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Testing Equipment for  Construction Materials

HUMBOLDT

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Heavy-Duty, Automatic, Single Compactor for Marshall Test Molds

Humboldt Automatic, Marshall Compaction Machines are designed to provide a stable and rigid mechanism for producing 4" or 6" diameter asphalt pills used in Marshall tests. These Marshall compaction machines are available in two types of configurations: one with a rotating mold with a tapered-foot hammer assembly, and the other a stationary mold with a flat-foot hammer. Both models feature a heavy-duty design, which stands up well to the constant jarring caused by the compaction process.

These machines feature an automatic counter allows the operator to preset the number of blows wanted and will turn off the machine when completed. After the number of blows has been set, the operator can start the machine with a push button and keep track of the number of blows on an LED readout. A cam-action lever operates the integral mold holder to facilitate insertion and removal of the compaction mold.

Machines can be ordered for use with 4" or 6" molds, but can be easily altered to accommodate the other size by purchasing a hammer and test molds of the desired size. Each machine includes: the mechanical compactor, an automatic counter, hammer assembly, (1) compaction mold, and (1) package of paper discs. Rotating-Mold Configuration machines come with a tapered-foot hammer assembly and Stationary-Mold Configuration machines come with a flat-foot hammer assembly. Hammer assembly for the stationary base models, Complies with ASTM D6926, AASHTO T245 and PTM705. Shipping wt. 400 lbs. (181.4kg).

Heavy-Duty, Automatic Single Compactor with Rotating Mold Configuration

Description	Model
For 4" diameter specimens. 115V 60Hz	H-1364R
For 6" diameter specimens. 115V 60Hz	H-1366R
For 4" diameter specimens. 230V 50/60Hz	H-1364R.4F
For 6" diameter specimens. 230V 50/60Hz	H-1366R.4F

Heavy-Duty, Automatic Single Compactor with Stationary Mold Configuration

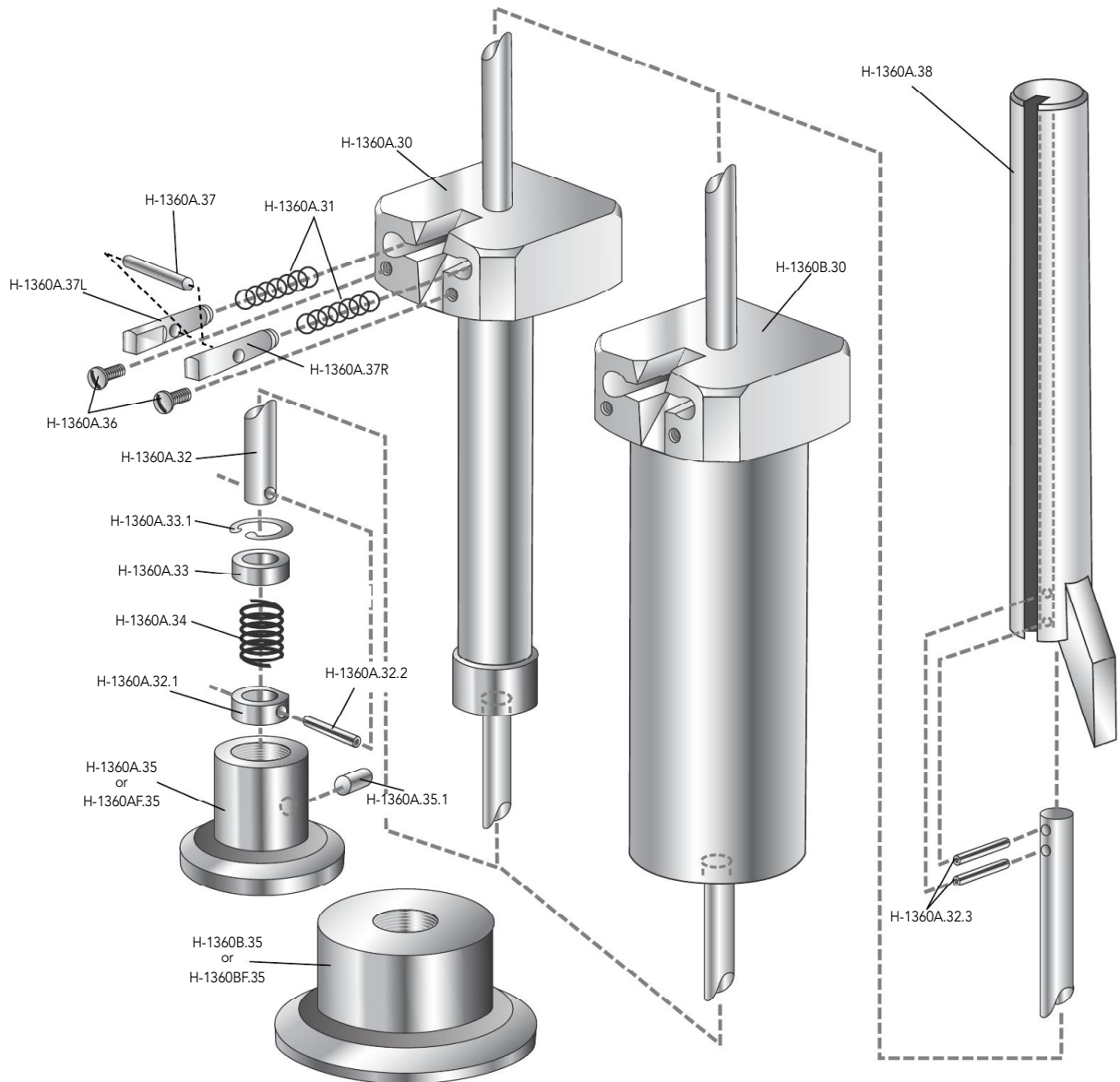
Description	Model
For 4" diameter specimens. 115V 60Hz	H-1364
For 6" diameter specimens. 115V 60Hz	H-1366
For 4" diameter specimens. 230V 50/60Hz	H-1364.4F
For 6" diameter specimens. 230V 50/60Hz	H-1366.4F

