors, add "F" to model number. **Product Dimensions:** 21x20x15in (533x508x381mm), WxDxH.

LC-72 Marcy® Gy-Roll 10in (254mm) model has about 600lb (272kg) per hour nominal throughput at finer settings, depending on material. Maximum capacity with coarser settings is 3,540lb (1,610kg). Unit is powered with 2hp 230/460V, 60Hz, three phase TEFC motor with V-belt drive. For units with 220/380/440V, 50Hz, three phase motors, add "F" to model number. **Product Dimensions:** 31x27x19in (787x686x483mm), WxDxH.

MARCY® GY-ROLL LAB CONE CRUSHERS

Marcy® Gy-Roll 6in, 230/460V, 60Hz, 3 phase	LC-70
Marcy® Gy-Roll 10in, 230/460V, 60Hz, 3 phase	LC-72

Accessories

Base Assembly for LC-70	LCA-96
Base Assembly for LC-72	LCA-97

LC-401

HOLMES HAMMERMILL COAL CRUSHERS
ASTM D2013

Two Holmes Hammermill Crusher models for coal and coke have rotor-swing hammers, enclosed cases, covered feed hoppers, and cast iron housings. Housings are hinged and latched for quick access to the grinding chamber for cleaning and replacement of the bolted-in screens. For safety, an open-latch sensor cuts all power and must be reset before re-starting the machine. Rotors, swing hammers, and screen plates larger than 3/16in (4.8mm) are heat-treated and hardened, and rotors are reversible end-for-end for maximum hammer life. Feed hopper gates allow manual feed control. Spring-loaded clamps securely seal the sample collection containers to discharge spouts to control dust during crushing. Two Screen Plates with round perforations are included with each machine, and size must be specified at time of order. Additional screens are available as noted below. Units are mounted on four casters for easy relocation in the lab. A special control box with NEMA 12 magnetic starter and over-load protection is standard. Standard wiring is 230V/60Hz, three phase, but a number of different configurations, including explosion-proof options, are available.

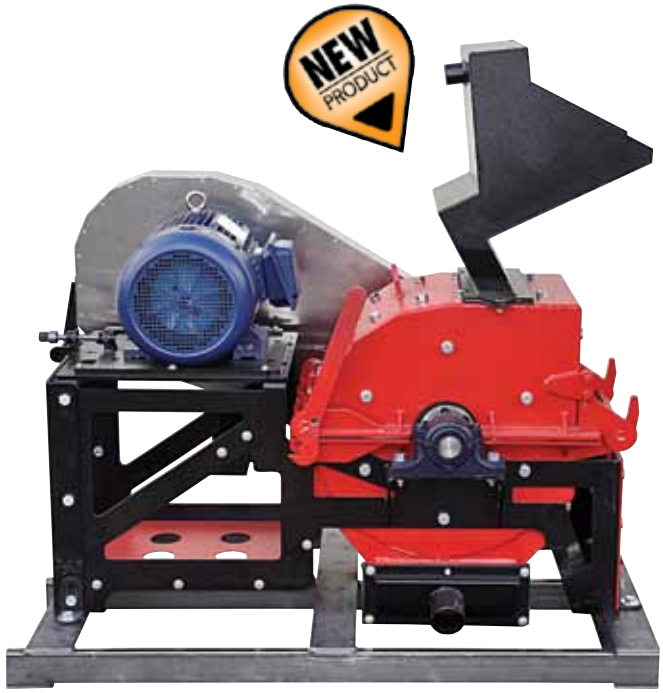
LC-201 Holmes Hammermill processes feed sizes up to 2in (51mm) at a maximum rate of about 1,000lb (454kg) of coal material per hour. Final size is approximately 1/16in (1.6mm) Rotor speed is 3,450rpm. Covered Feed Hopper capacity is 0.40ft^3 (11.3L), and crushing chamber is 7x6in (178x152mm). Includes a choice of two screen plates in sizes 1/16, 3/32, 1/8, 3/16, 1/4, 3/8, or 1/2in (1.6, 2.4, 3.2, 4.8, 6.4, 9.6, or 12.7mm), specify when ordering. Inquire to purchase other sizes separately. Also included are two sample collection containers with approximately 10lb (4.5kg) and 35lb (16kg) coal capacity, and 10ft (3m) of four-wire conductor, rubber-covered cable for connection to a power source. Powered by a 2hp TEFC motor. **Product Dimensions:** 25x28x43in (635x710x1,090mm), WxDxH.

LC-401 Holmes Hammermill is suitable for larger feed sizes up to 6in (152mm). Maximum throughput is about 4,000lb (1,814kg) per hour and final sizes range to 3/16in (4.75mm). Standard rotor speed is 1,260rpm. Inquire for speeds up to 2,360rpm. Capacity of the covered feed hopper is 1.6ft^3 (45L), and crushing chamber dimensions are 10x15in (254x380mm). Includes a choice of two screen plates in sizes 1/8, 3/16, 1/4, 5/16, 3/8, 1/2, 3/4, or 1in (3.2, 4.8, 6.4, 7.8, 9.6, 12.7, 19.2 or 25.4mm), specify when ordering. Inquire to purchase other sizes separately. A sample collection container, and 10ft (3m) of four-wire conductor, rubber-covered cable for connection to a power source are also included. Powered by a 7.5hp TEFC motor. **Product Dimensions:** 36x39x56in (915x990x1,422mm).

HOLMES HAMMERMILL COAL CRUSHERS

Model	Max. Feed Size, in (mm)	Approx. Final Size, in (mm)	Hopper Capacity, ft^3 (L)	Max. Throughput lb (kg)/hour
LC-201	2 (51)	1/16 (1.6)	0.40 (11.3)	1,000 (454)
LC-401	6 (152)	1/8 (3.2)	1.6 (45)	4,000 (1,814)

LC-44



LC-47

PORTABLE CRUSHERS

Rugged and versatile, new crushers excel at processing bulk aggregate, minerals, and ore materials for high-volume lab testing, pilot-plant, and even small production operations. Outfitted with your choice of gasoline, diesel, or electric power, their tough construction allows easy adaptation for the most remote placements or in permanent installations. Both crusher models feature robust design and use heavy welded-steel plate and high-quality materials throughout for uninterrupted reliability in the harshest environments. Top of the line bearings, pillow blocks, and other components mean less downtime and higher production. Crushers are pre-mounted on sturdy welded-steel frames. Inquire for available mounting options on single or dual-axle trailers for truly mobile operation.

Jaw Crusher and Hammermill models can be used independently, but also work efficiently together as primary and secondary crushers for reduction of bulk materials from 8in (203mm) to finer than No. 35 (0.5mm) sizes. Each crusher arrives fully assembled, ready for immediate use.

LC-44 10in Jaw Crusher has a maximum feed size of 8in (203mm) and final output size can be regulated from ¼ to 3in (6 to 76mm) through clearance adjustment of the jaw plates. Throughput is approximately 1 to 2 tons (900 to 1,800kg) per hour. Jaw sizes are 10 x 6in (254 x 152mm) WxD and are made from 3/4in (19mm) material hard-faced with abrasion resistant steel. Facing material has Brinell hardness of 450. Special abrasion-resistant LCA-415 Cast Manganese/Chrome jaw plates are also available for longer life or for processing of especially hard and tough materials. Available power options are 20hp Gasoline or 18hp Diesel engines, or a 10hp Electric Motor. The main shaft is 2.4in (61mm) at the cam shaft and 2in (51mm) at the drive shaft. The efficient electric motor is supplied ready for wiring to a number of common three-phase voltage configurations from 208 to 460 volt. **Product Dimensions:** 56x32x48in (1422x812x1220mm) WxDxH. Net Weight: 950lb (430kg).

LC-47 Hammermill Crusher has a maximum feed size of 2in (51mm) and final output sizes as fine as No. 80 (0.2mm), controlled by standard screen inserts of No. 35 (0.5mm) or No. 20 (1.0mm) openings. Production is higher and hammer life is enhanced by feeding 1in (25mm) material. Approximately 1 to 2 tons (900 to 1,800kg) of throughput per hour. The ten 1.5in (38mm) wide Hammers are made from wear-resistant high-chrome steel for long service life. One standard screen is included, specify at time of order. Custom Screens are also available with any opening size, Inquire. Screens are laser-cut from long-lasting 1/4in (6mm) material. Proprietary non-slip disc system allows complete change-out of the hammers in less than ten minutes Power is supplied by 30hp Gasoline or 24hp Diesel engines, or a 15hp Electric Motor. The powerful electric motor is supplied ready for wiring to a number of common three-phase voltage configurations from 208 to 460 volt. The drive shaft is 2in (51mm) diameter. **Product Dimensions:** 56x33x53in (1422x838x1346mm) WxDxH. Net Weight: 1,400lb (635kg).

PORTABLE CRUSHERS	
Portable 10in Jaw Crusher, 20hp Gasoline Engine	LC-44G
Portable 10in Jaw Crusher, 18hp Diesel Engine	LC-44D
Portable 10in Jaw Crusher, 10hp Electric Motor	LC-44E
Portable Hammermill Crusher, 30hp Gasoline Engine	LC-47G
Portable Hammermill Crusher, 24hp Diesel Engine	LC-47D
Portable Hammermill Crusher, 15hp Electric Motor	LC-47E
Accessories	
Replacement Hard-Faced Steel Jaw Plates for LC-44	LCA-412
Cast Manganese/Chrome Steel Jaw Plates for LC-44	LCA-415
1/8in (3.18mm) Screen for LC-47	LCA-416
No. 10 (2.0mm)) Screen for LC-47	LCA-417
No. 20 (1.0mm) Screen for LC-47	LCA-418
0.75mm Screen for LC-47	LCA-419
No. 35 (0.5mm) Screen for LC-47	LCA-422

LC-115

VIBRATING CUP PULVERIZER

The Vibrating Cup Pulverizer is also known as a puck mill or shatterbox. This pulverizer efficiently uses pressure, impact and friction to grind rock, ore, minerals, soil, and other materials to analytical size. It has many useful applications in the laboratory and small-scale pilot plants. An 8in (203mm) diameter bowl containing grinding rings and a puck is driven by a rotating eccentric and swings contents on a horizontal plane at a precise speed and distance for maximum grinding efficiency. The grinding bowl is locked down and held securely in-place by a cam lever system, and a protective cover encloses the grinding chamber for safe and quiet operation. Wet or dry samples of 1/2in (12.7mm) maximum feed size are rapidly reduced to a final particle size of 150—38µm (No.100 to No.400 U.S. Standard sieve size), depending on material.

The included chrome-steel alloy Grinding Set has a sample volume of 250ml and consists of an 8in (203mm) bowl with cover, two rings and a puck. For more efficient processing, additional Grinding Sets can be ordered as LCA-240. LCA-242 Tungsten Carbide Grinding Set with 100ml capacity is also available. Contact a Gilson Product Specialist for expert advice on applications for this unit. The heavy-duty 1hp motor includes a starting switch and drives the eccentric at a speed of 900rpm (750rpm at 50Hz). The control panel is set at the proper angle and height for best visibility and ease of operation. A 0-100 minute digital timer resets itself automatically after each test for maximum repeatability. An emergency stop button is provided. Sturdy painted-steel insulated cabinet reduces noise. The motor operates on 208/220/400V, 50/60Hz, and 3 phase power supplies. Single phase available as well. **Product Dimensions:** 24x24x43in (610x610x1092mm) WxDxH.

VIBRATING CUP PULVERIZER	
Vibrating Cup Pulverizer, 208/220/400V, 50/60Hz, 3 phase	LC-115
Accessories	
Chrome Steel 250ml Grinding Set	LCA-240
Tungsten Carbide 100ml Grinding Set	LCA-242

LC-53

BICO PULVERIZER

The Bico Pulverizer features efficient operation with minimum power consumption and long service life. Time proven design is compact and effective for processing hard rock, ores, and minerals. The grinding chamber is easily accessible for cleaning, maintenance and complete sample recovery.

The LC-53 Pulverizer grinds 1/4in (6.4mm) feed material to approximately 75µm (No.200 sieve size) in a single pass, depending on material. Throughput is about 60lb (27kg) per hour. A threaded knob with locking lever adjusts the gap between the 8in (203mm) diameter grinding plates to control particle size output. Stationary and revolving grinding plates are easily replaced. Grinding Plate Sets are available in a variety of materials and hardnesses to suit individual applications. One LCA-6 Iron Alloy Grinding Plate Set is included. LCA-5 Semi-Steel set is recommended for most applications, and has up to three times the wear resistance of LCA-6. Semi-steel is a compound of iron carbide in a Martensite matrix, with a Rockwell C-Scale hardness of 55—62. Other heavy-duty or special-use plate sets available for specialized applications. Contact a Gilson Product Specialist for advice on selecting the best grinding plate options for your application.

Power from the 2hp motor rotates the shaft at 900—1,000rpm through a double V-belt drive. Three phase 50 or 60Hz motors can be set to operate on 220V or 440V. A motor starting switch is included, and must be installed separately. Inquire for additional voltages. Totally enclosed motor has thermal overload protection. Safety guards and catch pan are included. Lubrication to shaft bearings is supplied by manually adjusted grease cups. **Product Dimensions:** 37x22x23 (940x559x584mm), WxDxH.

The LCA-91 Dust Enclosure Bench has a lighted interior, removable bottom grate and a hinged cover with a viewing panel. High capacity blower moves dust to a collection drawer with a replaceable filter cartridge and exhaust silencer. **Product Dimensions:** 65x36x60in (1,651x914x1,524mm), WxDxH.

BICO PULVERIZER	
Bico Pulverizer, 220-240V, 50/60Hz, 3 phase	LC-53
Accessories	
Semi-Steel Grinding Plate Set	LCA-5
Iron Alloy Grinding Plate Set	LCA-6
Low-Phosphorus Carbon Steel Grinding Plate Set	LCA-7
Manganese Steel Grinding Plate Set	LCA-8
Hardened Alloy Grinding Plate Set	LCA-9
Ceramic Grinding Plate Set	LCA-11
Dust Enclosure Bench, 115V/60Hz	LCA-91
Replacement Filter for LCA-91	LCA-92

LC-350

LC-502

HOLMES COAL PULVERIZERS
ASTM D2013

These bench-type pulverizers are recommended for reducing coal or coke from No.4 to No.60 sieve size. Light duty LC-350 has manual feed from the 1L feeder hopper to pulverizing chamber. Other models have 1/8hp chain-driven auger feed. All have 6in (152mm) diameter x 2in (51mm) wide chamber. LC-350 and LC-500 have 115V direct rotor drive. Top quality LC-502 has 230V (115V on request) belt drive for smoother operation and longer parts life. Starter is NEMA 12. Add "F" to model numbers for units to operate on 230V/50Hz power supplies.

All models have one-piece balanced rotor with hard coated hammers, driven by 1hp, single phase motor with overload protection. Pulverizing chambers are fully sealed and have quick-opening latch for cleaning or changing screen plate cylinders. Five screen plate cylinders are supplied with each machine in sizes .020, .024, .033, .040, .0625in diameter holes. Lock pins hold screens in place around circumference of pulverizing chamber. Feed hoppers and sample cups are galvanized. Standard feed hoppers have 0.5L capacity. Inquire for 1L hoppers. Machines all have steel base plate with four rubber pads.

HOLMES COAL PULVERIZERS

Model	lb/min (g/min)	Feed Hopper ft³ (L)	Sample Cup ft³ (L)	Dimensions WxDxH, in (mm)
LC-350	0.9 (400)	0.04 (1.0)	0.1 (3)	18x22x21-1/2 (457x559x545)
LC-500	0.9 (400)	0.02 (0.5)	0.23 (6.4)	19x19-1/2x25 (485x495x635)
LC-502	1.0 (450)	0.02 (0.5)	0.19 (5.4)	20x28x24 (508x711x610)

LC-100

HARDGROVE GRINDABILITY TESTER
ASTM D409

Hardgrove Grindability measures relative ease of pulverization of coals compared to standard coals. The resulting Hardgrove Grindability Index (HGI) provides a measure of energy required in a grinding process or a measure of yield for a given energy input. A prepared 50g sample of No.16—No.30 sieve size coal and eight 1in (25.4mm) diameter polished steel grinding balls are placed in a stationary bowl having a machined circular track. An upper grinding ring with matching track is rotated at 20rpm to drive the balls while a fixed load of 64lb (29kg) is maintained by weighting the motor-driven spindle attached to the upper ring. A counter/switch assembly automatically stops the tester after 60 revolutions, and amount of grinding is determined by sieving on a No.200 sieve. Model LC-100 is made from durable quality materials throughout to assure reliable, maintenance-free operation. The LC-82 Motorized Disk Mill (listed separately) meets ASTM requirements for sample preparation for the LC-100. **Product Dimensions:** 20x16x16in (508x406x406mm), WxDxH.

New Hardgrove machines must be user-calibrated with a set of four special coal reference samples having approximately 40, 60, 80, and 100 HGI. Order separately as LCA-30.

HARDGROVE GRINDABILITY TESTER

Hardgrove Grindability Tester, 115V/60Hz LC-100
230V/50Hz LC-100F

Accessories

Reference Samples for Calibration, set of 4 ..... LCA-30

LC-8

LC-7

LC-82

LC-80

MINI-PULVERIZER & MINI-CRUSHER

LC-7 Mini-Pulverizer reduces up to 20g of 1/8in (3.2mm) material to minus No.140 (106µm). Unit is supplied with 1-5/8in (41mm) diameter high density alumina ceramic grinding plates. A switch reverses direction of plate rotation for extended plate life of up to 3,000 samples. For extra-hard materials, the LCA-56 Tungsten Carbide Plate Set is available as an accessory. Grind is adjustable to produce sample sizes from No.40—No.140 (425—106µm). Nearly all product is recoverable by brushing.

The Mini-Pulverizer has cam-action closure with sealed bearings and is driven by a 1/3hp capacitor-start motor mounted on rubber feet. **Product Dimensions:** 15x10x10in (381x254x254mm), LxWxH.

LC-8 Mini-Crusher has 2x2in (51x51mm) feed opening for crushing 1in (25.4mm) and smaller feed material to 1/16in (1.6mm) and finer at about 1/4lb (114g) per minute. The unit comes standard with hardened steel alloy jaw and cheek plates. For special applications, also order LCA-46 ceramic jaw and cheek set (85% alumina) to avoid metal contamination or LCA-47 tungsten carbide set (in 6% cobalt binder) for extra tough jobs. Sets are interchangeable and adjust in opening to produce product from 1/4in (6.4mm) to below 1/16in (1.6mm) in size.

Construction of the LC-8 features a case-hardened alloy steel eccentric shaft running in heavy-duty sealed needle bearings. The crusher is belt driven by a 1/4hp motor with overload and On/Off switches, all mounted on a steel base with rubber feet for freestanding operation. **Product Dimensions:** 16x9x9in (406x229x229mm), LxWxH. Samples are collected in a stainless steel tray.

MINI-PULVERIZER & MINI-CRUSHER

Mini-Pulverizer, 115V/60Hz	LC-7
230V/50Hz	LC-7F
Mini-Crusher, 115V/60Hz	LC-8
230V/50Hz	LC-8F

Accessories

Replacement Alumina Plate Set for LC-7	LCA-55
Tungten Carbide Plate Set for LC-7	LCA-56
Replacement Alloy Steel Plate Set for LC-8	LCA-45
Ceramic Plate Set for LC-8	LCA-46
Tungsten Carbide Plate Set for LC-8	LCA-47

LABORATORY DISK MILLS

Hand-Crank or Motorized Laboratory Disk Mills provide adequate performance for limited dry or wet grinding to moderate fineness. Mills are useful for coal, chemicals, ores, pharmaceuticals, nuts, grains, and other friable materials. Feed hoppers hold 50in³ (0.8L). Product fineness is easily set by thumb screw adjustment of disk clearance. No.80—No.100 (180—150µm) is typical fineness limit. Mills disassemble quickly without tools for cleaning. Both use 4in (102mm) diameter fixed and rotating dry grinding disk sets.

LCA-171 Coarse Grinding Set allows higher throughput of coarse product. Wet Grinding Worm Feeder accessories are available for wet or oily materials. Feeders (with included disk sets) quickly interchange, so extras are useful for different sample types to avoid contamination.

LC-80 Hand-Crank Disk Mill has painted, cast iron body that mounts by screw clamp on a bench top up to 1.5in (38.1mm) thick. Capacity varies with type of material, but 10lb (4.5kg) per hour is typical. Overall height is 14in (356mm). Includes LCA-175 Dry Grinding Feeder and Disk Set.

LC-82 Motorized Disk Mill has a 1/3hp single phase gearmotor mounted to a rigid cast aluminum base with stable 3-point rubber foot pads. Body is plated cast iron. Capacity varies with type of material, but 40lb (18kg) per hour is typical. The LC-82 meets the requirements of ASTM C409 for sample preparation of Hardgrove Grindability specimens. The oil-filled gear box has a replaceable (LCA-179) safety coupling to prevent overload damage. An 8ft (2.4m) grounded cord with in-line switch is provided. Includes LCA-176 Dry Grinding Feeder and Disk Set. A complete extra Grinding Head (includes body) with tooth feed is also available. **Product Dimensions:** 25x8x12in (635x203x305mm), LxWxH.

LABORATORY DISK MILLS

Hand-Crank Disk Mill	LC-80
Motorized Disk Mill, 115V/60Hz	LC-82
230V/60Hz	LC-82S
230V/50Hz	LC-82F

Accessories

Fine Grinding Disk Set	LCA-170
Coarse Grinding Disk Set	LCA-171
Wet Grinding Feeder & Disk Set for LC-80	LCA-172
Wet Grinding Feeder & Disk Set for LC-82	LCA-173
Dry Grinding Feeder & Disk Set for LC-80	LCA-175
Dry Grinding Feeder & Disk Set for LC-82	LCA-176
Complete Grinding Head for LC-82	LCA-178
Safety Coupling for LC-82	LCA-179

LC-88

LCA-34 thru LCA-37

LC-91 shown with LCA-63

BENCHTOP LABMILL

Compact Benchtop Labmill runs smoothly and quietly, adjusting easily for four sizes of milling jars from 0.5—10L (16—320oz). Sample volumes from 75ml to 4L can be handled with unattended ease. Estimated specimen capacity is approximately 25% of total jar volume. Volume for grinding media required is approximately 50% of jar volume. The special HDPE (High Density Polyethylene) jars are disposable to avoid cross-contamination and feature baffled interiors for efficient wet or dry grinding action. Each milling jar is held in a supporting metal sleeve for rigidity.

The unit also holds other grinding jars, from 3—7in (75—178mm) diameter, and up to 11in (279mm) width. A speed control switch gives 10—260rpm roller speed from the direct-drive 60 Watt DC motor. For 230V, 50/60Hz electrical supplies, order TR-502 Transformer separately. Disposable Grinding Jars and Supporting Metal Sleeves are ordered separately. **Product Dimensions:** 18x14x2.5in (457x356x64mm), WxDxH.

BENCHTOP LABMILL	
Benchtop Labmill, 115V, 50/60Hz	LC-88
Accessories	
Disposable HDPE Jars, 500ml, pkg. 12	LCA-73
Disposable HDPE Jars, 1L, pkg. 6	LCA-74
Disposable HDPE Jars, 4L, pkg. 6	LCA-75
Disposable HDPE Jars, 10L, pkg. 4	LCA-76
Stainless Steel Sleeve for 500ml Jar	LCA-34
Stainless Steel for 1,000ml Jar	LCA-35
Anondized Sleeve for 4,000ml Jar	LCA-36
Aluminum Sleeve for 10,000ml Jar	LCA-37

JAR MILLS

Bench or floor model Jar Mills have one to six jar capacities. Rollers allow for simple adjustment for jars from 2—9in (51—229mm) diameter. Mills are used for wet or dry grinding, mixing, and blending of ores, chemicals, ceramics, glass, etc. Special 2in (50.8mm) diameter neoprene rollers keep jars centered during operation. Adjustable speed settings from 0—300rpm. Welded steel frames, roller chain drives, and sealed ball bearings assure long service life. Mills operate on 115V, 50/60Hz electrical supply. Add "F" to model number for 230V/50Hz models. Grinding jars and media are ordered separately.

Grinding Jars are Roalox porcelain or premium High Alumina ceramic. Roalox has four times the wear life of ordinary porcelain. High Alumina fired ceramic has higher service life, negligible silica contamination, and polyurethane coated body to minimize breakage. Both have wide mouths for fast loading/cleaning and neoprene gasketed lids with positive-locking bar and hand wheel. Jar capacities range from 0.3—5.6L, and diameters from 3.4—9.5in (86—241mm). Specimen capacity is approximately 25% of total jar volume. Grinding media required is approximately 50% of jar volume.

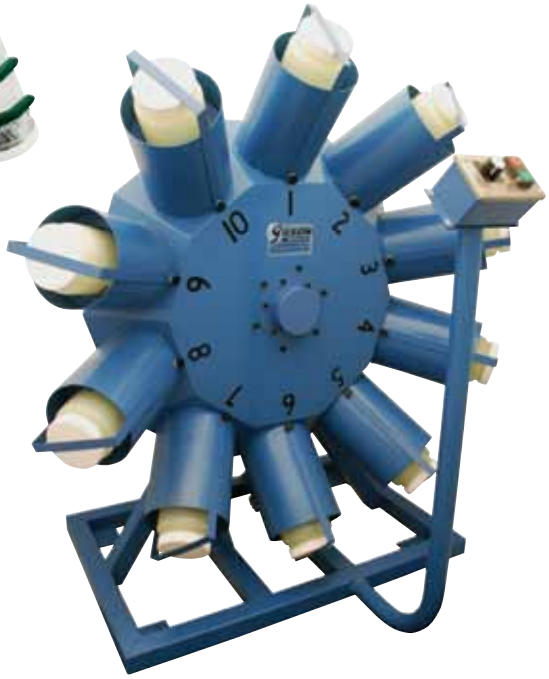
Grinding Media is cylindrical with length equal to diameter for maximum surface area. Ultra high fired Burundum alumina with 3.42 specific gravity is ideal for most milling. Burundum is supplied in 10lb (5kg) packages. Premium high-density 5.55 specific gravity Zirconia mills twice as fast as alumina with less wear of grinding jars and media. Zirconia is sold in 5lb (2kg) packages.

JAR MILLS			
Model	**Capacity Tiers/Jars**	**Motor hp**	**Dimensions WxDxH, in (mm)**
LC-91	1/2	1/4	30x13x16 (762x330x406)
LC-92	2/2	1/4	20x12x34 (508x305x864)
LC-95	3/6	3/4	40x12x50 (1,016x305x1,270)

Accessories	
Roalox Porcelain Grinding Jar, 0.3L	LCA-50
Roalox Porcelain Grinding Jar, 1.0L	LCA-51
Roalox Porcelain Grinding Jar, 1.8L	LCA-52
Roalox Porcelain Grinding Jar, 5.6L	LCA-53
High Alumina Grinding Jar, 1.0L	LCA-61
High Alumina Grinding Jar, 5.6L	LCA-63
Burundum Media, 13x13mm, 10lb pkg.	LCA-65
Burundum Media, 21x21mm, 10lb pkg.	LCA-66
Burundum Media, 32x32mm, 10lb pkg.	LCA-68
Zirconia Media, 10x10mm, 5lb pkg.	LCA-70
Zirconia Media, 13x13mm, 5lb pkg.	LCA-72

SSA-39

SP-42 shown with SPA-60 & SPA-64



SP-48R shown with SC-108

BALL-PAN HARDNESS TEST
ASTM D3802

The ball-pan hardness test method determines degradation resistance of granulated activated carbons. SSA-39 set consists of a special 8in (203mm) diameter brass ball-pan and two sets of 1/2in (12.7mm) and 3/8in (9.5mm) steel balls. The ball-pan has a special 8mm thick hardened brass bottom plate dished out at 1,092mm inner radius to give a 3.2mm thickness at its center. The bottom plate is mounted in a standard full-height sieve frame with extended rim for stacking.

A sample is placed in the ball-pan with the steel balls and run for 30 minutes in a Model SS-30 Ro-Tap Sieve Shaker. The ball-pan is stacked with five regular 8in sieves, sieve pan, and cover. "Hardness" of the activated carbon sample is determined by degradation resistance as measured by sieving the ground sample. The Ro-Tap, sieves, sieve pan, and cover are listed separately.

BALL-PAN HARDNESS TEST	
Ball-Pan Hardness Set	SSA-39
Accessories	
Ball-Pan	SSA-41
1/2in Steel Balls, set of 15	SSA-43
3/8in Steel Balls, set of 15	SSA-44

GILSON MIXING WHEELS
ASTM D2013

Sample preparation for coal or ores requires thorough mixing to assure consistent and accurate results. To satisfy the need for mechanical sample mixing instruments, Gilson offers bench-mounted, and floor-mounted Mixing Wheels for a wide range of sample quantities.

SP-42 Mini Mixing Wheel rotates up to six 8oz (237ml) sample jars over a 10—60rpm adjustable speed range. The large three-finger thumbscrew clamps lock bottles securely at a 45° angle (as specified by ASTM D2013) or other required position. The sturdy bench unit with painted steel frame has resilient rubber feet and includes a 6ft (1.8m) three-wire cord. The remote speed control module permits safe use away from wheel rotation. The continuous-duty 1/30hp motor is adequate to rotate containers with diameters up to the 3-1/2in (89mm) limit of the clamps, but SPA-60 wide-mouth, straight-sided 8oz glass jars with 58mm cap are recommended. When permissible, SPA-64 metallic Jack Rocks may be added to samples to speed the mixing process. Order the TR-502 transformer for 230V applications. **Product Dimensions:** 9.5x10x10in (241x254x254mm), WxDxH without jars.

SP-48R Floor Mount Mixing Wheel has ten 45°-mounted sample stations for 1/2gal (2L) sample containers 4.7x9.4in (119x239mm), dia.xH. The wheel is mounted on a heavy-duty painted steel floor stand. Rotation can be varied from 0—25rpm. **Product Dimensions:** 48x40x50in (1,220x1,020x1,270mm), WxDxH.

SC-108 wide-mouth high density polyethylene sample containers with screw-top lids are ordered in cases of 12. Mixing wheels for other containers quoted on request.

GILSON MIXING WHEELS	
Mini Mixing Wheel, 115V, 50/60Hz	SP-42
Floor Mount Mixing Wheel, 115V/60Hz	SP-48R
230V/50Hz	SP-48RF
Accessories	
8oz Sample Jar for SP-42, case of 24	SPA-60
1/2gal Sample Jar for SP-48R, case of 12	SC-108
Jack Rocks, case of 500	SPA-64
Transformer for 230V for SP-42	TR-502

TSA-169R

TSA-1167

TSA-190

MA-193

MA-189

MA-38

TSA-195

MA-30

TIMERS & STOPWATCHES

TIMERS & STOPWATCHES			
Description	**Model**	**Power Supply**	**Range**
Digital Lab Timer controls up to 20 amp loads. Bright 1/2in (12.6mm) LED display shows remaining time, stops machine at zero, then resets to programmed time for next use. Test times are set with tactile panel buttons. When stopped and restarted, countdown resumes from paused time. Electronics are mounted in a stainless steel case. The timer has a three-wire receptacle for timed devices. TSA-169RF has two 6ft (3m) three-wire cords without plugs for connection to mains and machine. Product Dimensions: 4.5x5x5.5in (114x127x140mm), WxDxH.	TSA-169R TSA-169RF	100-250V 50/60Hz	Four Modes: 9,999 sec 9,999 min 99:59 min:sec 99:59 hr:min
Gralab Timer is an electromechanical timer that plugs into wall outlet, and controlled device plugs into timer. Option for continuous-run without removing timer from circuit. Rugged steel case with white finish. 8in (203mm) Dial has black markings and hands. Smaller red numerals allow alternate use as a stop-clock. Controls up to 1/3hp motor or 1,200 Watt resistive load.	TSA-1167 TSA-1167F	120V/60Hz 230V/50Hz	60min x 1sec
Spring-Wound Timers are simple to operate and have 30 or 60 minute ranges in 1 minute increments. Just plug the timed device into the back of the timer and turn the dial to the desired interval. When the dial returns to zero, power is cut off and the device stops. The black plastic case features an easy to set indicator dial and satin chrome face with black numerals. These timers are fully grounded for single-phase 115V/60Hz operation up to 1,800 Watts.	TSA-190 TSA-191	115V/60Hz/15A	30min x 1min 60min x 1min
Dual Timer has 0.6in LCD displays for two independent timers, with both audio and flashing green/red visual alarms. Two memory settings for repetitive times. Large buttons and simple programming make it easy to use. NIST Traceable certificate for ±0.01% accuracy. Supplied with magnetic back, stand/spring-clip, lanyard opening, and two AAA alkaline batteries.	MA-193	Two AAA Batteries (Included)	2 Timers 99hr:99min x 1sec
Thermo-Timer is a 99 minute countdown timer that also displays temperature in 32°—392°F (0°—200°C) range, and is switchable between °F and °C. Temperature cable with probe fits into closed oven door. Alarm sounds when time or temperature limit is reached. Time and temperature functions can be used separately or simultaneously. The display swivels for easy reading, and magnets permit mounting on sides of ovens. Accuracy is ±2°C. Probe and two AAA batteries included.	MA-189	Two AAA Batteries (Included)	24hr x 1sec
Four-Channel Traceable® Alarm Timer has a large, 3/4in (19mm) display for viewing from across the lab. Accuracy is 0.01%. The extra-loud, high-decibel alarm sounds for one minute or until silenced. At zero, the timer starts counting up, showing time elapsed since alarm. All 4 channels may be used simultaneously and separately to count-down or count-up. For repetitive tests, the memory returns the display to the previously programmed countdown time at the touch of a key. Finger-size keys make it easy to set times and change channels. An individually serial-numbered Traceable® Certificate traceable to NIST is provided from an A2LA accredited laboratory. Magnetic back and flip-open stand allows the timer to be placed on any surface. Product Dimensions: 2-3/4 x 2-1/2 x 1/2 in (70x64x13mm) Weight is 2oz (60g).	MA-38	2-year, silver-oxide battery (Included)	99 hr, 59 min, 59sec x 1sec
Field Test Timer is a simple LCD digital timer with a magnetic back, audible signal, and large 1.2in (30mm) start button, ideal for laboratory or field applications. Test times reset automatically until new time is programmed. Timer can be hand held or attached to magnetic material. A 30 second alarm sounds at zero. Durable plastic case measures 3.5x1.8x0.5in (89x46x13mm), HxWxD.	TSA-195	1.5V Battery (Included)	99min x 1sec
Large Display Digital Stopwatch has click-stop controls with positive tactile feedback and a large LCD display. Unit has split interval, clock and calendar functions. Housed in a rugged 3x2.5x0.75in (76x64x19mm) ABS plastic case. A vinyl case is included.	MA-30	Battery (Included)	60min x 0.01sec

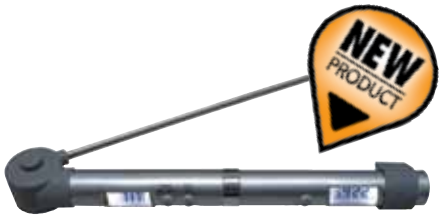
MA-102

MA-117

MA-118

MA-123

MA-127



MA-114

DIAL & POCKET THERMOMETERS

DIAL & POCKET THERMOMETERS

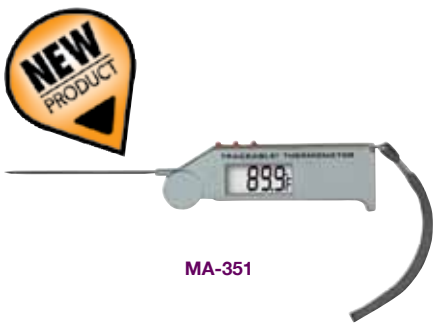
Description	Model	Range	Division	Length in (mm)
Pocket Dial Thermometers Dial case and pointed 0.15in diameter stem are type 304 stainless steel. Accurate to 1% of range. Have calibration reset adjustment and plastic carrying case with clip. 1in diameter dial face.	MA-100 MA-101 MA-102 MA-103 MA-104 MA-105	-40° — 160°F 0° — 220°F 25° — 125°F 50° — 550°F 0° — 150°F 10° — 285°C	2° 2° 1° 5° 2° 5°	5 (127) 5 (127) 5 (127) 5 (127) 5 (127) 5 (127)
Pocket Digital Thermometers Both have °F/°C switch. LCD display, one year "on" life with included 1.5V watch battery, On/Off switch, one second update, pocket case and clip, 5in L x .15in diameter SS stem. Wide range MA-117 also has spare battery. Waterproof MA-118 features LED backlit display, Max/Min memory and hold functions.	MA-117 MA-118	-58° — 500°F (-50° — 260°C) -40° — 500°F (-40° — 260°C)	0.1° 0.1°	5 (127) 5 (127)
Dial Lab Testing, Dual Range Dial cases and 0.15in diameter stems are type 304 stainless steel. 1.75in °F/°C dual-scale Polycarbonate dials. Accurate to 1% of range. Indicating pointer and adjustable mounting clip. Adjustment nut allows calibration to known temperature. MA-123 has 2in dial with sturdy Glass crystal, less expensive MA-123P has 2in polycarbonate crystal. Not for oven use.	MA-120 MA-121 MA-122 MA-123 MA-123P	0° — 220°F (-18° — 110°C) 25° — 125°F (0° — 50°C) 32° — 300°F (0° — 150°C) 50° — 550°F (0° — 285°C)	2° 1° 2° 5°	8 (203) 8 (203) 8 (203) 8 (203)
Dial Lab Testing, Single Range 304 stainless steel Dial cases with 0.15in diameter stems. Polycarbonate dials are 1.75in diameter with single-range °F or °C dial faces and indicating pointers. Accurate to 1% of range. Adjustment nut allows calibration to known temperature. Not for oven use.	MA-120F MA-121F MA-124	0° — 220°F 25° — 125°F 0° — 50°C	2° 1° 0.5°	8 (203) 8 (203) 8 (203)
Surface Dial Dials are 2in diameter with 2% accuracy and measure on contact with any horizontal surface. Also attach to non-horizontal ferrous surfaces via two integral magnets.	MA-125 MA-126 MA-127 MA-130 MA-131	0° — 150°F 0° — 250°F 0° — 500°F -15° — 65°C -20° — 120°C	2° 5° 10° 1° 1°	— — — — —
Thermistor/Infrared Pen Unit handles both infrared surface and penetration temperature measurements. Infrared surface temperatures are displayed on a backlit LCD. Accuracy is ±2% of reading or 2°C, whichever is greater. The stainless steel thermistor probe rotates out and locks at 90° or 180° for penetration measurements, and features min-max and hold functions. Accuracy is ±1.5% of reading. Carrying case and batteries are included. 7x3/4in (185x15mm). Probe: 6x1/16in (155x3mm).	MA-114	IR: -28° — 428°F (-33° — 220°C) Thermistor: -58° — 302°F (-50° — 150°C)	IR: 0.1°, 1° above 200°C Thermistor: 0.1°	6 (155)

MA-341

MA-115

MA-343

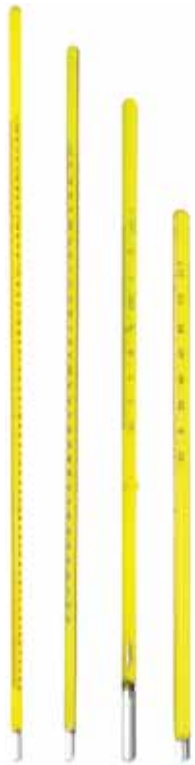
MA-347



MA-351

DIAL & POCKET THERMOMETERS

DIAL & POCKET THERMOMETERS				
Description	**Model**	**Range**	**Resolution**	**Accuracy**
Traceable® Jumbo Display Digital Dial Thermometers provide continuous display for over a year. Switchable between °F/°C. MA-342 Ultra™ accuracy is ±0.3°C at tested points. Extra large LCD display is easy to read. Stainless steel probe is resistant to most laboratory chemicals. Plastic and stainless steel construction make it safer than mercury thermometers. An individually serial numbered NIST traceable Certificate is included. Stem: 5.25x0.15in (133x3.8mm), LxDia. Top Diameter: 2-1/8in (54mm). Overall Length: 6-1/2in. Supplied with silver oxide battery.		-58°— 302°F (-50°— 150°C)	0.1° from -20° — 200°, 1° otherwise	
Traceable® Jumbo Display Digital Dial Thermometer	MA-341			±1°C
Traceable® Ultra™ Jumbo Display Digital Dial Thermometer	MA-342			±0.3°C
Traceable® Long-Stem Thermometers feature stainless steel probes for easy measurements in flasks, beakers, and other recessed areas. Rugged ABS Plastic and stainless steel construction. MA-115 and MA-116 models have 8in (203mm) probes but differ in accuracy. MA-119 has a longer 11.4in (290mm) stem. Bright 1/4in digital display switches between °C/°F ranges. Includes protective probe sleeve, NIST Traceable certificate and battery.		-58°— 302°F (-50°— 150°C)	0.1° from -20° — 200°, 1° otherwise	
Traceable® Long-Stem Thermometer	MA-115			±1°C
Traceable® Long-Stem Ultra Thermometer	MA-116			±0.2°C
Traceable® Long-Stem Thermometer	MA-119			±1°C
Traceable® Pocket Thermometer has flat profile design. Stainless steel and plastic construction makes it safe for all lab tests. Probe guard extends overall length to 10-3/4in. MA-344 Ultra™ model accuracy is ±0.4°C at tested points. Recall Max/Min readings at the touch of a key. HOLD key freezes display; another switches from °F/°C. Large, bright LCD display is easy to read. Operates continuously for 1-1/2 years on a replaceable silver oxide battery. Includes an individually serial numbered NIST traceable Certificate and a protective case. Overall Length: 7in (178mm). Stem: 3.5x0.14in (89x3.6mm), LxDia.		-58°— 572°F (-50°— 300°C)	0.1° from -20° — 200°, 1° otherwise	
Traceable® Pocket Thermometer	MA-343			±1.5°C
Traceable® Ultra™ Pocket Thermometer	MA-344			±0.4°C
Traceable® Robo™ Thermometer has rotating digital display for easy viewing. Switchable between °F/°C. MA-348 Ultra™ accuracy is ±0.4°C. Stainless steel probe is resistant to most laboratory chemicals. Rugged plastic and stainless steel construction makes it safer than mercury in glass thermometers. An individually serial numbered NIST traceable Certificate is included. Large, bright 1/4in high LCD display is easy to read. Overall Length: 9.25in (235mm). Stem: 8x0.14in (203x3.6mm), LxDia. Battery is included.		-58°— 536°F (-50°— 280°C)	0.1° from -20° — 200°, 1° otherwise	
Traceable® Robo™ Thermometer	MA-347			±1°C
Traceable® Ultra™ Robo™ Thermometer	MA-348			±0.4°C
Traceable® Flip-Stick™ Thermometer has flip-to-open design. Stainless steel probe can be positioned at any angle. When folded, protected probe permits carrying by the wrist strap or in a pocket. Large LCD display. Ultra™ model accuracy is ±0.3°C at tested points. Features include °F/°C switch, Max/Min memory, and a HOLD switch. An individually serial numbered NIST traceable Certificate is included. Length: extended 11in (279mm), folded 6in (152mm). Stem: 4.5x0.14in (114x3.6mm), LxDia. Weight: 2.4oz (340g).		-58°— 572°F (-50°— 300°C)	0.1° from -20° — 200°, 1° otherwise	
Traceable® Flip-Stick™ Thermometer	MA-351			±1°C
Traceable® Ultra™ Flip-Stick™ Thermometer	MA-352			±0.3°C



ASTM Thermometers

ASTM THERMOMETERS
ASTM E1, E77

ASTM thermometers have strict manufacturing tolerances. Accuracy is assured by inspection and testing of samples from each production run. Each thermometer is supplied with a statement of compliance to E1 and E77 requirements. ASTM Thermometers are yellow-backed glass with permanent graduations, mercury-filled and individually packed in cardboard tubes. MA-450 Sets include one each of ASTM 62 to 70 (°C or °F) in a velvet-lined protective case. Inquire for other ASTM Thermometers.