Replacement Parts for Heavy-Duty, Automatic Single Compactors

Description	Model
4" Hammer with tapered foot (rotating mold). Shipping wt. 20 lbs (9kg)	H-1360A
6" Hammer with tapered foot (rotating mold). Shipping wt. 25 lbs (11kg)	H-1360B
4" Hammer with flat foot (stationary mold). Shipping wt. 20 lbs (9kg)	H-1360AF
6" Hammer with flat foot (stationary mold). Shipping wt. 25 lbs (11kg)	H-1360BF
Lift Chain for H-1364, H-1366 Series Compactors	H-1360.21
Replacement ASTM-compliant pedestal for Compactors	H-1347M
Replacement Counter and Proximity Switch for Compactors, 120V 60Hz	H-1334BA
Replacement Counter and Proximity Switch for Compactors, 220V 50/60Hz	H-1334BA.4F



See the following pages for Ovens (pgs. 246 and Hotplates (pgs 244) to facilitate the heating of molds and hammers for operation.



Hammer Assemblies and Replacement Parts

Description	Model	Description	Model
Compaction hammer, 10 lb (for 4" mold)	H-1360A.30	Anvil release arm weldment	H-1360A.38
Compaction hammer, 22.5 lb (for 6" mold)	H-1360B.30	Hammer release arm	H-1360A.38.1
Hammer slide shaft	H-1360A.32	Anvil, top	H-1360A.38.2
Spring retainer, anvil	H-1360A.32.1	Spring	H-1338.34
Spring washer, anvil	H-1360A.33	Spring	H-1360A.31
Hammer foot, 4" tapered	H-1360A.35	1/4" dia. x 1" large roll pin	H-1360A.32.2
Hammer foot, 4" flat	H-1360AF.35	3/16" dia. x 1-1/2" roll pin	H-1360A.32.3
Hammer foot, 6" tapered	H-1360B.35	Internal retaining ring	H-1360A.33.1
Hammer foot, 6" flat	H-1360BF.35	5/16" dia x 1/2" large dowel pin	H-1360A.35.1
Hammer release pin, left hand	H-1360A.37L	1/4-20 x 1/2" large truss head screw	H-1360A.36
Hammer release pin, right hand	H-1360A.37R	1/4" dia. x 1-3/8" Large dowel pin	H-1360A.37



H-1336D

Standard-Duty 4" Automatic, Single Compactor with Stationary Base

Easy sample preparation with an automatic, mechanical compactor. Apparatus compacts samples at a preset number of hammer blows and shuts off on completion. Unit includes mechanical compactor, automatic counter, ASTM-compliant oak compaction pedestal, (1) hammer and (1) H-1341 mold assembly. Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Complies with ASTM D6926, AASHTO T245 and PTM705. Shipping wt. 198 lbs (89.8kg)



H-1346D

Standard-Duty 4" Automatic, Double Compactor with Rotating Base

Automatically compacts dual samples at a preset number of hammer blows and shuts off automatically on completion. Unit includes mechanical compactor, automatic counter, ASTM-compliant oak compaction pedestal, (2) hammers and (2) H-1337 mold assemblies. Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Overall dimensions: 10 x 21 x 66" H. Complies with ASTM D6926, AASHTO T245 and PTM705. Shipping wt. 265 lbs (120.2kg)