To order ASTM thermometers with NIST traceable Certificate of Calibration at five points, add "T" suffix to the model number.

helpfulhint

State or local ordinances may prevent sales or shipment of instruments containing Mercury into your area.

Please check for restrictions before ordering or consult our customer service professionals.

ASTM THERMOMETERS

ASTM THERMOMETERS

Type	Model	ASTM Number	Range	Division	Length in (mm)	Immersion in (mm)
General Use	MA-420F	1F	0°— 302°F	2.0°F	12.7 (322)	3 (76)
	MA-420C	1C	-20°— 150°C	1.0°C	12.7 (322)	3 (76)
	MA-421F	2F	20°— 580°F	2.0°F	15.4 (390)	3 (76)
	MA-421C	2C	-5°— 300°C	1.0°C	15.4 (390)	3 (76)
	MA-422F	3F	20°— 760°F	2.0°F	16.3 (415)	3 (76)
	MA-422C	3C	-5°— 400°C	1.0°C	16.3 (415)	3 (76)
Cloud & Pour	MA-424F	5F	-36°— 120°F	2.0°F	9.0 (230)	4.3 (108)
	MA-424C	5C	-38°— 50°C	1.0°C	9.0 (230)	4.3 (108)
	MA-425F	6F	-112°— 70°F	2.0°F	9.0 (230)	3 (76)
	MA-425C	6C	-80°— 20°C	1.0°C	9.0 (230)	3 (76)
Distillation	MA-426F	7F	30°— 580°F	2.0°F	15.1 (384)	Total
	MA-426C	7C	-2°— 300°C	1.0°C	15.1 (384)	Total
	MA-427F	8F	30°— 760°F	2.0°F	15.1 (384)	Total
	MA-427C	8C	-2°— 400°C	1.0°C	15.1 (384)	Total
Precision Use	MA-430F	62F	-36°— 35°F	0.2°F	14.9 (379)	Total
	MA-430C	62C	-38°— 2°C	0.1°C	14.9 (379)	Total
	MA-431F	63F	18°— 89°F	0.2°F	14.9 (379)	Total
	MA-431C	63C	-8°— 32°C	0.1°C	14.9 (379)	Total
	MA-432F	64F	77°— 131°F	0.2°F	14.9 (379)	Total
	MA-432C	64C	25°— 55°C	0.1°C	14.9 (379)	Total
	MA-433F	65F	122°— 176°F	0.2°F	14.9 (379)	Total
	MA-433C	65C	50°— 80°C	0.1°C	14.9 (379)	Total
	MA-434F	66F	167°— 221°F	0.2°F	14.9 (379)	Total
	MA-434C	66C	75°— 105°C	0.1°C	14.9 (379)	Total
	MA-435F	67F	203°— 311°F	0.5°F	14.9 (379)	Total
	MA-435C	67C	95°— 155°C	0.2°C	14.9 (379)	Total
	MA-436F	68F	293°— 401°F	0.5°F	14.9 (379)	Total
	MA-436C	68C	145°— 205°C	0.2°C	14.9 (379)	Total
	MA-437F	69F	383°— 581°F	1.0°F	14.9 (379)	Total
	MA-437C	69C	195°— 305°C	0.5°C	14.9 (379)	Total
	MA-438F	70F	563°— 761°F	1.0°F	14.9 (379)	Total
	MA-438C	70C	295°— 405°C	0.5°C	14.9 (379)	Total
Precision Use Full Set	MA-450F	°F	-36°— 761°F	Varies	14.9 (379)	Total
	MA-450C	°C	-38°— 405°C	Varies	14.9 (379)	Total
Pensky-Martens & Tag Closed High	MA-210F	9F	20°— 230°F	1.0°F	11.8 (290)	2.3 (57)
	MA-210C	9C	-5°— 110°C	0.5°C	11.8 (290)	2.3 (57)
Tag Closed Low	MA-428F	57F-	4°— 122°F	1.0°F	11.8 (290)	2.3 (57)
	MA-428C	57C	-20°— 50°C	0.5°C	11.8 (290)	2.3 (57)
Pensky-Martens High	MA-211F	10F	200°— 700°F	5.0°F	11.8 (290)	2.3 (57)
	MA-211C	10C	90°— 370°C	2.0°C	11.8 (290)	2.3 (57)
Open Flash	MA-212F	11F	20°— 760°F	5.0°F	12.1 (310)	1 (25)
	MA-212C	11C	-6°— 400°C	2.0°C	12.2 (310)	1 (25)
Gravity	MA-429F	12F	-5°— 215°F	0.5°F	16.5 (420)	Total
	MA-429C	12C	-20°— 102°C	0.2°C	16.5 (420)	Total
Loss on Heat	MA-223C	13C	155°— 170°C	0.5°C	7.0 (155)	Total
Bituminous Softening Point	MA-225F	15F	30°— 180°F	0.5°F	15.6 (396)	Total
	MA-225C	15C	-2°— 80°C	0.2°C	15.6 (396)	Total
	MA-226F	16F	85°— 392°F	1.0°F	15.6 (396)	Total
	MA-226C	16C	30°— 200°C	0.5°C	15.6 (396)	Total
	MA-227F	113F	30°— 350°F	1.0°F	15.9 (405)	Total
	MA-227C	113C	-1°— 175°C	0.5°C	15.9 (405)	Total
Saybolt Viscosity	MA-213F	17F	66°— 80°F	0.2°F	10.8 (275)	Total
	MA-213C	17C	19°— 27°C	0.1°C	10.8 (275)	Total
	MA-214F	18F	94°— 108°F	0.2°F	10.8 (275)	Total
	MA-214C	18C	34°— 42°C	0.1°C	10.8 (275)	Total
	MA-215F	19F	120°— 134°F	0.2°F	10.8 (275)	Total
	MA-215C	19C	49°— 57°C	0.1°C	10.8 (275)	Total
	MA-216F	20F	134°— 148°F	0.2°F	10.8 (275)	Total
	MA-216C	20C	57°— 65°C	0.1°C	10.8 (275)	Total
	MA-217F	21F	174°— 188°F	0.2°F	10.8 (275)	Total
	MA-217C	21C	79°— 87°C	0.1°C	10.8 (275)	Total
	MA-218F	22F	204°— 218°F	0.2°F	10.8 (275)	Total
	MA-218C	22C	95°— 103°C	0.1°C	10.8 (275)	Total
	MA-452F	77F	245°— 265°F	0.5°F	10.8 (275)	Total
	MA-454F	78F	295°— 315°F	0.5°F	10.8 (275)	Total
	MA-453F	108F	270°— 290°F	0.5°F	10.8 (275)	Total
	MA-455F	109F	320°— 340°F	0.5°F	10.8 (275)	Total
	MA-456F	79F	345°— 365°F	0.5°F	10.8 (275)	Total
	MA-457F	80F	395°— 415°F	0.5°F	10.8 (275)	Total
	MA-458F	81F	445°— 465°F	0.5°F	10.8 (275)	Total
Kinematic Viscosity	MA-219F	47F	137.5°— 142.5°F	0.1°F	12.0 (305)	Total
	MA-219C	47C	58.6°— 61.4°C	0.05°C	12.0 (305)	Total
	MA-220F	110F	272.5°— 277.5°F	0.1°F	12.0 (305)	Total
	MA-220C	110C	133.6°— 136.4°C	0.05°C	12.0 (305)	Total
Solvents Distillation	MA-460C	37C	-2°— 52°C	0.2°C	15.6 (396)	3.9 (100)
	MA-462C	39C	48°— 102°C	0.2°C	15.6 (396)	3.9 (100)
	MA-464C	41C	98°— 152°C	0.2°C	15.6 (396)	3.9 (100)
	MA-467C	103C	148°— 202°C	0.2°C	15.6 (396)	3.9 (100)
	MA-469C	105C	198°— 252°C	0.2°C	15.6 (396)	3.9 (100)
	MA-471C	107C	248°— 302°C	0.2°C	15.6 (396)	3.9 (100)

MA-531F

ASTM NON-MERCURY THERMOMETERS
ASTM E1, E77, E2251

These ASTM Non-mercury Thermometers meet standard test method requirements for use in their referenced applications. The liquid-in-glass thermometers have the same performance characteristics as ASTM Mercury Thermometers, but use safe blue liquid instead of mercury. The proprietary formula is biodegradable, nontoxic, and nonhazardous. Dark blue color is easily read against the white-backed stem.

For individual thermometers with five-point certification by an ISO/IEC accredited laboratory, add a "T" suffix to the model number when ordering. Full sets of Certified Precision Use Thermometers are available as MA-751CT for S62C to S70C ASTM numbers, or MA-751FT for S62F to S70F. To prevent fluid column separation, always store Non-Mercury Thermometers vertically, using our MA-305 Thermometer Storage Rack.

ASTM NON-MERCURY THERMOMETERS

Type	Model	ASTM Number	Range	Divisions	Length mm	Immersion
Bomb Calorimeter	MA-538C	S56C	19°— 35°C	0.02°	600	Total
	MA-538F	S56F	66°— 95°F	0.05°	600	Total
Coud & Pour	MA-524C	S5C	-38°— 50°C	2.0	235	108mm
	MA-524F	S5F	-36°— 120°F	1.0	235	108mm
Gravity	MA-529C	S12C	-20°— 120°C	0.2°	425	Total
	MA-529F	S12F	-5°— 215°F	0.5°	425	Total
Kinematic Viscosity	MA-536	S120C	38.5°— 41.5°C	0.05°	305	Total
Low Softening Point	MA-525C	S15C	-2°— 80°C	0.2	400	Total
	MA-525F	S15F	30°— 180°F	0.2	400	Total
Precision Use	MA-530C	S62C	-38°— 2°C	0.1°	400	Total
	MA-530F	S62F	-36°— 35°F	0.2°	400	Total
	MA-531C	S63C	-8°— 32°C	0.1°	400	Total
	MA-531F	S63F	18°— 89°F	0.2°	400	Total
	MA-532C	S64C	25°— 55°C	0.1°	400	Total
	MA-532F	S64F	77°— 131°F	0.2°	400	Total
	MA-533C	S65C	50°— 80°C	0.1°	400	Total
	MA-533F	S65F	122°— 176°F	0.2°	400	Total
	MA-534C	S66C	75°— 105°C	0.1°	400	Total
	MA-534F	S66F	167°— 221°F	0.2°	400	Total
	MA-535C	S67C	95°— 155°C	0.2°	400	Total
	MA-535F	S67F	203°— 311°F	0.5°	400	Total
Precision Use, Full Set	MA-751CT	°C	-38°— 405°C	Varies	400	Total
	MA-751FT	°F	-36°— 761°F	Varies	400	Total
Saybolt Viscosity	MA-514C	S18C	34°— 42°C	0.1	280	Total
	MA-514F	S18F	94°— 108°F	0.2	280	Total
	MA-518C	S22C	95°— 103°C	0.1°	280	Total
	MA-518F	S22F	204°— 218°F	0.2	280	Total
Tank	MA-540C	S58C	-34°— 49°C	0.5°	305	Total
	MA-540F	S58F	-30°— 120°F	1.0°	305	Total
	MA-542C	S59C	-18°— 82°C	0.5	305	Total
	MA-542F	S59F	0°— 180°F	1.0	305	Total

ASTM EQUIVALENT NON-MERCURY THERMOMETERS
ASTM E1, E77

These liquid-in-glass thermometers have physical and performance characteristics matching those of ASTM thermometers for their referenced applications, but have not yet been reviewed and accepted by ASTM for these purposes. They use a safe blue indicating liquid that is biodegradable, nontoxic, and nonhazardous. Dark blue color is easily read against the white-backed stem. Add a "T" suffix to the model number to specify thermometers with five-point certification by an ISO/IEC accredited laboratory. Always store Non-Mercury Thermometers vertically to prevent indicator fluid separation using our MA-305 Thermometer Storage Rack.

ASTM EQUIVALENT NON-MERCURY THERMOMETERS

Type	Model	ASTM Number	Range	Divisions	Length mm	Immersion
Bituminous Softening Point	MA-526C	S16C	30°— 200°C	0.5°	400	Total
	MA-526F	S16F	85°— 392°F	1.0°	400	Total
	MA-527C	S113C	-1°— 175°C	0.5°	410	Total
	MA-527F	S113F	30°— 350°F	1.0°	410	Total
Cloud & Pour	MA-545C	S6C	-80°— 20°C	1.0°	232	76mm
	MA-545F	S6F	-112°— 70°F	2.0°	232	76mm
General Use	MA-520C	S1C	-20°— 150°C	1.0°	327	76mm
	MA-520F	S1F	0°— 302°F	2.0°	327	76mm
Kinematic Viscosity	MA-519C	S47C	58.6°— 61.4°C	0.05°	320	Total
	MA-519F	S47F	137.5°— 142.5°F	0.1°	320	Total
	MA-557C	S110C	133.6°— 136.4°C	0.05°	320	Total
	MA-557F	S110F	272.5°— 277.5°F	0.1°	320	Total
Loss on Heat	MA-523C	S13C	155°— 170°C	0.5°	175	Total
Pensky-Martens & Tag Closed High	MA-510F	S9F	20°— 230°F	1.0°	295	57mm
	MA-510C	S9C	-5°— 110°C	0.5°	295	57mm
Saybolt Viscosity	MA-513C	S17C	19°— 27°C	0.1°	280	Total
	MA-513F	S17F	66°— 80°F	0.2°	280	Total
	MA-515C	S19C	49°— 57°C	0.1°	280	Total
	MA-515F	S19F	120°— 134°F	0.2°	280	Total
	MA-516C	S20C	57°— 65°C	0.1°	280	Total
	MA-516F	S20F	134°— 148°F	0.2°	280	Total
	MA-517C	S21C	79°— 87°C	0.1°	280	Total
	MA-517F	S21F	174°— 188F	0.2°	280	Total
	MA-552F	S77F	245°— 265°F	0.5°	290	Total
	MA-553F	S108F	270°— 290°F	0.5°	290	Total
	MA-554F	S78F	295°— 315°F	0.5°	290	Total
	MA-555F	S109F	320°— 340°F	0.5°	290	Total
	MA-556F	S79F	345°— 365°F	0.5°	290	Total
Solvents Distillation	MA-567C	S103C	148°— 202°C	0.2°	410	100mm
	MA-560C	S37C	-2°— 52°C	0.2°	400	100mm
	MA-562C	S39C	48°— 102°C	0.2°	400	100mm
	MA-564C	S41C	98°— 152°C	0.2°	410	Total
Tag Closed Low	MA-528C	S57C	-20°— 50°C	0.5°	292	57mm
	MA-528F	S57F	-4°— 122°F	1.0°	292	57mm

MA-155, MA-156 & MA-157

GENERAL PURPOSE NON-MERCURY THERMOMETERS

General Purpose Lab Thermometers are liquid-in-glass and SAMA (Scientific Apparatus Makers Association) approved. Each Thermometer is filled with an environmentally safe, nonhazardous Blue-Spirit liquid. There are no hazards from exposure or disposal problems if broken. Single fixed scale is accurate to ±1 division below 105°C (221°F), ±1.5 division above 105°C (221°F), and ±2 divisions above 200°C (392°F). Thermometers are calibrated for partial or total immersion as noted, serial numbered, and shipped with an accuracy statement. To prevent fluid column separation, these thermometers should be stored vertically in our MA-305 Thermometer Storage Rack.

GENERAL PURPOSE NON-MERCURY THERMOMETERS

Model	Range	Divisions	Length, mm	Immersion
MA-655	-20°— 110°C	1.0°	305	Total
MA-645	0°— 230°F	2.0°	305	Total
MA-145	0°— 230°F	2.0°	305	76mm
MA-646	0°— 300°F	2.0°	305	Total
MA-146	0°— 300°F	2.0°	305	76mm
MA-657	-10°— 260°C	1.0°	355	Total
MA-157	-10°— 260°C	1.0°	405	76mm
MA-155	-20°— 110°C	1.0°	305	76mm
MA-656	-20°— 150°C	1.0°	305	Total
MA-156	-20°— 150°C	1.0°	305	76mm
MA-147	20°— 500°F	2.0°	405	76mm
MA-648	-30°— 120°F	1.0°	305	Total
MA-649	-30°— 120°F	1.0°	305	76mm
MA-650	-35°— 50°C	1.0°	305	Total
MA-650P	-35°— 50°C	1.0°	305	76mm

NON-MERCURY THERMOMETERS

MA-110

MA-161

NON-MERCURY THERMOMETERS

Description	Model	ASTM Number	Range	Division	Length in (mm)
Pocket Copper-Plated Thermometer Red spirit-filled. Pointed copper bulb prevents abrasion and breakage. Reversible aluminum storage case serves as a handle.	MA-110	—	0°— 120°F	1.0°	6.0 (152)
Max/Min Registering Thermometer shows maximum and minimum temperatures in °F and °C since last reset, as well as current temperature. Reset button and protective plastic case for the spirit filled U-shaped capillary instrument are included.	MA-161	—	-40°— 120°F (-40°— 50°C)	2.0°F (1.0°C)	8.0 (203)
Hybrid Max/Min Thermometer is a unique Mercury-Free model with spirit-in-glass units showing current temperatures, and a built-in digital display to indicate maximum and minimum temperatures since last reset. Both display in °F or °C.	MA-159	—	-40°— 120°F (-40°— 50°C)	2.0°	8.0 (203)
Non-Mercury Concrete Reference Thermometer meets ASTM C1064 and E 77 requirements to verify temperature measuring devices for cement and concrete testing. Blue liquid spirit filled glass thermometer is calibrated for 3in (76mm) immersion and includes documented certification at seven points with NIST traceability.	MA-149	—	-1°— 51°C	0.2°C	15.7 (400)

MA-140 & MA-150

MA-240

MA-111

MA-162

MA-158

MA-305

MERCURY-IN-GLASS THERMOMETERS

MERCURY-IN-GLASS THERMOMETERS

Description	Model	Range	Division	Length in (mm)
General Purpose Lab Thermometers have single scale to S.A.M.A. standards and engraved stem. Calibrated for total immersion, mercury filled.	MA-140 MA-150 MA-141 MA-151 MA-142 MA-152 MA-143 MA-153 MA-144 MA-154	-30°— 120°F -35°— 50°C 0°— 230°F -20°— 110°C 0°— 300°F -20°— 150°C 20°— 500°F -10°— 250°C 20°— 750°F -10°— 400°C	1° 1° 2° 1° 2° 1° 2° 1° 5° 2°	12 (305) 12 (305) 12 (305) 12 (305) 12 (305) 12 (305) 16 (405) 16 (405) 16 (405) 16 (405)
Armored Mercury-in-Glass Thermometers have 12in (305mm) slotted penetration cases of plated steel. Case has top ring and threaded cap. For glass thermometer refill only, add "R" suffix to desired model.	MA-240 MA-241 MA-242	50°— 450°F 50°— 600°F 0°— 120°F	5° 5° 1°	12 (305) 12 (305) 12 (305)
Copper-Plated Pocket Thermometer is mercury-filled. Pointed copper bulb resists abrasion and breakage. Reversible aluminum case serves as handle.	MA-111	100°— 450°F	5°	6 (152)
Max/Min Registering Thermometer shows maximum and minimum temperatures since last reset, as well as current temperature in °F and °C. Reset button and protective plastic case for the mercury-filled U-shaped thermometer are included.	MA-162	-60°— 120°F -50°— 50°C	2°F & 1°C	8 (203)
Concrete Reference Thermometer checks calibration of other devices used for temperature determinations in cement and concrete. Meets ASTM C 1064 and E 77. Mercury-filled with black engraved numbers against yellow background. Calibrated for 3in (76mm) immersion and includes a certificate with NIST traceability.	MA-158	30°— 124°F	0.2°F	18 (457)
Thermometer Storage Rack holds up to 25 thermometers in correct vertical position to prevent filler separation and reduce risk of breakage. Construction is 1/4in (6.35mm) thick polyethylene with sturdy base and large carrying handles. Retaining holes are 5/16in (7.9mm) and base plate has 1/8in (3.2mm) drain holes.	MA-305	—	—	—
Thermometer Well provides temperature stability when checking and calibrating laboratory ovens. The solid aluminum block with machined internal well protects 1/4in (6.4mm) dia. glass thermometers, transfers heat efficiently, and maintains constant temperature when oven doors are opened. The large, square cross-section is stable on most oven shelves. Product Dimensions: 2x2x3.75in (51x51x95mm) WxDxH.	MAA-90	—	—	—

MAA-90

helpfulhint

State or local ordinances may prevent sales or shipment of instruments containing Mercury into your area.

Please check for restrictions before ordering or consult our customer service professionals.

MA-372

MA-373

INFRARED THERMOMETERS

INFRARED THERMOMETERS					
Description	**Model**	**Range**	**Resolution**	**Accuracy**	**D:S Ratio**
Infrared Thermometer has selectable °F/°C temperature units, 8-point circular laser pointing, and maximum temperature capture shown on the LCD display. Emissivity is fixed at 0.95, and D:S ratio is 12:1. This model is suitable for most construction materials.		-76°—932°F -60°—500°C	0.1°F or °C	±2% or 2°C	12:1
Infrared Thermometer Soft Carry Case	MA-372 MAA-10B				
Infrared/Thermocouple Thermometer features port for Type K Thermocouple Probes (purchased separately). Also includes high and low alarms, selectable °F/°C, and 8-point circular laser aiming. Emissivity is adjustable from 0.10—1.00, with default setting of 0.95. Selectable modes for IR or probe functions include Max/Min, Difference (Max/Min), and Lock, for continuous scanning.		-76°—1,157°F -60°—625°C	0.1°F or °C	±2% or 2°C	16:1
Infrared/Thermocouple Thermometer Soft Carry Case	MA-373 MAA-10B				
Infrared/Thermocouple Extended Range Thermometer is similar to MA-373, but has extended range and higher D:S ratio of 20:1. High/low alarms, and Type K Thermocouple port (probes purchased separately) are standard. Adjustable emissivity from 0.10—1.00. Selectable modes for IR or probe functions include Max/Min, Difference (Max/Min), and Lock, for continuous scanning.		-76°—1,400°F -60°—760°C	0.1°F or °C	±2% or 2°C	20:1
Infrared/Thermocouple Extended Range Thermometer Soft Carry Case	MA-381 MAA-10B				
Dual-Laser Infrared Thermometer has the widest temperature range and highest D:S ratio of 50:1. Dual-laser aiming system allows precise spotting of target area. It also features a built-in LED flashlight and magnetic base. Adjustable emissivity from 0.10—1.00. Measuring modes include Max/Min, Difference (Max/Min), and Lock, for continuous scanning. Programmable high and low temperature alarms. Supplied with a hard plastic carrying case.	MA-383	-76°—1,832°F -60°—1,000°C	0.1°F or °C	±2% or 2°C	50:1
Traceable® Infrared Memory/Alarm Thermometer is small and lightweight. Features include nine memories, high/low alarm, backlighting, data hold, laser targeting, Max/Min, average and differential readings, low-battery indicator, and selectable °C/°F. Emissivity is adjustable from 0.3—1.0. Distance to Spot (D:S) ratio is 8:1. An individually serial numbered NIST traceable certificate is provided. Supplied with a wrist-strap, soft-sided carrying case, 9V battery, and Traceable® Certificate. Product Dimensions: 2x1.25x6in (51x32x152mm).	MA-233	0°—788°F -20°—420°C	1°F or °C	±2% or 2°C	8:1

MA-381

MA-383

MA-233

NEW! Ship Weight Index

The Estimated Ship Weight for every product is easy to find in the NEW Ship Weight Index!

MA-249

MA-234

MA-182

DIGITAL THERMOMETERS

DIGITAL THERMOMETERS

Description	Model	Range	Resolution
Waterproof Thermometers Waterproof and shockproof digital thermometers monitor chambers, water baths, and other lab and field environments. Max/Min readings can be recalled for any time period. Accuracy is ±1°C between -20°—100°C for MA-248 and ±0.5°C for MA-249. Tough 1-3/4in (44mm) dia. ABS plastic case and stainless steel probe with 10ft (3m) cable can be installed anywhere with included suction cups, Velcro®, or magnetic mounts. °F/°C switchable.		-58°— 572°F (-50°— 300°C)	0.1° from -19.9°—199.9° Otherwise 1°
Waterproof Thermometer Hi-Accuracy Waterproof Thermometer	MA-248 MA-249		
Traceable® Printing Thermometer This thermometer provides permanent, print-out and full-time monitoring. Printing for the two channels may be programmed to print date, time and temperature in any interval from 3 seconds to 24 hours. Alarm sounds when temperature exceeds set points, and may be set up to trigger an external device. Dual inputs display temperatures for probe 1, probe 2, or the differential between 1 and 2. Thermometer accepts Type J, K, T or E probes. Minimum, maximum, and average temperature memories may be displayed or cleared at any time. An individually serial numbered NIST traceable certificate is provided. Supplied with two 48in (1.2M) Type K beaded sensors, six AAA batteries, two thermal paper rolls, and ABS plastic case. MAA-176 Adapter for continuous AC operation is available. Product Dimensions: 8x1.25x3.5in (203x32x89mm), WxDxH.		-328°— 2,431°F (-200°— 1,333°C)	0.1°
Traceable® Printing Thermometer Replacement Printing Paper Rolls, pkg. 6 AC Adapter, 115V/60Hz	MA-234 MAA-175 MAA-176		
Max/Min Memory Thermometer Displays inside and outside temperature simultaneously in large 1.25in (32mm) LCD digits and has memory for maximum and minimum limits of both until cleared. Accuracy is ±2% of reading. The unit comes with an 8ft (2.4m) sensor cable for outside measurements. The case has a built-in stand and a wall-mount bracket is also provided. One AAA battery is included.	MA-182	-58°— 158°F (-50°— 70°C)	0.1°F

MA-322A

MA-323

MA-238

MAA-289, MAA-288, MAA-287 & MAA-286

DIGITAL THERMOMETERS

DIGITAL THERMOMETERS			
Description	**Model**	**Range**	**Resolution**
Basic Type K or J Thermometers are pocket-sized thermometers that accept standard Type K or J thermocouples with connectors, and provide accurate temperatures over a wide range. Features Max/Min memory, hold, auto power-off and relative temperature function. Four digit LCD display switches between °C and °F. Includes a 9V battery and beaded wire probe (two probes for MA-322A). Dual channel MA-322A reads and displays results from two probes simultaneously. Add "T" to model number for NIST traceable certificate of calibration. Accuracy is ±0.05% of reading +0.7°C (1.4°F). MAA-203 Rubber Boot Accessory provides protection for rugged use. Product Dimensions: 2.25x1.25x5.25in (56x38x130mm), WxDxH.		Type K -328° —2,498°F (-200° —1,370°C) Type J -328° —1,922°F (-200° —1,050°C)	0.1°C
Basic Type K Thermometer, Single-Channel	MA-321A		
Basic Type K Thermometer, Single-Channel with NIST Certificate	MA-321AT		
Basic Type K Thermometer, Dual Channel	MA-322A		
Basic Type K Thermometer, Dual Channel with NIST Certificate	MA-322AT		
Rubber Boot Accessory	MAA-203		
4-Channel Thermometer displays data from four probes simultaneously on a backlit LCD screen in °C or °F, using standard Type K thermocouples. Features include automatic shut-off, auto ranging, Max/Min, and hold functions. Accuracy is ±0.5% of reading +1°C or 2°F, full-scale. Includes foam-lined case, two beaded-wire probes, and 9V battery. An AC adapter is optional. A plastic, water-resistant pouch and bench-top mounting tripod are also available. Add "C" to the model number for models with NIST Traceable Certification. Product Dimensions: 2.5x1.25x7.25in (64x30x184mm), WxDxH.		-328°— 2,498°F (-200°— 1,370°C)	0.1°—200°F and 1° above 200°F
4-Channel Thermometer	MA-323		
4-Channel Thermometer with NIST Certificate	MA-323C		
AC Adapter, 115V/60Hz	MAA-227		
Water Resistant Instrument Pouch	MAA-228		
Bench-Top Tripod	MAA-229		
Traceable® Workhorse™ Thermometer has an adjustable offset for calibration to a specific temperature or sensor. The sharp LCD display is easy to read in variable light conditions. The MA-238 is compatible with all Type K probes, and features a hold key to capture current reading. An individually serial numbered NIST traceable certificate is provided.Includes a Type K sensor with 3.1x0.13in (80x3mm), LxDia. Probe and 40in (1m) cable. A bench stand, 9V battery, and carrying case are also supplied. Product Dimensions: 2.75x1.25x5.5in (70x32x140mm), WxDxH.	MA-238	-58°— 2,372°F (-50°— 1,300°C)	0.1° from -50°—200° Otherwise 1°
Thermocouple Probes & Accessories Type K thermocouple probes have standard two-blade connector. Separate connectors and bulk rolls of Type K thermocouple wire allow users to fabricate probes as needed. Simply install a connector and solder or crimp the ends of the two wires together to form an inexpensive, disposable probe. Temperature is measured only at the electrical junction. Probe handle and insulating materials may not withstand these temperatures. Probes and wire for different applications are also available.			
Short General Purpose Probe, 1/16x4in (1.6x101.6mm)	MAA-286	—	—
Long General Purpose Probe, 1/8x8in (3.2x203.2mm)	MAA-287	—	—
High-Temperature[1] Probe, 2,200°F (1,200°C), 5/16x5-3/8in (7.9x136.5mm)	MAA-288	—	—
Type K Wire Probe, 3ft (914mm)	HMA-320	—	—
Type K Male Connector	HMA-323	—	—
Type K Wire, 100ft (30m)	HMA-324	—	—
Type T Wire, 100ft (30m)	HMA-20	—	—
Type K Wire Extension with Female Connectors, 10ft (3m)	HMA-321	—	—

MA-81

MA-324

MA-46

MA-84R

TEMPERATURE HUMIDITY RECORDERS & DATA LOGGERS

TEMPERATURE HUMIDITY RECORDERS & DATA LOGGERS

Description	Model	Range	Division	Accuracy
Key-Wound Temperature Recorders save data on 8in (203mm) circular paper charts and feature selectable 24 hour or 7-day operation. No power source or batteries required. Wall-mounted or Portable models can be equipped with air or liquid sensors. Air sensors have a bendable 14-3/8in (365mm) cable. Liquid sensors are supplied with 5ft (1.5m) cable. Heavy aluminum cases have gasket seals. Includes 100 7-day charts and a felt-tip pen. Extra pens and 24 hour charts are ordered separately. Recorders for other ranges (°F or °C), and/or electric and battery operated drives are quoted on request. Temperature sensors contain mercury and may be restricted for sale in some areas. Check local regulations before ordering. Product Dimensions: 10.5x14.5x5in (267x368x127mm), WxHxD.		Temperature 0°— 150°F	3°	±1%
Wall-Mounted Recorder with Air Sensor	MA-80			
Wall-Mounted Recorder with Liquid Sensor	MA-80B			
Portable Recorder with Air Sensor	MA-81			
Portable Recorder with Liquid Sensor	MA-81B			
7-Day Charts, pkg. 100	MAA-60			
24 Hour Charts, pkg. 100	MAA-61			
Felt-Tip Pens, pkg. 6	MAA-62			
4-Channel Data Logging Thermometer displays data from four probes simultaneously on a backlit LCD screen in °C or °F, using standard Type K thermocouples. Features include automatic shut-off, auto ranging, Max/Min, and hold functions. Accuracy is ±0.5% of reading +1°C or 2°F, full-scale. Stores up to 16,000 data points for downloading to PC with included RS-232 cable and software. Includes foam-lined case, two beaded-wire probes, and 9V battery. An AC adapter is optional. A plastic, water-resistant pouch and bench-top mounting tripod are also available. Add "C" to the model number for models with NIST Traceable Certification. Product Dimensions: 2.5x1.25x7.25in (64x30x184mm), WxDxH.		Temperature -328°— 2,498°F (-200°— 1,370°C)	0.1°—200°F and 1° above 200°F	±0.5% of reading +1°C/2°F
4-Channel Data Logging Thermometer	MA-324			
RS-232 to USB Adapter	MAA-231			
Data Software	MAA-226			
AC Adapter, 115V/60Hz	MAA-227			
Water Resistant Instrument Pouch	MAA-228			
Bench-Top Tripod	MAA-229			
Datalogging Thermometer captures 5.9 million date, time and temperature readings on a 256mb SD memory card. Data is quickly uploaded to any Windows™ PC via the included USB flash drive with built-in SD card reader port. Features include max/min memory and user-adjustable high/low alarms. Four-line display shows probe and ambient temperatures, relative humidity, and time of day. Range is -22° to 158°F (-30° to 70°C) with 0.1° resolution. Accuracy is ±0.6°C from 0° to 50°C, and ±1.2°C otherwise. Stainless steel probe is 0.16x1in (4x25mm) ODxL. A 256mb SD card, USB card reader, bench stand, wall mount, batteries, AC adaptor, and certificate are included.	MA-245	-22°—158°F (-30°— 70°C)	0.1°	±0.6°C from 0°—50°C
Temperature and Humidity Data Logger stores up to 16,000 measurements of temperature and relative humidity (non-condensing) in one second to two hour intervals. Ambient temperature and relative humidity are displayed directly. Sensors are built into the rugged plastic case. Reading dates and times are stored in non-volatile memory. Docking station allows programming of start times, intervals and alarms, as well as downloading of data to PC. Set includes Logger, software, docking station with RS-232 computer cable, battery and instructions. Additional Data Logger without docking station and RS-232 to USB Adaptor Cable are available.		Temperature -40°— 185°F Humidity 0— 100%RH Non-Condensing	0.1° 0.1% RH	±0.6°C from -20°—50°C ±5% RH
Temperature and Humidity Data Logger	MA-46			
Temperature and Humidity Data Logger, with NIST Traceable Certificate	MA-46C			
Additional Data Logger, without Docking Station	MAA-230			
RS-232 to USB Adaptor Cable	MAA-231			
Hygrothermograph records temperature, humidity and dew point. Data is digitally displayed and graphed on 6in (152mm) circular charts with selectable speeds. Includes temperature/humidity sensor and sixty assorted charts. Operates on standard AC power, with 48 hours of battery backup using 8 AA alkaline batteries (not included). MAA-80 is a package of 60 7-day, 40°—110°F temperature charts. Other charts are available upon request. Product Dimensions: 7.3x2.8x9.3in (190x75x250mm), WxDxH.		Temperature -40°— 130°F (-40°— 55°C) Humidity 0— 100%RH Non-Condensing at 32°— 130°F	2°F 2.5%RH	±2°F (1°C) ±2%
Hygrothermograph, 115V/50-60Hz	MA-84R			
Hygrothermograph, 230V/50-60Hz	MA-84RF			
7-Day Chart Paper, pkg. 60	MAA-80			

MA-491

MA-492

MA-493

MA-494

MA-495

MA-496

USB DATA LOGGERS

These rugged, accurate, and reliable USB Data Loggers are fast and easy to set-up by plugging directly into the USB port of any Windows-based PC. Data for graphing and printing of stored readings is quickly exported using free Easy-Log Software downloaded from the internet. The software also exports data to other applications for detailed analysis. Inquire for Calibration Certification.

USB DATA LOGGERS

Description	Model	Range	Division	Accuracy
Thermocouple Data Logger with Graphic Screen measures and stores more than 250,000 temperature readings from K, J or T-type thermocouples. It is supplied with a K-type thermocouple. A high contrast dot-matrix LCD graphic display has three buttons to navigate through the on-screen menu. This menu provides access to real-time trend analysis, data summaries and the ability to start, stop and restart the data logger independently of the host-PC. The max/min reading can be reset on-screen; introducing an event marker into the data which can later be viewed in the graphing software and data file. Logging intervals selectable from 2 seconds to 1 hour. The data logger is supplied with two lithium batteries, with typical life of up to one year.	MA-491	-31°— 176° (-35°— 80°)	0.2 (0.1)	±1.0 (±0.5)
Thermocouple Temperature Data Logger with Display measures and stores over 32,000 temperature readings from K, J or T type thermocouples. Thermocouples are attached via a standard connector the base of the unit. The user can cycle between several different temperature variables on the LCD display using the push button. The logger can be started immediately, delayed or with push-start button. The data logger is supplied with a long-life lithium battery, with typical life of up to one year.	MA-492	K: -328°— 2462° (-200°— 1350°) J: -328°— 2174° (-200°— 1190°) T: -328°— 734° (-200°— 390°)	1.0 (0.5)	±2 (±1)
Temperature and Humidity Data Logger with Display stores up to 16,379 each relative humidity and temperature readings over 0 to 100%RH and -35 to +80°C (-31 to +176°F) measurement ranges. Relative humidity, temperature and dew point data can be graphed, printed and exported to other applications. At the touch of a button, the user can cycle between current temperature and humidity, and max/min stored values. The data logger is supplied with a long-life lithium battery, with typical life of up to one year.	MA-493	Temperature: -31°— 176° (-35°— 80°) Relative Humidity: 0— 100% Non-Condensing	Temp: 0.2 (0.1) RH: 0.5%	Temp: ±4 (±2) RH: ±5%
Temperature Data Logger stores up to 16,382 readings Operational status is indicated by flashing red, green and orange LEDs. The data logger is protected against moisture to IP67 standard when the protective cap is fitted. Selectable parameters include logging rate, temperature units, high & low alarms and start-time. The data logger is supplied with a long-life lithium battery, with typical life of up to one year.	MA-494	-31°— 176° (-35°— 80°)	1.0 (0.5)	±2 (±1)
Thermocouple Temperature Data Logger measures and records over 32,000 temperature readings from K, J, or T type thermocouples. A standard Type K thermocouple is included. Thermocouples are attached via a standard connector the base of the unit. Start times are programmed, and recorded temperatures displayed through connection to the USB port of a Windows-based PC. The data logger is supplied with a long-life lithium battery, with typical life of up to one year.	MA-495	K: -328°— 2462° (-200°— 1350°) J: -328°— 2174° (-200°— 1190°) T: -328°— 734° (-200°— 390°)	1.0 (0.5)	±2 (±1)
Submersible Temperature Data Logger measures and stores up to 32,510 temperature readings. The logger is housed in a 316 grade stainless steel case for years of protection from corrosion, impact and moisture. Moisture protection is rated at IP-67 standards. A slot for a retrieval lanyard is provided. A long life, high-capacity lithium battery is included for logging for up to 3 years.	MA-496	-40°— 257° (-40°— 125°)	0.1°F and C	±2.9 (±1.6)
Spare Batteries fit USB Data Loggers. All are non-rechargeable Lithium. MAA-321 is 3.6V, 1/2AA size, and fits all except MA-496. MA-491 requires two batteries. MAA-322 is 3.6V, 2/3AA size for MA-496.		-	-	-
3.6V, 1/2AA Lithium Battery 3.6V, 2/3AA Lithium Battery	MAA-321 MAA-322			

METAL SAMPLE PANS & CONTAINERS

TSA-163

SPA-100

SC-4, SC-1 , SC-5 & SC-3

SC-45

SC-55, SC-56, SC-51 & SC-50

SC-74, SC-73, SC-78 & SC-77

SC-83, SC-84, SC-81, SC-82 & SC-80

SC-151, SC-149, SC-150 & SC-152

METAL SAMPLE PANS & CONTAINERS

Description	Type	Model	External Dimensions, in	Capacity qt
Steel Painted, welded, durable for long life. Cross-stacking Handling Pans have chute end and swing-down handle to permit oven access. Others have end flanges for lifting. SPA-120 is also available in aluminum as SPA-122.	Handling Pans	TSA-162	15 x 30 x 4H	39.0
		TSA-163	12 x 20.5 x 4H	17.0
	Sample Pans	SPA-105	29 x 12 x 9H	48.0
		SPA-104	22 x 13 x 11H	49.0
		SPA-400	25 x 9 x 8H	31.0
		SPA-101	20 x 7 x 6H	14.0
		SPA-100	26 x 9 x 6H	24.0
		SPA-120	29 x 13.75 x 6.75H	36.0
Galvanized Iron Wire-bound rolled top edges and two drop handles. Often used for coal and coke drying or mixing and slump testing of concrete. Pans SC-2 , SC-4 and SC-5 have tapered sides for nesting. Others have straight sides. Combined with maximum oven temperatures to 350°F (177°C).	Galvanized Pans	SC-1	18 x 18 x 1.5H	8.0
		SC-2	18 x 18 x 3H	17.0
		SC-3	24 x 24 x 4H	40.0
		SC-4	24 x 24 x 3H	30.0
		SC-5	10 x 20 x 3H	10.0
Stainless Steel Top quality seamless construction with rounded corners. Rectangular pans have straight sides. SC-45 thru SC-47 have handles, others have oversize flanges for handling. Round pans have tapered sides. SC-77 is sized to contain 8in (200mm) sieves. SC-80 thru SC-84 are round sided.	SS Rectangular Pans	SC-45	17.2 x 14.5 x 2.5H	8.3
		SC-46	15.3 x 13 x 2.5H	6.5
		SC-47	13.5 x 11.2 x 2.5H	4.3
		SC-50	20.7 x 12.7 x 2.5H	8.3
		SC-51	20.7 x 12.7 x 4H	14.0
		SC-55	10.4 x 12.7 x 2.5H	4.0
		SC-56	10.4 x 12.7 x 4H	6.7
		SC-57	10.4 x 12.7 x 6H	9.6
		SC-60	6.9 x 12.7 x 2.5H	2.6
		SC-61	6.9 x 12.7 x 6H	5.9
		SC-65	6.4 x 10.4 x 2.5H	1.8
		SC-70	6.9 x 6.3 x 2.5H	1.2
	SS Round Pans	SC-73	10 dia. x 1.9H	0.7
		SC-74	14.2 dia. x 1.9H	1.3
		SC-77	11 dia. x 3.5H	5.0
		SC-78	13.5 dia. x 5H	7.5
	SS Round Bowls	SC-80	7.7 dia. x 2.7H	1.5
		SC-81	9 dia. x 3.2H	3.0
		SC-82	11.3 dia. x 3.6H	5.0
		SC-83	13.3 dia. x 4.4H	8.0
		SC-84	17.5 dia. x 5.2H	16.0
Aluminum Popular seamless, heavy-gauge aluminum pans are economical, durable, lightweight and rust-proof. Models SC-149 thru SC-151 have end handles. Large SC-149 is extra heavy-duty.	Aluminum Pans	SC-149	26 x 18 x 3.5H	27.0
		SC-150	18 x 12 x 2.5H	7.7
		SC-151	15.5 x 11 x 2.5H	4.5
		SC-163	13.5 x 10 x 2.5H	4.0
		SC-152	8 x 8 x 2H	2.0
		SPA-301	7.5 x 3.7 x 2.3H	1.1
	Aluminum Round Pans	SC-165	8 dia. x 1.5H	1.3