H-1356D

Standard-Duty 4" Automatic, Triple Compactor with Rotating Base

Triple simultaneous specimen compactions are produced automatically at a preset number of hammer blows. Machine shuts off on completion. Unit includes mechanical compactor, automatic counter, ASTM-compliant oak compaction pedestal, (3) hammers and (3) H-1337 mold assemblies. Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Overall dimensions: 16 x 22 x 66" H. Complies with ASTM D6926, AASHTO T245 and PTM705. Shipping wt. 351 lbs (181.4kg)

Description	Model
Compactor, 115V 60Hz	H-1336D
Compactor, 230V 60Hz	H-1336D.2F
Compactor, 230V 50Hz	H-1336D.5F

Description	Model
Compactor, 115V 60Hz	H-1346D
Compactor, 230V 60Hz	H-1346D.2F
Compactor, 230V 50Hz	H-1346D.5F

Description	Model
Compactor, 115V 60Hz	H-1356D
Compactor, 230V 60Hz	H-1356D.2F
Compactor, 230V 50Hz	H-1356D.5F



H-1338A
H-1338B
H-1338C

H-1347.3M

H-1347.2M

H-1347M

H-1334B
H-1334B.4F

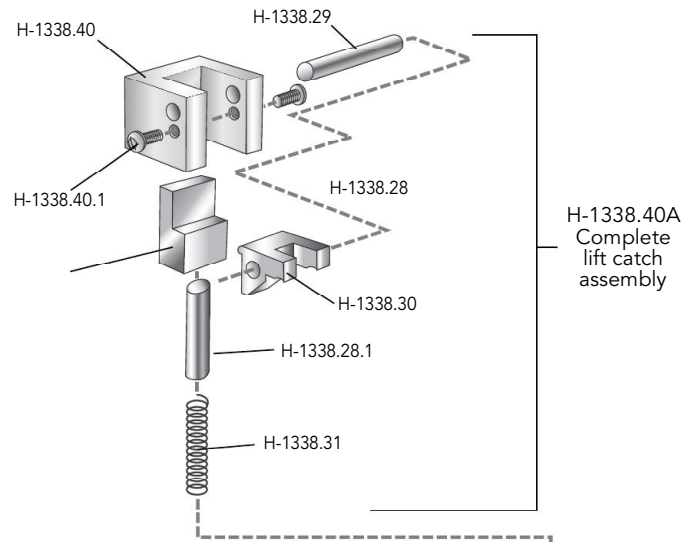
Replacement Parts for Standard-Duty, Automatic Compactors

Description	Model
4" hammer with flat foot (stationary base) for H-1336D	H-1338A
4" hammer with tapered foot (rotating base) for H-1346D, H-1356D	H-1338B
4" hammer with "Canadian" tapered foot (rotating base) for H-1346D, H-1356D	H-1338C
Lift Chain for H-1336D, H-1346D and H-1356D	H-1336.21
Replacement Counter and proximity switch for Compactors	H-1334B
Replacement Counter and proximity switch for Compactors, 230V	H-1334B.4F
Replacement Pedestal for H-1336 Marshall Compactor	H-1347M
Replacement Pedestal for H-1346 Marshall Compactor	H-1347.2M
Replacement Pedestal for H-1356 Marshall Compactor	H-1347.3M

See the following pages for Ovens (pgs. 246 and Hotplates (pgs 244) to facilitate the heating of molds and hammers for operation.