SC-250 & SC-251

SC-252 SC-259

SC-400 thru SC-406

SC-498 thru SC-508

SC-115 & SC-118

HM-450

SC-270 & SC-272

SC-183 thru SC-187

SAMPLE PANS & CONTAINERS

SAMPLE PANS & CONTAINERS

Description	Type	Model	External Dimensions, in	Capacity
Glass Ovenware Heavy-duty 3/8in (9.5mm) thick ovenproof and microwavable. All are clear. Dimensions include handles.	Rectangular Dish	SC-250	10.9 x 15.8 x 2.3	3qt
	Rectangular Dish	SC-251	8.5 x 13.7 x 2.3	2qt
	Square Dish	SC-252	8.5 x 10.5 x 2.5	1.5qt
	Deep Dish	SC-253	5.5 x 11.3 x 3	1.5qt
	Round Bowl	SC-258	8.5dia. x 4.3	2.5qt
	Round Bowl	SC-259	7.3dia. x 3.5	1.5qt
Round Sample Containers, Metal Round containers with tight-fitting lids prevent moisture loss in samples. All have straight sides and flat bottoms. Covers fit bottom of container during drying. Premium aluminum never needs tare adjustment for rusting. Sold in packages of twelve. Add "-1" to model numbers to order single containers.	Aluminum, Round Pkg. of 12	SC-400	2dia. x 0.9h	1.5oz
		SC-402	2.5dia. x 1.8h	4oz
		SC-404	3dia. x 1h	5oz
		SC-406	3.5dia. x 2h	11oz
	Tinned, Round Pkg. of 12	SC-498	1.9dia. x 1.3h	2oz
		SC-500	2.2dia. x 1.6h	3oz
		SC-502	2.4dia. x 1.6h	4oz
		SC-504	2.9dia. x 1.9h	6oz
		SC-506	3dia. x 2.2h	8oz
		SC-508	3.8dia. x 2.8h	16oz
Round Sample Jars, Plastic Lightweight and enclosed to protect from moisture, dust, etc. Intermediate Polypropylene wide-mouth jars with leakproof screw-top lids. Sold in case lots only.	Plastic, Round			
	12/case	SC-115	4.4dia. x 3.8h	32oz
	12/case	SC-116	3.4dia. x 4.1h	16oz
	12/case	SC-117	2.5dia. x 3.5h	8oz
	24/case	SC-118	2dia. x 2.8h	4oz
	24/case	SC-119	1.6dia. x 2.8h	2oz
Sample Cans Round, tinned-metal 1pt, 1qt or 4qt (0.95 or 3.79L) ideal for storing or transporting soil, aggregates, or other samples. Epoxy lacquered interiors and tight fitting friction-type lids provided.	Tinned-Metal, Round			
	6/Case	SC-272	6.6dia. x 7.5h	4qt
	12/Case	SC-270	4.3dia. x 4.9h	1qt
	1 each	MAA-43	3.3da. x 4.0h	1pt
Square Sample Buckets are ideal for bulk field samples. Thick-wall, high-density polyethylene containers have sturdy bail handles for easy transport, and can be reused many times. Tight-fitting lids prevent moisture loss and spillage.	Plastic Square	HM-450	9.5x9.5x13	16qt
Fiberglass Reinforced Plastic Sample pans are lighter than aluminum, yet strong, chemical-resistant and weatherproof. Stable from -40°—375°F without softening or becoming brittle. Ideal for drying or handling of large samples.	Nesting Pans	SC-180	30.8 x 12.8 x 2h	7.8qt
		SC-181	21.3 x 15.6 x 5h	21.5qt
		SC-184	17.8 x 11.8 x 1h	2.8qt
		HM-51	24.3 x 24.3 x 1.9h	14.7qt
	Sample Pans	SC-183	22 x 12 x 1.3h	5.4qt
		SC-185	23.4 x 12x 3.1h	12.6qt
		SC-186	21.1 x 15.6 x 6h	23qt
		SC-187	31.8 x 19.1 x 4.5h	38qt
		SC-188	23.5 x 16 x 10h	64qt

SC-180

HM-51

TSA-168 TSA-170 TSA-173

TSA-172

TSA-171

TSA-174 TSA-176

WT-6

TSA-177 & TSA-178

TSA-182 & TSA-183

TSA-184, TSA-186 & TSA-188

TSA-198 thru 208

BRUSHES

BRUSHES	
Small Fine Sieve Cleaning Brush has soft, 100% China bristles in round 3/4in (19mm) ferrule that are tapered for use with fine mesh sieves. Especially handy for 3in diameter or Precision Electroformed sieves and others of small diameter. Overall length is 5in (127mm) with wood handle.	TSA-168
Fine Sieve Cleaning Brush is ideal for cleaning No.16 and finer sieves. Soft bristle, nickeled steel ferrule, lacquered wood handle, 1-1/4in diameter and 5-3/4in long.	TSA-170
Wire Loop Brush is a 1-1/4in wide fan type brush with 1-5/8in long metal bristles and a wire loop handle. The 4-3/4in long brush is designed for use on coarse wire cloth.	TSA-173
Coarse Sieve Cleaning Brush has an 8-1/2in curved plastic handle with 1-1/2in x 1-3/4in of slanted brass wire bristles—perfect for No.30 and coarser wire cloth in round sieves.	TSA-172
Coarse Screen Tray Brush is recommended for No.30 and coarser wire cloth in screen trays. The 13in curved wooden handle has 5-1/2in x 3/4in of fine (0.005) brass wire bristles, which slant toward the tip for cleaning corners of screen trays. Also useful for cleaning molds.	TSA-171
Table Brush has 9x3in of horsehair bristles. This 14in long brush comes with a plastic or wood handle, depending on availability. A general purpose brush suitable for clean up of lab equipment.	TSA-174
Wire Scratch Brush has flat wire bristles that are grouped in 5x10 rows. Sturdy wood block handle is 7-3/4in long x 2-5/8in wide. The TSA-176, with 2in bristles, may be used on soil-cement specimens to meet ASTM D559, D560, AASHTO T 135, and T 136.	TSA-176
Scrub Brushes for concrete testing equipment are available in 20in (508mm) long-handled, or 8in (203mm) short-handled versions, and stand up to heavy everyday use in the field. Both feature durable, solid plastic handles and sturdy, acid-resistant synthetic fibers.	
Short Scrub Brush, 8in (203mm)	TSA-232
Long Scrub Brush, 20in (508mm)	TSA-233
Camel Hair Brush Set for delicate mesh includes two flat-tip and two round-tip brushes.	WT-6

TSA-232

TSA-233

SCOOPS

SCOOPS					
Type	**Model**	**Capacity oz (ml)**	**Bottom Type**	**Bowl LxW, in**	**Overall Length in**
Plastic	TSA-177	32 (946)	Flat	6.5 x 5.0	11.5
	TSA-178	82 (2,425)	Flat	9.0 x 6.0	14.5
Aluminum	TSA-182	38 (1,124)	Flat	8.8 x 5.3	14.0
	TSA-183	3.5 (104)	Flat	4.8 x 2.8	8.5
	TSA-193	2 (53)	Round	4.5 x 2.0	7.8
	TSA-184	5 (148)	Round	4.8 x 2.5	7.3
	TSA-185	12 (355)	Round	5.8 x 3.3	8.8
	TSA-186	24 (710)	Round	7.0 x 3.8	10.5
	TSA-187	85 (2,366)	Round	11.8 x 6.3	16.0
	TSA-188	38 (1,124)	Round	8.8 x 4.6	12.3
	TSA-189	58 (1,715)	Round	10.0 x 5.3	14.3
Stainless Steel	TSA-198	4 (118)	Round	3.0 x 5.0	9.0
	TSA-205	12 (355)	Flat	5.5 x 3.0	9.0
	TSA-206	24 (710)	Flat	7.0 x 4.5	12.0
	TSA-207	45 (1,331)	Flat	8.0 x 5.5	13.5
	TSA-208	63 (1,863)	Flat	10 x 7.0	15.0


GW-11


GW-74


GW-20 thru GW-24


GW-32


MA-45, MA-48 & MA-50


SG-250


GW-60


MA-42, MA-41 & MA-40


GW-40 thru GW-47

LABORATORY FLASKS, BEAKERS & GRADUATED CYLINDERS

Top quality glassware made from Kimax, Pyrex, or equivalent quality borosilicate glass is chemical, heat and wear resistant. Stainless steel is smooth, seamless, and corrosion resistant. Plasticware is transparent, rigid poly-methylpentene, resists impact and handles temperature to 200°C. Order as single unit or package quantity.

LABORATORY FLASKS, BEAKERS & GRADUATED CYLINDERS

Description	Capacity ml	Other Features	Pkg. Qty.	Models Unit	Models Pkg.
Erlenmeyer Flasks		Graduations, ml			
Narrow-mouth Erlenmeyers have heavy-duty rim and volume graduations for approximate measuring/mixing. Large matte spot for easy writing and erasing. Not for vacuum or pressure use.	125	50-125	12	GW-10	GW-10P
	250	50-200	12	GW-11	GW-11P
	500	100-500	6	GW-12	GW-12P
	1,000	250-1,000	6	GW-13	GW-13P
	2,000	600-1,800	4	GW-14	GW-14P
	4,000	1,000-4,000	1	GW-15	—
	6,000	1,500-6,000	1	GW-16	—
Filter Flasks		Stopper Size			
With side tubulation for 3/8in ID tubing. Heavy-duty 2,000/4,000ml sizes have thick wall for max. strength.	1,000	#8	1	GW-74	—
	2,000	#9	1	GW-75	—
	4,000	#12	1	GW-76	—
Graduated Cylinders		Graduations, ml			
Meet Type A requirements, with durable double scale numbered up and down. Large stable base. Enlarged funnel top on 10ml size.	10	0.2	4	GW-20	GW-20P
	25	0.5	4	GW-21	GW-21P
	50	1.0	4	GW-22	GW-22P
	100	1.0	4	GW-23	GW-23P
	250	2.0	2	GW-24	GW-24P
	500	5.0	1	GW-25	—
	1,000	10.0	1	GW-26	—
	2,000	20.0	1	GW-27	—
Beakers		Graduations, ml			
Low form Griffin beakers have reinforced rims, uniform wall thickness, and spouts designed for excellent pouring. Approximate volume graduations guide measuring/mixing. Large matte area for pencil markings.	50	10-40	12	GW-30	GW-30P
	100	20-80	12	GW-31	GW-31P
	250	25-200	12	GW-32	GW-32P
	400	50-350	12	GW-33	GW-33P
	600	100-500	6	GW-34	GW-34P
	800	100-750	6	LPA-43	LPA-43P
	1,000	100-900	6	GW-35	GW-35P
Volumetric Flasks					
Calibrated to contain indicated quantity at 20°C. Supplied with plastic snap cap. Meets ASTM E288, E694; useful for specific gravity tests such as ASTM D854.	100	—	1	SG-100	—
	250	—	1	SG-250	—
	500	—	1	SG-500	—
	1,000	—	1	SG-1000	—
Stainless Steel Beakers		Top Dia. x Ht. in (mm)			
Heavy-duty, smooth, seamless, and corrosion resistant beakers have rolled top rims. Larger MA-45 through MA-48 are straight-sided Bain Marie style beakers with no handles or graduations. Useful for handling, collecting corrosive solvents and/or extracts and bitumen samples without fear of breakage.	500	3.5x4.5 (89x114)	1	MA-40	—
	1,000	4.5x5 (114x127)	1	MA-41	—
	2,000	5.5x6.5 (140x165)	1	MA-42	—
	1,893	4.9x6.8 (124x172)	1	MA-45	—
	5,678	7.3x8.6 (185x218)	1	MA-48	—
	11,356	9x10.9 (229x279)	1	MA-50	—
Plastic Graduated Cylinders	Cylinders	Graduations, ml			
Plastic cylinders are quality polymethylpentene (PMP). PMP is highly transparent, rigid, resists impact, and handles temperatures of 200°C (180°C continuous). Not recommended for use with chlorinated solvents or strong oxidizing agents. Cylinders have pour-out, stable base, and molded-in graduations.	10	0.2	10	GW-40	GW-40P
	25	0.5	5	GW-41	GW-41P
	50	1.0	5	GW-42	GW-42P
	100	1.0	5	GW-43	GW-43P
	250	2.0	1	GW-44	—
	500	5.0	1	GW-45	—
	1,000	10.0	1	GW-46	—
	2,000	20.0	1	GW-47	—
Measuring Pipettes		Color Code			
Mohr type Measuring Pipettes are color coded by size and calibrated to deliver at 20°C. Each has permanent markings with zero at the top. Mouth end of 5ml and larger sizes is reduced in diameter for ease of use.	1	Yellow	1	GW-60	—
	5	Blue	1	GW-62	—
	10	Orange	1	GW-63	—
	25	White	1	GW-64	—
	50	None	1	GW-65	—


MA-278


MA-275


HMA-302


HMA-340


HMA-300


HMA-304


HMA-307


MA-203


MA-207, MA-208 & MA-209


MA-187


MA-194


WT-4


MA-195


MA-196


MA-198

LABORATORY TOOLS

LABORATORY TOOLS

Evaporating Dishes, Porcelain, MA-275 and MA-276 are glazed inside and out; MA-277 and MA-278 are glazed inside and around rim, bottom is not glazed.		
Diameter x Height, mm	ml	
80 x 34	80	MA-275
93 x 40	120	MA-276
104 x 40	150	MA-277
120 x 42	250	MA-278
Chisel, hardened steel with 1in (25.4mm) wide blade; 10in (254mm) long.		HMA-302
Estwing Rock and Soils Tools from Gilson are top quality for digging, splitting, and prying. All are one-piece forged solid steel. Handles have nylon-vinyl grips. Pick heads are fully polished.		HMA-340
Rubber Mallet, hard rubber, 2.25in (57mm) face, wooden handle, 12in (305mm) overall length.		HMA-300
Spoon, for mixing, digging of soils, etc., one piece stainless steel. Approximate length: 11.5in (292mm).		HMA-304
Trowel, 4.5x3in (114x76mm), LxW flat blade with wood handle.		HMA-306
ASTM Trowel, 4.5x3in (114x76mm), LxW flat blade with wood handle. Has straight edges to meet ASTM C109, AASHTO T 106.		HMA-307
Desiccators, Scheibler, complete with cover, but without plate. Clear heavy glass, ground cover with knob.		
6in (152mm) ID		MA-203
8in (203mm) ID		MA-204
10in (254mm) ID		MA-205
Desiccator Plates, stable and chemical resistant. Withstand temperatures to 300°F (149°C).		
140mm (for 6in)		MA-207
190mm (for 8in)		MA-208
230mm (for 10in)		MA-209
Desiccant Cartridges in durable bags to fit desiccators. Nutrasorb indicating silica gel beads are blue when dry, pink when moist, and cartridges regenerate repeatedly in a 300°F (150°C) oven.		
114mm (for 6in and 8in)		MA-187
197mm (for 10in)		MA-188
Aspirator with Coupling, Chapman style. Low cost vacuum using 10—50psi water source. Has 3/8in NPT water inlet or fits threaded faucet with included coupling. Ni-plated, 6in long, with ball valve to prevent water backflow.		MA-194
Tongs, 9in (229mm) long, Ni-plated steel with riveted joint. MA-195 has 4.5in plastisol jaws to fit 50—2,000ml beakers.		
Beaker Tongs		MA-195
Crucible Tongs		MA-196
Clear Vinyl Tubing, 1/16in wall	3/8in ID, per foot	WT-4
	100ft pack	WT-4R
	1/4in ID, per foot	WT-8
	100ft pack	WT-8R
Hose Clamp, with adjustment screw to permit accurate flow regulation in flexible tubing. Ni-plated brass with pivoting lower jaw.		MA-198

HMA-25 & HMA-24

HM-109

HM-111

HMA-10, HMA-11, HMA-11A & HMA-12

HMA-13

SC-90

SPA-22

SP-92

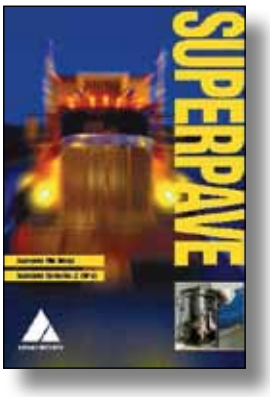
TR-1002

LABORATORY TOOLS

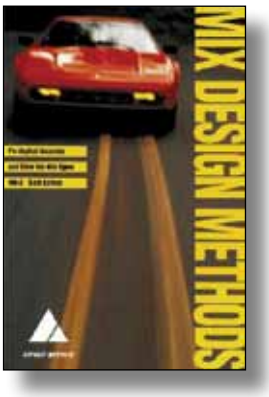
LABORATORY TOOLS

Wash Bottles, polyethylene, squeeze dispensing; adjust flow by cutting tip.	
Wash Bottle, 250ml	HMA-24
Wash Bottle, 500ml	HMA-25
Mortar & Pestles, heavy porcelain 5in dia. mortar has 320ml, glazed except for sample contact area (small porcelain pestle included). Use rubber tipped wooden pestle to break up agglomerates of soils, etc.	
Mortar & Pestle	HM-109
Rubber Tip Pestle	HM-111
Spatulas with mirror-finished stainless steel blades riveted to hardwood handles. HMA-11A meets ASTM C1252 and AASHTO T 304.	
L x W of Blade, in (mm) — **Overall Size, in (mm)**	
4 x 3/4 (102 x 19) — 7.8 (197)	HMA-10
6 x 1/2 (152 x 13) — 11.5 (292)	HMA-9
6 x 1 (152 x 25) — 10.5 (267)	HMA-11
5.5 x 1 (140 x 25) — 10.0 (254)	HMA-11A
10 x 1.5 (254 x 38) — 14.3 (368)	HMA-12
Stainless Steel Spatula & Spoon is handy for mixing, scraping, and handling powders. Constructed entirely of stainless steel, the overall length is 7.8in (198mm). Spatula blade is 1.8x0.4in (30x9mm).	HMA-13
Sample ID Tags of soft embossable aluminum, can be permanently marked by either pencil or ballpoint to attach to bags, containers, etc. via wire ties provided. Weatherproof and ovenproof. Packages of 500. Product Dimensions: 3x0.8in (76x22mm), LxW.	SC-90
Bucket Liner Sample Bags are a fast, efficient way for one person to collect and handle bulk soil, aggregate or asphalt samples, and a perfect fit for metal or plastic buckets with 3 to 6gal (11 to 22L) capacity. Fabric and thread are temperature-rated to 400°F (204°C). Simply drop the sturdy cotton 20x24in (508x610mm) WxH bags into a bucket, fill with material, and secure using heavy-gauge wire ties and Wire Twister, purchased separately.	
Bucket-Liner Sample Bags, qty. of 10	SPA-22
Bucket-Liner Sample Bags, qty. of 100	SPA-22C
Bucket-Liner Sample Bags, qty. of 1,000	SPA-22K
Double-Loop Wire Ties, 8in (200mm), qty. of 50	SPA-23
Wire Tie Twister, Plastic Handle	SPA-24
Sample Bags are heavy-duty and ordered with or without poly liners. Bags are quality high count drill textile with drawcords and are suitable for use with soil, sand, aggregates, ores, and similar materials. Use lined bags for fine or wet materials. Packages of 10.	
Sample Bags, 10 x 18in (254 x 457mm)	SP-92
Sample Bags, 17 x 32in (432 x 813mm)	SP-96
Lined Sample Bags, 10 x 18in (254 x 457mm)	SP-93
Lined Sample Bags, 17 x 32in (432 x 813mm)	SP-97
Step-up/Step-Down Transformers convert electrical voltages up from 110-120 volt to 220-240 volt, or down from 220-240 volt to 110-120 volt. Included adaptor allows input connection to common grounded power supplies in North America, Europe, and many other parts of the world. Universal output accepts North American, UK, European, and other plugs. Transformers have an on/off switch, two spare fuses, and are CE marked. Do not exceed maximum rated wattage.	
Step-Up/Step-Down Transformer, 500W	TR-502
Step-Up/Step-Down Transformer, 1000W	TR-1002
Step-Up/Step-Down Transformer, 3000W	TR-3002

BK-50

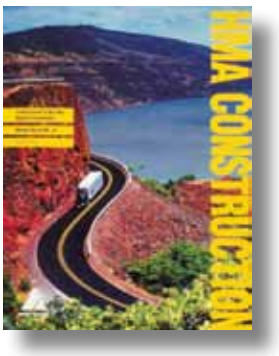


BK-42



BK-43

BK-44



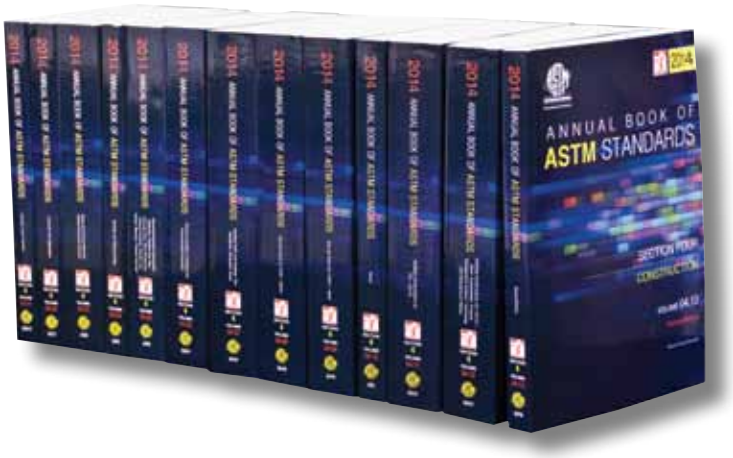
BK-45

BK-447R

BK-36

REFERENCE LIBRARY

REFERENCE LIBRARY	
ASPHALT BINDER HANDBOOK A comprehensive manual devoted entirely to information about asphalt binders and bitumen. It is a compilation of information contained in numerous other Asphalt Institute publications, including SP-1, MS-4, MS-5, MS-19, and MS-25 manuals. It also includes previously unpublished information on topics like the Multiple-Stress Creep Recovery (MSCR) test, testing variability and resolution, and the generation of mastercurves. Fully illustrated, 223 pages, 6x9in (150x225mm).	BK-50
SUPERPAVE LEVEL 1 MIX DESIGN Concepts of and requirements for Superpave asphalt mix design. Aggregate tests described include source properties, gradation control points and forbidden zones. Level 1 mix design is presented with discussion of design, volumetrics, and the gyratory compactor. Fully illustrated in 6x9in(152x229mm) paperback. 1995, 128 pp.	BK-42
MIX DESIGN METHODS FOR ASPHALT CONCRETE & OTHER HOT-MIX TYPES A practical guide to asphalt mix design by Marshall and Hveem methods. Fully illustrated in 6x9in (152x229mm) paperback. 6th edition. 1994, 112 pp.	BK-43
THE ASPHALT HANDBOOK Chapters include types of asphalts, mix designs, mixing facilities, paving, compaction, surface treatments, recycling, maintenance, structural design and more. Leatherette bound 6x9in (152x229mm). 7th edition, 832 pp.	BK-44
PRINCIPLES OF CONSTRUCTION OF HOT-MIX ASPHALT PAVEMENTS Prepared by the Asphalt Institute for the U.S. Federal Highway Administration to define asphalt pavement quality control procedures. Chapters include Inspection and the Inspector, Materials, Mix Design, Plant Operations, Placing Operations and Compaction. Useful for engineers, inspectors and technicians. Paperback with appendices. 2nd edition.	BK-45
MANUAL ON TEST SIEVING METHODS New 5th edition ASTM publication supplements current ASTM sieving standards. Subject matter covers sieve types, sampling methods, sieving procedures, calculation and graphing. Appendices include reference tables and charts. 66 pp. soft cover.	BK-447R
THE AGGREGATES HANDBOOK This compilation of articles creates a comprehensive reference for anyone dealing with aggregates. Discusses basic properties, aggregate as a component of Portland cement and asphalt concrete, sampling and testing principles and more. New second edition features expanded coverage of many industry topics.	BK-36



BK-400

BK-405

BK-401C

ASTM & AASHTO STANDARDS

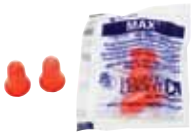
ASTM & AASHTO STANDARDS		
Description	**Book**	**CD-ROM**
SECTION 4: CONSTRUCTION SET. Complete 13-volume set includes volumes described below, plus more on bituminous roofing and waterproofing materials, building sealants, fire standards, building construction performance and other construction-related subjects.	BK-400	BK-400C
VOLUME 4.01 CEMENT; LIME; GYPSUM. Tests and procedures for portland, natural, pozzolanic, masonry and slag cements. Also, specifications and tests for lime, limestone and gypsum. (Updated in October).	BK-401	BK-401C
VOLUME 4.02 CONCRETE & AGGREGATES. Standards and specifications for concrete, aggregates, curing materials, and grout. Also contains ASTM's Manual of Aggregate and Concrete testing. (Updated in November).	BK-402	BK-402C
VOLUME 4.03 ROAD & PAVING MATERIALS; VEHICLE-PAVEMENT SYSTEMS. Specifications and tests for Asphalt and other road and paving materials. Other specifications focus on measuring traveled surface characteristics. (Updated in July).	BK-403	BK-403C
VOLUME 4.05 CHEMICAL-RESISTANT NONMETALLIC MATERIALS; VITRIFIED CLAY PIPE, CONCRETE PIPE, FIBER-REINFORCED CEMENT PRODUCTS; MORTARS & GROUTS; MASONRY. Specifications and practices for mortars, grouts, and masonry construction. Also included are specifications for concrete pipe, vitrified clay pipe, clay drain tile, with a section on fiber-cement and precast concrete products. (Updated in July).	BK-405	BK-405C
VOLUME 4.08 SOIL & ROCK, VOLUME 1; D420 to D5611. Specifications and practices for soil testing, sampling, field investigation, and hydrological and structural properties. Also includes site characterization, ground water investigation and statistical modeling. (Updated in April).	BK-408	BK-408C
VOLUME 4.09 SOIL & ROCK, VOLUME 2; D5714 to LATEST. Specifications for numerous tests and Practices. Also Includes several new standards and a terminology document for geosynthetics and geotextiles. (Updated in May).	BK-409	BK-409C

helpfulhint

Publication dates vary among volumes and are noted in the descriptions. Current editions of each volume are supplied until new editions are available. Returns or exchanges for newer editions cannot be accepted. Inquire for other ASTM volumes or sections.

SAFETY EQUIPMENT

SE-20



MA-74

SE-26

SE-42

SE-28

SE-24

SE-31

SE-30

SAFETY EQUIPMENT	
Lightweight Hearing Protector earmuff features three-position contoured headband for use with helmets and shields, and is made from non-conductive materials. Cushion-seal earpieces adjust easily for comfortable fit. Includes an auxiliary headband strap for multi-position wear. Noise reduction rating (NRR) is 25dB.	
Hearing Protector	SE-20
Compressible Hearing Protectors are reusable, form-fitting foam ear plugs. Bright orange plugs have a smooth, soil-resistant skin and tapered shape for easy insertion. Once inserted, the plugs expand slightly for a snug, comfortable fit. Flared ends enable effortless removal. Noise reduction rating (NRR) 33. Sold in packs of twenty five pairs.	
Compressible Hearing Protectors	MA-74
Safety Goggles have soft, clear vinyl frame that fits snugly and comfortably. Perforated side-shields permit air flow but still protect from splashes, flying chips, and particles. Premium clear polycarbonate lenses are scratch-resistant with anti-fog coating. Can be worn over prescription glasses; adjustable elastic headband provided.	
Safety Goggles	SE-26
Face Shield with full coverage protects from sparks, particles, short duration heat exposure, etc. The headgear has ratchet type adjustment, floating suspension and pivots up when not in use. The 70 mil thick 9x15.5" (229x394mm) impact and heat resistant polycarbonate window is held securely in place by locking cams. Meets ANSI Z87.1.	
Face Shield	SE-42
Safety Glasses have clear, impact-resistant polycarbonate lenses with full coverage side-shields for maximum protection. Wrap around ear pieces for secure fit.	
Safety Glasses	SE-28
Disposable Dust Masks provide relief from non-toxic nuisance dusts. Lightweight, contoured design has a comfortable fit, adjustable elastic headband, and an adjustable metal nosepiece. They are not NIOSH approved. Packed in boxes of fifty.	
Disposable Dust Masks	SE-24
Heat Resistant Gloves are heavy leather with extended gauntlet for maximum protection around ovens and furnaces. Ideal for asphalt lab testing. One size fits all. Gloves are tanned to be soft and flexible. Fully lined with seamless index finger and wing thumb.	
Heat Resistant Gloves	SE-31
Nitrile Rubber Gloves are durable and outperform other rubber types for petroleum and chlorinated solvents. They are ideal for use with oils, acids, caustics, and alcohol compounds. Sturdy embossed-grip gloves are 12.5in (318mm) long, 17mil thick, flock lined and resistant to cuts and snags. Available individually or by the dozen in M, L, or XL sizes.	
Nitrile Rubber Glove, Medium, 1 pair	SE-30M
Nitrile Rubber Gloves, Medium, pkg. 12	SE-30MD
Nitrile Rubber Gloves, Large, 1 pair	SE-30L
Nitrile Rubber Gloves, Large, pkg. 12	SE-30LD
Nitrile Rubber Gloves, XL, 1 pair	SE-30X
Nitrile Rubber Gloves, XL, pkg. 12	SE-30XD

A

B

C

T

U

V

W

Y

Z

HMA

LC

LCA

LP

MA

MC

MD / MF

MH / MM

MO / MS

NM

OB / OT

PM / PO / PR

PS / PT

SA

SC

SE / SF

SG

SM

This index is designed to help you find products based on your ASTM, AASHTO or other testing requirements. The pages with products related to the specific Test ID are listed. For assistance, contact a Gilson Technical Service representative at 800-444-1508.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) INDEX

(See Reference Library for books of Test Standards.)

INTERNATIONAL STANDARDS ORGANIZATION (ISO)

PENNSYLVANIA TEST METHODS (PTM)

TEXAS DEPARTMENT OF TRANSPORTATION TEST METHODS (TxDOT)

BRITISH STANDARDS (BS)

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

(See Reference Library to order BK-14, two-volume set of Materials Specifications and Tests, and Provisional Standards)

CALIFORNIA DEPARTMENT OF TRANSPORTATION TEST METHODS (CALIFORNIA)

UNIT MEASUREMENT CONVERSION EQUIVALENTS

LENGTH

1mm	=	1000 µm
1 in	=	25.40 mm
1 m	=	3.281 ft
1 mile	=	1.609 km

AREA

1 in^2	=	645.2 mm^2
1 ft^2	=	0.0929 m^2

VOLUME

1 fl oz	=	29.57 cm^3
1 in^3	=	16.387 cm^3
1 qt	=	0.9464 liters
1 liter	=	1 dm^3
1 gal	=	3.785 liters
1 ft^3	=	28.317 liters
1 m^3	=	35.31 ft^3
1 m^3	=	1000 liters
1 yd^3	=	0.7646 m^3

MASS

1 oz (avdp)	=	28.350 g
1 g	=	1000 mg
1 kg	=	2.2046 lbs
1 short ton	=	2000 lbs
1 long ton	=	2240 lbs
1 metric ton	=	1000 kg
1 lb (avdp)	=	16 oz (avdp)

DENSITY

1 g/cm^3	=	62.43 lb/ft^3
1 lb/ft^3	=	16.019 kg/m^3

FORCE

1 lbf	=	0.4536 kgf
1 lbf	=	4.448 N
1kip (1000 lbf)	=	4448 kN
1 kN	=	224.9 lbf
1 N	=	1 $kg•m/sec^2$
1 N	=	10^5 dynes

PRESSURE

1 N/mm^2	=	145.0 psi (lbf/in^2)
1 N/m^2	=	1 Pa
1 Pa	=	133.32 torr
1 kPa	=	101.97 kgf/m^2
1 kPa	=	20.885 lbf/ft^2
1 kPa	=	0.145 psi
1 bar	=	100 kPa
1 atm.	=	760.02 mm Hg
1 atm.	=	14.696 psi
1 short ton/ft^2	=	0.9765 kgf/cm^2
1 short ton/ft^2	=	95.76 kPa
1 mm Hg	=	1 torr
1 mm Hg	=	0.01934 psi
1 in Hg	=	3.3769 kPa
1 in water	=	0.2488 kPa

ENERGY

1 Btu	=	1.0551 kJ
1 calorie	=	4.1868 J
1 J	=	0.7376 ft•lbf
1 kgf•m	=	7.233 ft•lbf
1 MJ	=	0.2778 kW•h

POWER

1 W	=	1 J/sec
1 kW	=	0.9478 Btu/s
1 W	=	3.4129 Btu/h
1-hp	=	745.7 W
1 ft•lbf/s	=	1.3558 W

KINEMATIC VISCOSITY

1 cSt	=	1 mm^2/s
1 m^2/s	=	10.764 ft^2/s

DYNAMIC VISCOSITY

1 cP	=	0.001 Pa•s
1 Pa•s	=	1 $N•s/m^2$
1 $lbf•s/ft^2$	=	47.880 Pa•s

TEMPERATURE

°F	=	(°C x 9/5) + 32
°C	=	(°F - 32) x 5/9

AD

	lb	(kg)
AD-12KA	40	(18)
AD-12KE	5	(2)
AD-20KA	40	(18)
AD-25	2	(1)
AD-30KA thru 60KA	40	(18)
AD-60PA	22	(10)
AD-61P	25	(11)
AD-101KA	40	(18)
AD-122	3	(1)
AD-150PA	22	(10)
AD-151P	25	(11)
AD-154 thru 214	3	(1)
AD-300PA	22	(10)
AD-301P	25	(11)
AD-302	3	(1)
AD-314	3	(1)
AD-401P	37	(17)
AD-402 thru 614	3	(1)
AD-1200E	3	(1)
AD-1200R	12	(5)
AD-2000E	5	(2)
AD-2000R	12	(5)
AD-3000E	5	(2)
AD-3000R	12	(5)
AD-6000E	5	(2)
AD-6000R	12	(5)
AD-6100R	12	(5)
AD-8000R	12	(5)
AD-8100R	12	(5)
ADA-4A	2	(1)
ADA-6A	2	(1)
ADA-9 thru 22	1	(0.5)
ADA-28	6	(3)
ADA-30A	1	(0.5)
ADA-32A	1	(0.5)
ADA-33A	4	(2)
ADA-34A	4	(2)
ADA-35	6	(3)
ADA-42R	16	(7)
ADA-45	1	(0.5)

AJ / AP

	lb	(kg)
AJ-101 thru 102F	45	(20)
AJA-3R	40	(18)
AJA-8	5	(2)
AJA-133, 133F	18	(8)
AJA-134, 134F	42	(19)
AJA-135	11	(5)
AJA-139	10	(5)
AJA-140 thru 144	2	(1)
AJA-210 thru 245	2	(1)
AP-1B	51	(23)
AP-14	20	(9)
AP-16	25	(11)
AP-20	350	(159)
AP-20L	393	(178
APA-11B	6	(3)
APA-18	1	(0.5)
APA-19	1	(0.5)
APA-22	8	(4)
APA-25	80	(36)
APA-31 thru 34	3	(1)
APA-35	2	(1)
APA-36	16	(7)
APA-105	2	(1)
APA-120	3	(1)
APA-144	2	(1)
APA-166	3	(1)

BK

	lb	(kg)
BK-14	20	(9)
BK-36	4	(2)
BK-42	1	(0.5)
BK-43	1	(0.5)
BK-44	3	(1)
BK-447R	1	(0.5)
BK-45	2	(1)
BK-50	2	(1)
BK-400	50	(23)
BK-400C	4	(2)
BK-401	3	(1)
BK-401C	4	(2)
BK-402	3	(1)
BK-402C	1	(0.5)
BK-403	3	(1)
BK-403C	1	(0.5)
BK-405	5	(2)
BK-405C	4	(2)
BK-408	5	(2)
BK-408C	4	(2)
BK-409	5	(2)
BK-409C	4	(2)

BO

	lb	(kg)
BO-10R, 10RF	43	(20)
BO-20R, 20RF	57	(26)
BO-30R thru 30RF	77	(35)
BO-40 thru 40F	92	(42)
BO-60EB thru 60GC	1875	(850)
BO-61EB thru 61GC	2075	(941)
BO-62EB thru 62GC	2075	(941)
BO-63EB thru 63GC	2285	(1036)
BO-64EB thru 64GC	2850	(1293)
BO-65EB thru 65GC	2960	(1342)
BO-110, 110F	51	(23)
BO-120, 120F	66	(30)
BO-130, 130F	85	(39)
BO-140, 140F	99	(45)
BO-250 thru 250SF	225	(102)
BO-323A thru 323C	600	(272)
BO-333A thru 333CF	750	(340)
BO-343A thru 343C	850	(385)
BO-350 thru 350SF	235	(107)
BO-355 thru 355SF	260	(118)
BO-550 thru 550SF	220	(100)
BOA-1	12	(5)
BOA-2	100	(45)
BOA-3	50	(23)
BOA-4	7	(3)
BOA-5	1	(0.5)
BOA-7	1	(0.5)
BOA-30 thru 32	2	(1)
BOA-33	4	(2)
BOA-40, 41	59	(27)
BOA-42	61	(28)
BOA-46	1	(0.5)
BOA-48	1	(0.5)
BOA-50	15	(7)
BOA-51	20	(9)
BOA-52	25	(11)
BOA-70	24	(11)
BOA-71	28	(13)
BOA-72	32	(15)
BOA-75	2	(1)

BR

	lb	(kg)
BR-2	38	(17)
BR-3	38	(17)
BR-10	148	(67)
BRA-30	7	(3)
BRA-31	7	(3)
BRA-32	62	(28)
BRA-33	6	(3)
BRA-34	1	(0.5)
BRA-40	15	(7)
BRA-41	15	(7)
BRA-42	25	(11)
BRA-45	50	(23)
BRA-59	19	(9)
BRA-60	15	(7)
BRA-61	15	(7)
BRA-62	20	(9)
BRA-63	5	(2)
BRA-64	5	(2)
BRA-67	4	(2)
BRA-70	4	(2)
BRA-75	1	(0.5)
BRA-76	1	(0.5)

BS

	lb	(kg)
BS-5	1	(0.5)
BS-10 thru BS-420	1	(0.5)

CD / CF

	lb	(kg)
CD-1	375	(170)
CD-6, 6F	150	(68)
CDA-15	8	(4)
CDA-16	9	(4)
CDA-20	10	(5)
CDA-22	45	(20)
CDA-24	12	(5)
CDA-26	10	(5)
CDA-32	3	(1)
CDA-40	4	(2)
CDA-41	4	(2)
CDA-43	6	(3)
CDA-45	7	(3)
CDA-46	8	(4)
CDA-50	12	(5)
CDA-51	12	(5)
CDA-55	6	(3)
CDA-122	7	(3)
CDA-123	9	(4)
CDA-130	8	(4)
CDA-131	10	(5)
CDA-132	8	(4)
CDA-133	10	(5)
CDA-140	10	(5)
CDA-141	12	(5)
CDA-142	10	(5)
CDA-143	12	(5)
CDA-160	14	(6)
CDA-161	16	(7)
CDA-162	14	(6)
CDA-163	16	(7)
CDA-220	6	(3)
CDA-221	8	(4)
CDA-222	7	(3)
CDA-223	9	(4)
CDA-230	8	(4)
CDA-231	10	(5)
CDA-232	8	(4)
CDA-233	10	(5)
CDA-240	10	(5)
CDA-241	12	(5)
CDA-242	10	(5)
CDA-243	12	(5)
CDA-260	14	(6)
CDA-261	16	(7)
CDA-262	14	(6)
CDA-263	16	(7)
CF-1, 1F	398	(180)
CFA-100 thru 102	30	(14)
CFA-112	35	(16)
CFA-113	30	(14)

CP / CS

	lb	(kg)
CP-6 thru 7	11	(5)
CP-15	11	(5)
CP-16	11	(5)
CP-35	11	(5)
CP-36	14	(6)
CP-46	11	(5)
CP-75 thru 76	11	(5)
CP-150A thru 151	11	(5)
CP-200 thru 201	11	(5)
CP-210 thru CP-230	15	(7)
CP-301 thru 310	6	(3)
CP-312	14	(6)
CP-315	6	(3)
CP-330	6	(3)
CP-335	14	(6)
CP-365	14	(6)
CP-3100	14	(6)
CPA-15	2	(1)
CPA-33	2	(1)
CS-10	12	(5)
CS-10W	10	(5)
CS-60	5	(2)
CSA-25	6	(3)
CSA-26	2	(1)
CSA-30	1	(0.5)

DO

	lb	(kg)
DOBA-2	3	(1)
DOBA-40A	7	(3)
DOBA-50A	7	(3)
DOC-38	270	(122)
DOC-67	360	(163)
DOC-120	480	(218)
DOC-180	600	(272)
DOCA-20 thru 50	5	(2)
DOCA-70 thru 73	130	(59)
DOL-69A, 69AF	320	(145)
DOL-120A	385	(175)
DOL-180A	485	(220)
DOL-24A, 24AF	205	(93)
DOL-270A	635	(288)
DOLA-20 thru 40A	5	(2)
DOLA-82	130	(59)
DOLA-83 thru 84	145	(66)
DOLA-85	130	(59)

GA

	lb	(kg)
GA-6	50	(23)
GA-8	170	(77)
GAA (All)	3	(1)

GP / GV

	lb	(kg)
GP-4 thru 6	3	(1)
GP-8	2	(1)
GP-12	7	(3)
GP-14	8	(4)
GP-16	9	(4)
GP-22	10	(5)
GP-24	11	(5)
GP-25	9	(4)
GP-29 thru 29A	11	(5)
GP-68A	20	(9)
GP-70A	22	(10)
GP-80	3	(1)
GP-82	4	(2)
GP-106	2	(1)
GP-112	2	(1)
GP-118	10	(5)

GW / GX

	lb	(kg)
GW-10 thru 13	2	(1)
GW-14	4	(2)
GW-15	6	(3)
GW-16	8	(4)
GW-20 thru 26	1	(0.)5
GW-27	5	(2)
GW-30 thru 47	3	(1)
GW-50 thru 63	2	(1)
GW-64	5	(2)
GW-65	1	(0.5)
GW-74	3	(1)
GW-75	4	(2)
GW-76	6	(3)
GWA-1 thru 3	2	(1)
GX-4A1thru 4A1F	3250	(1474)
GX-4A2 thru 4A2F	2550	(1156)
GX-5A1 thru 5A1F	3300	(1497)
GX-5A2 thru 5A2F	3025	(1372)
GXA (All)	20	(9)

HM

	lb	(kg)
HM-5, 5F	30	(14)
HM-6, 6F	50	(23)
HM-8	70	(32)
HM-10	23	(10)
HM-11	14	(6)
HM-12	12	(5)
HM-13	4	(2)
HM-15	35	(16)
HM-20	35	(16)
HM-21	22	(10)
HM-22	19	(9)
HM-23	7	(3)
HM-24	3	(1)
HM-25	1	(0.5)
HM-27	3	(1)
HM-28	15	(7)
HM-29	8	(4)
HM-30	35	(16)
HM-31	8	(4)
HM-32L	29	(13)
HM-33	18	(8)
HM-34	2	(1)
HM-35	70	(32)
HM-36	19	(9)
HM-37	26	(12)
HM-38B, 38R	10	(5)
HM-39, 39F	3	(1)
HM-42	24	(11)
HM-43	4	(2)
HM-45	5	(2)
HM-45M	7	(3)
HM-47	2	(1)
HM-48, 48A	3	(1)
HM-49	225	(102)
HM-50	150	(68)
HM-51	10	(5)
HM-52, 52F	35	(16)
HM-53	2	(1)
HM-54	20	(9)
HM-56, 56A	2	(1)
HM-57R, 57RF	50	(23)
HM-58R	16	(7)
HM-59	420	(190)
HM-60, 60F	182	(83)
HM-62, 62F	500	(227)
HM-63	4	(2)
HM-65	2	(1)
HM-66	15	(7)
HM-67	15	(7)
HM-68	10	(5)
HM-70A, 70AF	1180	(535)
HM-71	4	(2)
HM-73, 73F	425	(193)
HM-74	550	(249)
HM-75	5	(2)
HM-76B	60	(27)
HM-78	1	(0.5)
HM-80	1	(0.5)
HM-81	7	(3)
HM-85	8	(4)
HM-86, 86F	165	(75)
HM-98	50	(23)
HM-100	5	(2)
HM-101	7	(3)
HM-102	2	(1)
HM-104	4	(2)
HM-106 thru 108	52	(24)
HM-109	2	(1)
HM-111	2	(1)
HM-112	17	(8)
HM-114	3	(1)
HM-116	12	(5)
HM-117A	2	(1)
HM-122D	601	(273)
HM-122P	64	(29)
HM-122S	4	(2)
HM-124E	40	(18)
HM-124H	41	(19)
HM-124P	37	(17)
HM-125E	433	(196)
HM-125H	442	(200)
HM-125P	403	(183)
HM-128	150	(68)
HM-130 thru 131D	25	(11)
HM-133, 133F	19	(9)
HM-134	10	(5)
HM-136	10	(5)
HM-140, 140F	151	(68)
HM-141	5	(20)
HM-142	23	(10)
HM-143	12	(5)
HM-144	25	(11)
HM-145 thru 148	7	(3)
HM-151 thru 153	36	(16)
HM-154	46	(21)
HM-156 thru 159	15	(7)
HM-160	1	(0.)5
HM-161	7	(3)
HM-162	2	(1)
HM-163 thru 164	18	(8)
HM-166	35	(16)
HM-178	1	(0.5)
HM-179	1	(0.5)
HM-180	20	(9)
HM-181	20	(9)
HM-182	8	(4)
HM-183	4	(2)
HM-184	52	(24)
HM-188	2	(1)
HM-189	52	(24)
HM-195	45	(20)
HM-196	3	(1)
HM-197	3	(1)
HM-200, 200F	18	(8)
HM-201, 201F	28	(13)
HM-202, 202F	31	(14)
HM-203, 203D	25	(11)
HM-204, 204F	52	(24)
HM-205, 205F	44	(20)
HM-206, 206F	47	(21)
HM-207, 207D	25	(11)
HM-210	2	(1)
HM-220	296	(134)
HM-221	355	(161)
HM-228	115	(52)
HM-229	20	(9)
HM-231	9	(4)
HM-239	160	(73)
HM-240, 240D, 240F	5	(2)
HM-241, 241F	2	(1)
HM-242, 242F	2	(1)
HM-246	21	(10)
HM-250, 250D	33	(15)
HM-252	250	(113)
HM-254	3	(1)
HM-255	27	(12)
HM-256	10	(5)
HM-257	10	(5)
HM-258	25	(11)
HM-259	25	(11)
HM-262	2	(1)
HM-262X	1	(0.5)
HM-266	2	(1)
HM-268	2	(1)
HM-270	25	(11)
HM-271, 271F	350	(159)
HM-272, 272F	110	(50)
HM-273, 273F	85	(39)
HM-274	25	(11)
HM-277	10	(5)
HM-279	25	(11)
HM-280	59	(27)
HM-281	25	(11)
HM-282	67	(30)
HM-284	82	(37)
HM-286	100	(45)
HM-290	27	(12)
HM-291	5	(2)
HM-294, 294M	14	(6)

HMA

	lb	(kg)
HMA-2	1	(0.5)
HMA-5	1	(0.5)
HMA-9	1	(0.5)
HMA-10 thru 12	2	(1)
HMA-13	1	(0.5)
HMA-15	1	(0.5)
HMA-20	2	(1)
HMA-21	2	(1)
HMA-24 thru 49	1	(0.5)
HMA-51	10	(5)
HMA-52	4	(2)
HMA-53	2	(1)
HMA-54	3	(1)
HMA-55V	1	(0.5)
HMA-56	6	(3)
HMA-56B	58	(26)
HMA-58	2	(1)
HMA-60	6	(3)
HMA-61	10	(5)
HMA-62	4	(2)
HMA-63	4	(2)
HMA-64	5	(2)
HMA-68	9	(4)
HMA-69	25	(11)
HMA-78	2	(1)
HMA-79	2	(1)
HMA-82	2	(1)
HMA-83	10	(5)
HMA-84	10	(5)
HMA-85	6	(3)
HMA-86	4	(2)
HMA-88	1	(0.5)
HMA-89	30	(14)
HMA-94	100	(45)
HMA-95	100	(45)
HMA-104, 104C	26	(12)
HMA-108	1	(0.5)
HMA-109	1	(0.5)
HMA-110	13	(6)
HMA-111	14	(6)
HMA-113	3	(1)
HMA-114	30	(14)
HMA-115	5	(2)
HMA-116	19	(9)
HMA-117	20	(9)
HMA-118	6	(3)
HMA-119	15	(7)
HMA-120	6	(3)
HMA-121 thru 123	10	(5)
HMA-124	20	(9)
HMA-125	3	(1)
HMA-129	6	(3)
HMA-130	13	(6)
HMA-131	20	(9)
HMA-132, 132WR	20	(9)
HMA-133	3	(1)
HMA-134	2	(1)
HMA-135	2	(1)
HMA-136	3	(1)
HMA-137	1	(0.5)
HMA-139	2	(1)
HMA-140	6	(3)
HMA-141	1	(0.5)
HMA-145	1	(0.5)
HMA-150 thru 152	2	(1)
HMA-180, 180C	1	(0.5)
HMA-181, 181C	1	(0.5)
HMA-182	2	(1)
HMA-183, 183S	1	(0.5)
HMA-188	2	(1)
HMA-190	3	(1)
HMA-191	16	(7)
HMA-203	2	(1)
HMA-204W	25	(11)
HMA-207	2	(1)
HMA-208	1	(0.5)
HMA-209	26	(12)
HMA-214 thru 220	2	(1)
HMA-221	3	(1)
HMA-224	28	(13)
HMA-225	17	(8)
HMA-227	26	(12)
HMA-228	3	(1)
HMA-229	3	(1)
HMA-232, 232D	3	(1)
HMA-234, 234D	5	(2)
HMA-236, 236D	8	(4)
HMA-240	55	(25)
HMA-247 thru 249	4	(2)
HMA-250	10	(5)
HMA-251	3	(1)
HMA-258	4	(2)
HMA-259	2	(1)
HMA-260	6	(3)
HMA-261	7	(3)
HMA-263	5	(2)
HMA-264	5	(2)
HMA-265	2	(1)
HMA-266	5	(2)
HMA-271A	3	(1)
HMA-272	1	(0.5)
HMA-276A	3	(1)
HMA-277	1	(0.5)
HMA-282	5	(2)
HMA-290	1	(0.5)
HMA-292	1	(0.5)
HMA-293	3	(1)
HMA-295	3	(1)
HMA-296	5	(2)
HMA-300	2	(1)
HMA-302	3	(1)
HMA-304 thru 308R	2	(1)
HMA-320	2	(1)
HMA-321	1	(0.5)
HMA-323	1	(0.5)
HMA-324	2	(1)
HMA-326	5	(2)
HMA-327	6	(3)
HMA-338	2	(1)
HMA-339	2	(1)
HMA-340	3	(1)
HMA-348R	1	(0.5)
HMA-353	1	(0.5)
HMA-354	50	(23)
HMA-355	2	(1)
HMA-356 thru 367	1	(0.5)
HMA-385	2	(1)
HMA-386	1	(0.5)
HMA-387	1	(0.5)
HMA-401	2	(1)
HMA-402, 402F	6	(3)
HMA-490	2	(1)
HMA-491	3	(1)
HMA-492	5	(2)
HMA-493	10	(5)
HMA-506	2	(1)
HMA-514, 514S	18	(8)
HMA-515	2	(1)
HMA-516, 516S	30	(14)
HMA-517, 517S	31	(14)
HMA-518, 518S	90	(41)
HMA-519, 519S	130	(59)
HMA-520	13	(6)
HMA-521	7	(3)
HMA-522	2	(1)
HMA-523	2	(1)
HMA-524	3	(1)
HMA-526	5	(2)
HMA-527 thru 529	2	(1)
HMA-542 thru 549	1	(0.5)
HMA-552	2	(1)
HMA-553	2	(1)
HMA-554	3	(1)
HMA-556	6	(3)
HMA-557	1	(0.5)
HMA-558	1	(0.5)
HMA-559	2	(1)
HMA-562 thru 569	1	(0.5)
HMA-572 thru 579	1	(0.5)
HMA-591	7	(3)
HMA-592	10	(5)
HMA-593	3	(1)
HMA-635	18	(8)
HMA-640	38	(17)
HMA-641	38	(17)
HMA-642	53	(24)
HMA-643	53	(24)
HMA-645	35	(16)
HMA-646 thru 648	40	(18)
HMA-650	1	(0.5)
HMA-651	1	(0.5)
HMA-652	3	(1)
HMA-653	1	(0.5)
HMA-654	1	(0.5)
HMA-655	2	(1)
HMA-656	1	(0.5)
HMA-657 thru 659	80	(36)
HMA-663	50	(23)
HMA-665	6	(3)
HMA-667	15	(7)
HMA-670	5	(2)
HMA-671	4	(2)
HMA-672	8	(4)
HMA-673	2	(1)
HMA-683D	24	(11)
HMA-685D	33	(15)
HMA-687D	30	(14)
HMA-701	1	(0.5)
HMA-702	1	(0.5)
HMA-723	4	(2)
HMA-725	160	(73)
HMA-727	70	(32)
HMA-729	235	(107)
HMA-730	75	(34)
HMA-731	225	(102)
HMA-732	135	(61)
HMA-734 thru 734S	3	(1)
HMA-735, 735S	3	(1)
HMA-736, 736S	6	(3)
HMA-737, 737S	6	(3)
HMA-744 thru 744S	1	(0.5)
HMA-745	1	(0.5)
HMA-746, 746S	1	(0.5)
HMA-747S	1	(0.5)
HMA-764 thru 764S	2	(1)
HMA-765	2	(1)
HMA-766, 766S	3	(1)
HMA-767S, 767S	3	(1)
HMA-810	173	(78)
HMA-812	2	(1)
HMA-813	20	(9)
HMA-814	2	(1)
HMA-836	6	(3)
HMA-837	6	(3)
HMA-838	7	(3)
HMA-839	6	(3)
HMA-850 thru 854	1	(0.5)
HMA-855	2	(1)
HMA-856	2	(1)
HMA-891	12	(5)
HMA-920	14	(6)
HMA-922	12	(5)
HMA-924	4	(2)
HMA-1050	65	(29)
HMA-1051	20	(9)
HMA-1052	1	(0.5)
HMA-1053	27	(12)
HMA-1054	65	(29)

HS

	lb	(kg)
HS-50K	30	(14)

LC

	lb	(kg)
LC-7, 7F	50	(23)
LC-8, 8F	75	(34)
LC-13	774	(351)
LC-14, 14F	1588	(720)
LC-20, 20F	737	(334)
LC-22, 22F	1736	(787)
LC-24, 24F	3770	(1710)
LC-33	395	(179)
LC-34	390	(177)
LC-35	580	(263)
LC-36	570	(259)
LC-37	845	(383)
LC-53	370	(168)
LC-70, 70F	282	(128)
LC-72, 72F	670	(304)
LC-80	15	(7)
LC-82, 82F	63	(29)
LC-82S	83	(38)
LC-88	33	(15)
LC-91, 91F	105	(48)
LC-92, 92F	220	(100)
LC-95, 95F	460	(209)
LC-100, 100F	256	(116)
LC-115	630	(286)
LC-201	542	(246)
LC-350, 350F	157	(71)
LC-401, 401F	1040	(472)
LC-500, 500F	181	(82)
LC-502, 502F	130	(59)

LCA

	lb	(kg)
LCA-5 thru 9	22	(10)
LCA-11	23	(10)
LCA-30	33	(15)
LCA-34	4	(2)
LCA-35	5	(2)
LCA-36	6	(3)
LCA-37	12	(5)
LCA-45	15	(7)
LCA-46	5	(2)
LCA-47	9	(4)
LCA-50	3	(1)
LCA-51	7	(3)
LCA-52	9	(4)
LCA-53	23	(10)
LCA-55	2	(1)
LCA-56	2	(1)
LCA-57	210	(95)
LCA-61	8	(4)
LCA-63	22	(10)
LCA-65 thru 68	11	(5)
LCA-70	6	(3)
LCA-72	6	(3)
LCA-73	4	(2)
LCA-74	3	(1)
LCA-75	9	(4)
LCA-76	10	(5)
LCA-91	700	(317)
LCA-92	13	(6)
LCA-96	306	(139)
LCA-97	306	(139)
LCA-170	2	(1)
LCA-171	2	(1)
LCA-172 thru 176	3	(1)
LCA-178	12	(5)
LCA-179	1	(0.5)
LCA-240	38	(17)
LCA-242	28	(13)

LP

	lb	(kg)
LP-9, 9F	430	(195)
LP-16	3	(1)
LP-22, 22F	38	(17)
LP-23, 23F	38	(17)
LPA-10 thru 12	3	(1)
LPA-20	2	(1)
LPA-21	2	(1)
LPA-24	1	(0.5)
LPA-26	2	(1)
LPA-30, 30F	53	(24)
LPA-31	10	(5)
LPA-35	20	(9)
LPA-43	2	(1)
LPA-52	15	(7)
LPA-55	1	(0.5)
LPA-56	4	(2)
LPA-58	1	(0.5)
LPA-62	1	(0.5)
LPA-121	1	(0.5)
LPA-127	1	(0.5)
LPA-127D	4	(2)
LPA-128	1	(0.5)
LPA-129	1	(0.5)
LPA-182, 182F	12	(5)

MA

	lb	(kg)
MA-10	7	(3)
MA-11	1	(0.5)
MA-12	4	(2)
MA-13	2	(1)
MA-15	65	(29)
MA-23, 23F	27	(12)
MA-24, 24F	20	(9)
MA-26	23	(10)
MA-26X	16	(7)

	lb	(kg)
MA-28, 28F	90	(41)
MA-29, 29F	90	(41)
MA-30	1	(0.5)
MA-32, 32F	25	(11)
MA-38	1	(0.5)
MA-40 thru 45	2	(1)
MA-46	3	(1)
MA-48	2	(1)
MA-50	2	(1)
MA-52	55	(25)
MA-54A, 54AF	210	(95)
MA-66, 66F	53	(24)
MA-67, 67F	113	(51)
MA-68, 68F	125	(57)
MA-74	2	(1)
MA-76	80	(36)
MA-78	5	(2)
MA-80, 80B	10	(5)
MA-81, 81B	10	(5)
MA-84R, 84RF	7	(3)
MA-100 thru 127	1	(0.5)
MA-130 thru 169	2	(1)
MA-170 thru 170F	3	(1)
MA-182	1	(0.5)
MA-187	1	(0.5)
MA-188	2	(1)
MA-189	1	(0.5)
MA-193 thru 198	2	(1)
MA-203 thru 205	5	(2)
MA-207 thru 209	1	(0.5)
MA-210C thru MA-234	3	(1)
MA-236R, 236RF	800	(363)
MA-238	2	(1)
MA-240 thru 242R	3	(1)
MA-243 thru 249	2	(1)
MA-250R	1	(0.5)
MA-252R	4	(2)
MA-267	2	(1)
MA-275 thru 278	1	(0.5)
MA-27A, 27AF	30	(14)
MA-290, 290F	5	(2)
MA-291, 291F	5	(2)
MA-305	2	(1)
MA-316	2	(1)
MA-321A thru 322AT	2	(1)
MA-323 thru 324C	3	(1)
MA-330 thru 373C	2	(1)
MA-381, 381C	3	(1)
MA-383	4	(2)
MA-391 thru 393	2	(1)
MA-420C thru 471T	3	(1)
MA-491 thru 496	1	(0.5)
MA-529C thru 541T	3	(1)
MA-542, 542T	2	(1)
MA-751CT, 751FT	3	(1)
MA-767	3	(1)
MA-771	0.3	(0.13)
MA-774 thru 778	7	(3)
MA-812	11	(5)
MA-814	22	(10)
MA-816	22	(10)
MA-818	45	(20)
MA-838	38	(17)
MA-839	38	(17)
MA-950	5	(2)
MA-1807, 1807F	9	(4)
MA-1810, 1810F	16	(7)
MA-1817, 1817F	1	(0.5)
MA-1827, 1827F	11	(5)
MAA-10B	2	(1)
MAA-12	2	(1)
MAA-28	6	(3)
MAA-30A	1	(0.5)
MAA-31	2	(1)
MAA-32	3	(1)
MAA-34A	9	(4)
MAA-38A	20	(9)
MAA-44	13	(6)
MAA-45	2	(1)
MAA-46	5	(2)
MAA-47	2	(1)
MAA-48 thru 52	1	(0.5)
MAA-60	2	(1)
MAA-61	2	(1)
MAA-62	1	(0.5)
MAA-64, 64F	12	(5)
MAA-65, 65F	25	(11)
MAA-70 thru 90	1	(0.5)
MAA-116	1	(0.5)
MAA-141	6	(3)
MAA-142	2	(1)
MAA-143	2	(1)
MAA-144	6	(3)
MAA-145	18	(8)
MAA-146	4	(2)
MAA-147	4	(2)
MAA-148	3	(1)
MAA-149	4	(2)
MAA-162 thru 165	2	(1)
MAA-175	1	(0.5)
MAA-176	1	(0.5)
MAA-181 thru 227	2	(1)
MAA-228 thru 230	1	(0.5)
MAA-231 thru 247	2	(1)
MAA-248	1	(0.5)
MAA-260	1	(0.5)
MAA-261A	4	(2)
MAA-266	5	(2)
MAA-269A	7	(3)
MAA-271	1	(0.5)
MAA-274 thru 288	2	(1)
MAA-321	1	(0.5)
MAA-322	1	(0.5)

MC

	lb	(kg)
MC-60, 60F	780	(354)
MC-250P thru 250PRF	800	(363)
MC-300P thru 300PRF	975	(442)
MC-400P thru 400PRF	1620	(735)
MC-400PRP, 400PRPF	2375	(1077)
MC-500P thru 500PRF	2500	(1134)
MC-500PRP, 500PRPF	2960	(1342)
MCA-3	44	(20)
MCA-4	190	(86)
MCA-5	41	(19)
MCA-6	41	(19)
MCA-7	38	(17)
MCA-8	117	(53)
MCA-9	101	(46)
MCA-10	152	(69)
MCA-11	114	(52)
MCA-12R	300	(136)
MCA-13R	342	(155)
MCA-14	34	(15)
MCA-15	33	(15)
MCA-16	47	(21)
MCA-17	24	(11)
MCA-18	22	(10)
MCA-19	32	(15)
MCA-20	40	(18)
MCA-24	90	(41)
MCA-26	10	(5)
MCA-27	90	(41)
MCA-29	1	(0.5)
MCA-30	83	(38)
MCA-32	300	(136)
MCA-34	190	(86)

MD / MF

	lb	(kg)
MD-2000 thru 2000F	252	(114)
MF-2 thru 2AF	43	(20)
MF-4 thru 4F	71	(32)
MF-6 thru 6AF	121	(55)
MF-8A	310	(141)
MF-1310	45	(20)
MF-1315	50	(23)
MF-6010	140	(63)
MF-6020	135	(61)
MF-7910	65	(29)
MF-7915	65	(29)
MF-8010 thru 8025	85	(39)

MO / MS

	lb	(kg)
MO-30, 30F	400	(181)
MO-32, 32F	400	(181)
MO-38	400	(181)
MOA-2	1	(0.5)
MOA-3	2	(1)
MOA-5	1	(0.5)
MOA-6	2	(1)
MOA-10	5	(2)
MOA-12	2	(1)
MOA-14	3	(1)
MS-1, 1F	198	(90)
MS-2, 2F	265	(120)
MS-3, 3F	357	(162)
MS-5, 5F	400	(181)
MS-6, 6F	400	(181)
MS-10	145	(66)
MS-26	25	(11)
MS-27	4	(2)
MS-29	44	(20)
MS-35	6	(3)
MS-36	25	(11)
MS-42	32	(15)
MS-43, 43F	45	(20)
MS-62, 62F	25	(11)
MS-64, 64F	45	(20)
MS-66, 66F	30	(14)
MS-67, 67F	94	(43)
MS-86, 86F	250	(113)
MS-398	250	(113)
MSA-100	8	(4)
MSA-100B thru 100M	4	(2)
MSA-101 thru 101M	8	(4)
MSA-106, 106M	15	(7)
MSA-111	24	(11)
MSA-112	20	(9)
MSA-113	25	(11)
MSA-114	26	(12)
MSA-120	4	(2)
MSA-121	4	(2)
MSA-125	22	(10)
MSA-130, 130F	109	(49)
MSA-131, 131F	100	(45)
MSA-860D	15	(7)

NM

	lb	(kg)
NM (All)	1	(0.5)

OB / OT

	lb	(kg)
OB-60	33	(15)
OB-132 thru 133H	20	(9)
OB-134 thru 135H	22	(10)
OB-160	33	(15)
OB-160L	51	(23)
OB-201	3	(1)
OB-210	3	(1)
OB-215	3	(1)
OB-300	51	(23)
OB-300L	71	(32)
OB-310	4	(2)
OB-311	4	(2)
OB-505	31	(14)
OB-510	31	(14)
OB-515	61	(28)
OB-520	61	(28)
OB-525	99	(45)
OB-600	71	(32)
OB-760	6	(3)
OB-1119	44	(20)
OB-1650	4	(2)
OB-2400M	19	(9)
OB-2400P	19	(9)
OBA-10	6	(3)
OBA-15R	13	(6)
OBA-20	6	(3)
OBA-110	2	(1)
OBA-126A	4	(2)
OBA-137M	10	(5)
OBA-137P	10	(5)
OBA-160	5	(2)
OBA-170	2	(1)
OBA-171	2	(1)
OBA-201 thru 204W	1	(0.5)
OBA-205 thru 209W	2	(1)
OBA-210 thru 210W	4	(2)
OBA-211 thru 211W	7	(3)
OBA-212 thru 212W	8	(4)
OBA-213 thru 213W	12	(5)
OBA-214 thru 214W	25	(11)
OBA-215 thru 215W	50	(23)
OBA-216 thru 217W	2	(1)
OBA-278 thru 278W	25	(11)
OBA-280 thru 280W	50	(23)
OBA-282 thru 282W	23	(10)
OBA-284 thru 284W	45	(20)
OBA-286 thru 286W	56	(25)
OBA-288 thru 288W	111	(50)
OBA-289 thru 289W	221	(100)
OBA-291 thru 291W	552	(250)
OBA-301 thru 305W	1	(0.5)
OBA-306 thru 309W	2	(1)
OBA-310 thru 310W	4	(2)
OBA-311 thru 311W	6	(3)
OBA-312 thru 312W	8	(4)
OBA-313 thru 313W	11	(5)
OBA-314 thru 314W	23	(10)
OBA-315 thru 315W	45	(20)
OBA-316 thru 317W	2	(1)
OBA-401 thru 405W	1	(0.5)
OBA-406 thru 409W	2	(1)
OBA-410 thru 410W	4	(2)
OBA-411 thru 411W	6	(3)
OBA-412 thru 412W	8	(4)
OBA-413 thru 413W	11	(5)
OBA-414 thru 414W	23	(10)
OBA-415 thru 415W	45	(20)
OBA-416 thru 417W	2	(1)
OBA-703, 703S	2	(1)
OBA-707	3	(1)
OBA-1101	2	(1)
OBA-10783A	2	(1)
OBD-152	20	(9)
OBD-210A	6	(3)
OBD-223	20	(9)
OBD-410A	6	(3)
OBD-421 thru 622	20	(9)
OBD-810A	6	(3)
OBD-821	20	(9)
OBD-2100A thru 8100A	6	(3)
OBX-101	17	(8)
OBX-102	17	(8)
OBX-124 thru 423	22	(10)
OBX-512 thru 535	26	(12)
OBX-623	22	(10)
OBX-911	23	(10)
OBX-922	16	(7)
OBX-942	16	(7)
OBX-961	17	(8)
OBX-962	17	(8)
OT-2, 2F	362	(164)

PM / PO

	lb	(kg)
PM (All)	1	(0.5)
PO-23	536	(243)
POA-10	5	(2)

PR / PS

	lb	(kg)
PR-10	380	(172)
PRA-14	5	(2)
PS-3, 3F	215	(98)
PS-4, 4F	246	(112)
PSA-114	4	(2)
PSA-299 thru 316	12	(5)
PSA-312	26	(12)
PSA-324 thru 335	3	(1)
PSA-336	12	(5)
PSA-367	20	(9)

PT

	lb	(kg)
PT-6A, 6AF	20	(9)
PT-8, 8F	10	(5)
PT-12, 12F	101	(46)
PT-53, 53F	80	(36)
PT-61, 61F	60	(27)
PT-62, 62F	65	(29)
PT-65	6	(3)
PT-82, 82F	94	(43)
PT-101 thru 115	2	(1)
PTA-59	10	(5)
PTA-61	20	(9)
PTA-70	51	(23)
PTA-85	1	(0.5)
PTA-86	1	(0.5)
PTA-90, 90F	197	(89)
PTA-100	2	(1)
PTA-161	42	(19)
PTA-162	1	(0.5)
PTA-163	1	(0.5)
PTA-164	10	(5)
PTA-165	1	(0.5)
PTA-166	1	(0.5)
PTA-168	2	(1)
PTA-169	1	(0.5)
PTA-176 thru 180	1	(0.5)

RL

	lb	(kg)
RLA-8 thru 12	2	(1)
RLA-22	1	(0.5)
RLA-24	3	(1)
RLA-25	3	(1)
RLA-30	6	(3)
RLA-32	6	(3)

SA

	lb	(kg)
SA-1	2	(1)
SA-2	2	(1)
SA-5	3	(1)
SA-10	18	(8)
SA-12	17	(8)
SA-16	3	(1)
SA-18	3	(1)
SA-19	15	(7)
SA-20, 20C	2	(1)
SA-25, 25F	155	(70)
SA-45	36	(16)
SA-55A	1	(0.5)
SA-60, 60F	16	(7)
SA-61	5	(2)
SA-62	5	(2)
SA-66	8	(4)
SA-80, 80F	67	(30)
SAA-2	1	(0.5)
SAA-8	3	(1)
SAA-9 thru 12	1	(0.5)
SAA-15	6	(3)
SAA-17	1	(0.5)
SAA-18	1	(0.5)
SAA-22 thru 24	1	(0.5)
SAA-30	12	(5)
SAA-31	38	(17)

SC

	lb	(kg)
SC-1	8	(4)
SC-2	8	(4)
SC-3	9	(4)
SC-4	9	(4)
SC-5	5	(2)
SC-45	7	(3)
SC-46	3	(1)
SC-47	4	(2)
SC-50	3	(1)
SC-51	4	(2)
SC-55	2	(1)
SC-56 thru 65	3	(1)
SC-70 thru 81	2	(1)
SC-82	3	(1)
SC-83	3	(1)
SC-84	4	(2)
SC-90	3	(1)
SC-108	10	(5)
SC-115	4	(2)
SC-116 thru 119	2	(1)
SC-149	8	(4)
SC-150	3	(1)
SC-151	3	(1)
SC-152 thru 165	2	(1)
SC-180	6	(3)
SC-181	7	(3)
SC-183	5	(2)
SC-184	4	(2)
SC-185	5	(2)
SC-186	8	(4)
SC-187	12	(5)
SC-188 thru 190	15	(7)
SC-195	12	(5)
SC-250	6	(3)
SC-251	6	(3)
SC-252	5	(2)
SC-253 thru 259	3	(1)
SC-270	7	(3)
SC-272	9	(4)
SC-400	1	(0.5)
SC-402	2	(1)
SC-404	3	(1)
SC-406	4	(2)
SC-498 thru 504	2	(1)
SC-506	3	(1)
SC-508	3	(1)

SE / SF

	lb	(kg)
SE-2B, 2BF	190	(86)
SE-5	31	(14)
SE-6	75	(34)
SE-20	4	(2)
SE-24	2	(1)
SE-26	2	(1)
SE-28	1	(0.5)
SE-30L	1	(0.5)
SE-30LD	5	(2)
SE-30M	1	(0.5)
SE-30MD	5	(2)
SE-30X	1	(0.5)
SE-30XD	5	(2)
SE-31	2	(1)
SEA-100A	3	(1)
SEA-100B	2	(1)
SEA-100C	2	(1)
SEA-100E	10	(5)
SEA-100F	2	(1)
SEA-100G	1	(0.5)
SEA-101	3	(1)
SEA-102	1	(0.5)
SEA-103	11	(5)
SF-10	45	(20)
SF-20	55	(25)
SFA-20	2	(1)
SFA-21	1	(0.5)
SFA-22	1	(0.5)
SFA-24	2	(1)
SFA-25	3	(1)

SG

	lb	(kg)
SG-4	37	(17)

SG-7A	3	(1)
SG-8	4	(2)
SG-15	7	(3)
SG-20	40	(18)
SG-24 thru 40	3	(1)
SG-42	29	(13)
SG-62 thru 66	2	(1)
SG-70	3	(1)
SG-100 thru 500	2	(1)
SG-1000	3	(1)
SGA-5R, 5RT	23	(10)
SGA-7	2	(1)
SGA-8	2	(1)
SGA-91	1	(0.5)
SGA-92	1	(0.5)
SGA-94	3	(1)
SGA-95	1	(0.5)
SGA-106	6	(3)
SGA-119	1	(0.5)
SGA-120	20	(9)
SGA-122	20	(9)
SGA-125	2	(1)
SGA-130	5	(2)

SM

	lb	(kg)
SM-1	1250	(567)
SM-2	1150	(522)
SM-3, 3L, 3LC	900	(408)
SM-4, 4L, 4LC	500	(227)
SM-4X, 4XL, 4XLC	700	(317)
SM-5, 5L, 5LC	500	(227)
SM-6, 6L, 6LC	300	(136)
SM-6SL	145	(66)
SM-6SLC	175	(79)
SM-31	1000	(454)
SM-41	700	(317)
SM-51	600	(272)
SM-61	400	(181)

SP

	lb	(kg)
SP-0	600	(272)
SP-1, 1C	134	(61)
SP-2	64	(29)
SP-2.5	40	(18)
SP-3	15	(7)
SP-6	330	(150)
SP-10	385	(175)
SP-12CA, 12CG	250	(113)
SP-33	15	(7)
SP-42, 42F	40	(18)
SP-48R, 48RF	470	(213)
SP-50	35	(16)
SP-55	70	(32)
SP-90	8	(4)
SP-92	3	(1)
SP-93	3	(1)
SP-96	5	(2)
SP-97	5	(2)
SP-138	4	(2)
SP-140	6	(3)
SP-171	3	(1)
SP-171X	6	(3)
SP-173	16	(7)
SP-174	28	(13)
SP-175	15	(7)
SP-177	16	(7)
SP-230	46	(21)
SP-245, 245F	735	(333)
SP-254	65	(29)
SP-256	72	(33)
SP-258	64	(29)
SP-259	72	(33)
SP-261	51	(23)
SP-262	57	(26)
SP-264	51	(23)
SP-266	57	(26)
SP-268	65	(29)
SP-269	74	(34)
SP-271	65	(29)
SP-272	74	(34)
SP-274	33	(15)
SP-278	33	(15)
SP-284	27	(12)
SP-285	33	(15)
SP-286	41	(19)
SP-287	49	(22)
SP-288	20	(9)
SP-289	27	(12)
SP-290	33	(15)
SP-291	41	(19)
SP-292	49	(22)
SP-293	20	(9)
SP-300	22	(10)
SP-302 thru 306	15	(7)
SP-1015FX	40	(18)
SP-1017FX	50	(23)
SP-1018FX	65	(29)
SP-1050, 1050X	115	(52)
SP-1060 thru 1070X	192	(87)
SPA-21	16	(7)
SPA-22, 22C	5	(2)
SPA-22K	45	(20)
SPA-23	5	(2)
SPA-24	5	(2)
SPA-30	9	(4)
SPA-31	13	(6)
SPA-60	5	(2)
SPA-64	4	(2)
SPA-100, 100S	10	(5)
SPA-101, 101S	6	(3)
SPA-102	6	(3)
SPA-104	55	(25)
SPA-105	55	(25)
SPA-108	4	(2)
SPA-109	12	(5)
SPA-110	10	(5)
SPA-111	12	(5)
SPA-114	15	(7)
SPA-120	20	(9)
SPA-122	10	(5)
SPA-129 thru 132	2	(1)
SPA-151	4	(2)
SPA-171	6	(3)
SPA-181	6	(3)
SPA-240X	1	(0.5)
SPA-241	1	(0.5)
SPA-242	2	(1)
SPA-244	1	(0.5)
SPA-245X	4	(2)
SPA-255	4	(2)
SPA-256 thru 262	2	(1)
SPA-263	5	(2)
SPA-264	1	(0.5)
SPA-301	1	(0.5)
SPA-302	8	(4)
SPA-303	2	(1)
SPA-400	20	(9)
SPA-450	30	(14)
SPA-501	12	(5)
SPA-501X	10	(5)
SPA-502	8	(4)

SS

	lb	(kg)
SS-3	17	(8)
SS-8R, 8RF	135	(61)
SS-10	137	(62)
SS-12R, 12RF	200	(91)
SS-14 thru 14F	162	(73)
SS-15 thru 15F	55	(25)
SS-18, 18F	76	(34)
SS-20, 20F	210	(95)
SS-21, 21F	210	(95)
SS-22, 22F	215	(98)
SS-23	8	(4)
SS-25, 25F	148	(67)
SS-28, 28F	8	(4)
SS-30 thru 30S	215	(98)
SS-31 thru 31S	215	(98)
SS-33 thru 33S	250	(113)
SS-34, 34F	210	(95)
SS-35	25	(11)
SS-36, 36F	210	(95)
SS-45A	55	(25)
SS-82, 82F	95	(43)
SSA-10	1	(0.5)
SSA-11 thru 15	2	(1)
SSA-20	5	(2)
SSA-22	3	(1)
SSA-41 thru 58	2	(1)
SSA-72 thru 76	1	(0.5)
SSA-77	5	(2)
SSA-320A	115	(52)
SSA-321	165	(75)
SSA-325	55	(25)
SSA-351 thru 355	2	(1)
SSA-801 thru 803	10	(5)
SSA-804	5	(2)
SSA-805R	125	(57)
SSA-807 thru 810	10	(5)
SSA-811	8	(4)
SSA-812	8	(4)
SSA-820	26	(12)
SSA-822	40	(18)
SSA-823	3	(1)

SV

	lb	(kg)
SV-125	2	(1)
SV-126	2	(1)
SV-135 thru 218	1	(0.5)
SV-800	2	(1)
SV8-2C, 2F	2	(1)

TM

	lb	(kg)
TM-5, 5F	680	(308)
TM-6, 6F	695	(315)

TS

	lb	(kg)
TS-1, 1F	495	(224)
TS-2, 2F	495	(224)
TSA-100 thru 115	15	(7)
TSA-116	22	(10)
TSA-117	22	(10)
TSA-124 thru 135	3	(1)
TSA-136	13	(6)
TSA-137	13	(6)
TSA-140 (All)	3	(1)
TSA-153	1	(0.5)
TSA-154R	30	(14)
TSA-155	24	(11)
TSA-156	45	(20)
TSA-157	20	(9)
TSA-159	30	(14)
TSA-162	15	(7)
TSA-163	10	(5)
TSA-167	51	(23)
TSA-168	1	(0.5)
TSA-169R, 169RF	5	(2)
TSA-170	1	(0.5)
TSA-171	2	(1)
TSA-172 thru 174	1	(0.5)
TSA-175 thru 178	2	(1)
TSA-180	290	(132)
TSA-182 thru 189	1	(0.5)
TSA-190	2	(1)
TSA-191	2	(1)
TSA-193	1	(0.5)
TSA-195	3	(1)
TSA-198	1	(0.5)
TSA-205	2	(1)
TSA-206	5	(2)
TSA-207	5	(2)
TSA-208	3	(1)
TSA-232 thru 271	2	(1)
TSA-273	3	(1)
TSA-275 thru 279	2	(1)
TSA-300	3	(1)
TSA-1167, 1167F	4	(2)

UB

	lb	(kg)
UB-5, 5A	120	(54)
UB-15	5	(2)
UB-18 thru 18B	183	(83)
UBA-1	7	(3)
UBA-4	11	(5)
UBA-100	7	(3)

V

	lb	(kg)
V3 (All)	1	(0.5)
V3 Covers	1	(0.5)
V3 Pans	1	(0.5)
V6 (All)	2	(1)
V6 Covers	1	(0.5)
V6 Pans	1	(0.5)
V8 (All)	2	(1)
V8 Covers	1	(0.5)
V8 Pans	2	(1)
V10 (All)	3	(1)
V10 Covers	2	(1)
V10 Pans	2	(1)
V12 (All)	4	(2)
V12 Covers	2	(1)
V12 Pans	4	(2)
V18 (All)	8	(4)
V18 Covers	4	(2)
V18 Pans	8	(4)
V200 (All)	2	(1)
V200 Covers	2	(1)
V200 Pans	2	(1)
V300 (All)	4	(2)
V300 Covers	4	(2)
V300 Pans	4	(2)

WC

	lb	(kg)
WC-3S thru 5S	2	(1)
WC-200 thru 625S	2	(1)

WT / WV

	lb	(kg)
WT-1, 1A	3	(1)
WT-3	2	(1)
WT-3S	3	(1)
WT-4	2	(1)
WT-4B	1	(0.5)
WT-4R	3	(1)
WT-5	1	(0.5)
WT-8	1	(0.5)
WT-8R	3	(1)
WT-10	4	(2)
WT-13	1	(0.5)
WT-13S	2	(1)
WT-33CSB thru 33ESB	1	(0.5)
WT-44CSB thru 44ESB	1	(0.5)
WT-60	3	(1)
WT-61	1	(0.5)
WT-62	1	(0.5)
WT-84CSB thru 86ESB	3	(1)
WT-88CSB thru 88ESB	4	(2)
WT-128CSB thru 128ESB	5	(2)
WT-204	2	(1)
WT-206	3	(1)
WT-324	2	(1)
WT-326	3	(1)
WTA-1 thru 54	1	(0.5)
WV-1, 1F	510	(231)
WV-2, 2F	510	(231)
WV-3, 3F	510	(231)
WVA-100 thru 165	5	(2)

GILSON COMPANY, INC.

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740.548.5314

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MC VISA AmEx Acct. #: _____ Exp. Date: _____ / _____ Zip for Card Account: _____

Cardholder: _____ Signature: _____

Date: _____

FAX #: _____ - _____ - _____ Phone#: _____ - _____ - _____ Ext: ____

Email: _____

Company: _____

Contact: _____

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_____

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City: _____ State: _____ Zip: _____

Model Number	Description	Price Each	Quantity	Total

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Claims - Items are shipped in new condition and packed to withstand normal shipping risks. The Purchaser is responsible to check all packages for damage or loss before accepting any shipment. Any damage or loss apparent from the shipping container must be noted on the bill of lading and Gilson must be notified by the Purchaser of the loss or damage within 5 business days of delivery. After 5 business days and in the absence of such notice, Purchaser is deemed to have accepted any shipment. Gilson is not responsible for damaged or lost items that have been accepted by the Purchaser. Concealed damage, where the box is in good condition but the product is missing or damaged, is an exception.

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Liability and Purchaser Indemnity - Use of Gilson products may involve hazardous procedures and materials. Our descriptions of items do not proclaim to address all of the safety issues involved with their use. The user is solely responsible for using these products in a safe and responsible manner as outlined in the appropriate published test procedures, operating instructions, warning labels and applicable regulatory requirements. Gilson shall not be liable for and Purchaser assumes all risk of any advice or failure to provide advice by Gilson regarding the products or Purchaser's use of the same. Gilson shall have no responsibility for any particular application made of any product. Purchaser agrees to indemnify and hold Gilson harmless from and against any costs, losses, liabilities and expenses (including reasonable attorney's fees) arising out of third-party claims related to Purchaser's use of Gilson products.

Warranty - Gilson warrants that the products supplied are suitable for the standard purpose for which they are designed. These products are warranted to be free of defects in materials and workmanship for a period of one (1) year from the date of original shipment and any claim must be submitted within such period. This warranty excludes damage from or repairs necessitated by neglect, abuse, normal wear and tear, use of the equipment for other than its intended purpose or other than under normal operating conditions, alterations or modifications, repairs attempted by anyone other than Gilson and any failure to comply with installation, maintenance or operating instructions. Also excluded are damages caused by lightning strikes, floods, electrical supply irregularities or other occurrences beyond our control. Purchaser may be required to establish that the product has not been altered or modified and has been properly installed, maintained and operated within the limits of rated and normal use. Products may not be returned to Gilson for warranty repair or replacement without obtaining a Returns Goods Authorization (RGA) number. If Gilson determines in its sole discretion that the product is defective and is covered by this warranty, Gilson's sole obligation, and Purchaser's sole and exclusive remedy, is the repair or replacement of the product by Gilson in Gilson's discretion. Gilson will not be responsible for labor charges or other expenses associated with a repair of a defective item (e.g., to reinstall a repaired or replaced part). Additional Third Party Manufacturer warranties are honored and passed through when applicable. Purchaser's sole and exclusive remedy for any defect covered by the warranty shall be as set forth in this section. This exclusive remedy shall not have failed of its essential purpose (as that term is used in the Uniform Commercial Code). Purchaser specifically acknowledges that Gilson's price for the products is based upon the limitations of Gilson's liability as set forth in these terms. These limitations of liability shall survive any finding that the exclusive remedy failed of its essential purpose.

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Governing Law - This sale and these Terms are governed by Ohio law without regard to choice of law rules. The parties agree that certain material events, occurrences, and transactions relating to the sale of the products bear a reasonable relationship to the State of Ohio. The State and Federal district courts located in Columbus, Ohio shall have exclusive jurisdiction and venue in any action or proceeding arising out of or relating to this sale or these Terms. The parties hereto irrevocably consent to the exclusive personal jurisdiction of such courts and to such venue and expressly waive any right to a trial by jury. For international sales, the parties hereby agree that the United Nations Convention on the International Sale of Goods does not apply to this sale or these Terms. Gilson shall be entitled to recover its fees and costs (including attorney's fees) in collecting any amounts due from Purchaser.

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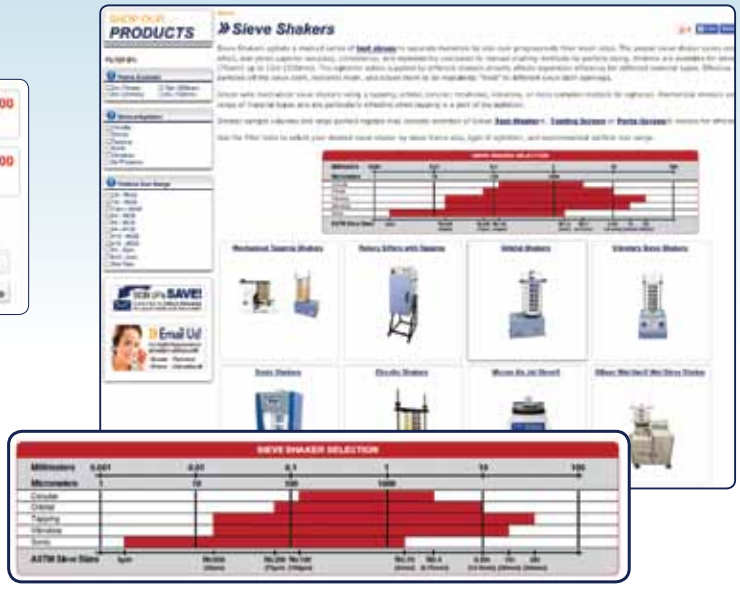

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