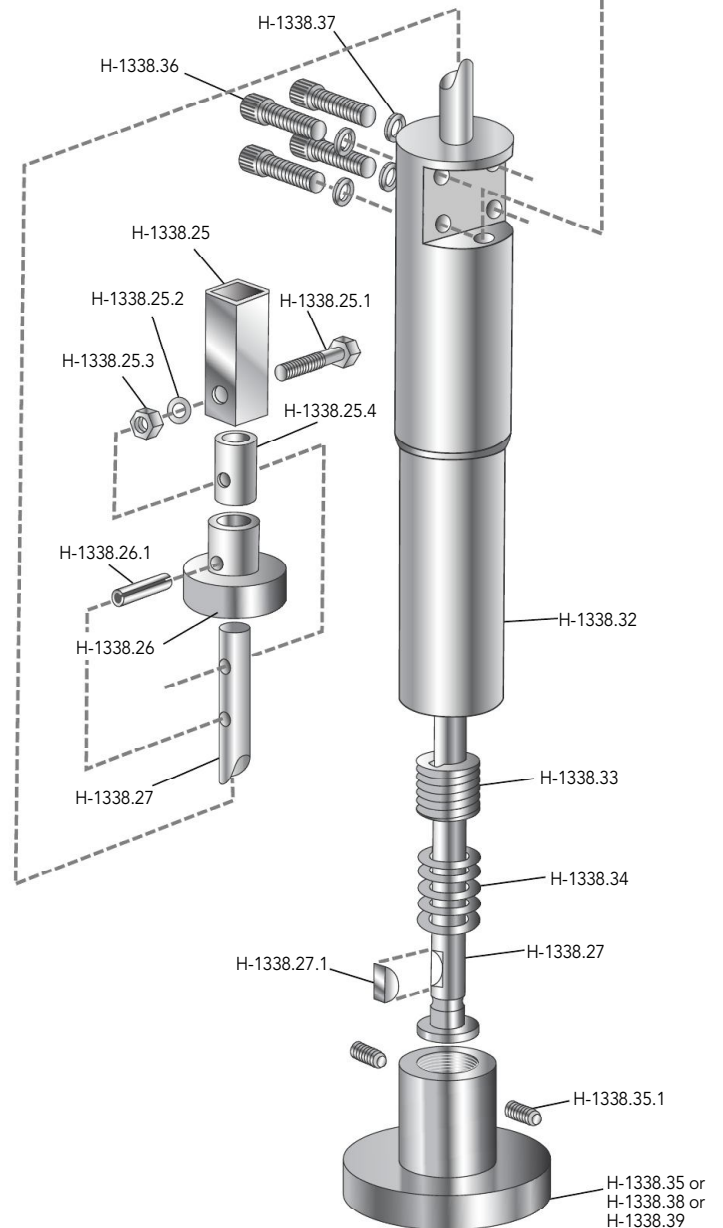
Lift Catch Assembly and Replacement Parts

Description	Model
Complete lift catch assembly	H-1338.40A
Release block	H-1338.28
Pin	H-1338.28.1
Clevis pin	H-1338.29
Lift catch	H-1338.30
Spring	H-1338.31
Screw	H-1338.36
Washer	H-1338.37
Release housing	H-1338.40
Screw for release housing	H-1338.40.1



Hammer Assemblies and Replacement Parts

Description	Model
Clevis pin with screw	H-1338.29
Locator guide	H-1338.25
Hex head bolt	H-1338.25.1
Washer	H-1338.25.2
Nut	H-1338.25.3
Spacer	H-1338.25.4
Hammer handle	H-1338.26
Spring pin	H-1338.26.1
Hammer rod	H-1338.27
Key	H-1338.27.1
Hammer weight (complete)	H-1338.32
Plug	H-1338.33
Spring	H-1338.34
Hammer foot, flat	H-1338.35
Hammer foot, tapered	H-1338.38
Hammer foot, Canadian spec	H-1338.39
Screw for foot	H-1338.35.1
Socket Head Screw, 5/16 x 18 x 1.25"	H-1338.36
Washer	H-1338.37





Hand Compactor Set for 4" Molds— H-1345

Compactor set that facilitates hand compaction of 4" Marshall specimens. Set features ASTM-compliant oak pedestal with hammer support rod, which holds hammer in perpendicular alignment to base during compaction. Also features a mold holder, which keeps the mold securely positioned during compaction. Set includes: H-1340G Compaction Hammer; H-1347 Pedestal with ASTM-compliant steel plate; H-1341 Compaction Mold; H-1343 Compaction Mold Holder; H-1345.6 Hammer Support Rod, and H-1345.5 Adjustable Guide. Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Complies with ASTM D6926. Shipping wt. 165 lbs. (74.8 kg)

4" Hand Compaction Hammer— H-1340

Compacts asphalt mixture in the compaction mold. Flat circular face is 3-7/8" (98mm) dia.; hammer is 10 lb. (4.54kg.) sliding weight and has a free fall of 18" (457mm). Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Shipping wt. 20 lbs. (9.0kg)

4" Hand Compaction Hammer w/Finger Guard— H-1340G

Compacts asphalt mixture in the compaction mold. Hammer has finger guard at base of sliding weight. Flat circular face is 3-7/8" (98mm) dia.; hammer is 10 lb. (4.54kg.) sliding weight and has a free fall of 18" (457mm). Additional mold and hammer assemblies are recommended for efficient testing operations, allowing you to heat multiple molds and hammers to speed testing. Shipping wt. 20 lbs. (9.0kg)

Mold Holder for Hand Compaction— H-1343

Holder mounts on compaction pedestal and centers the compaction mold over the center of the post. Mold holder keeps mold, collar and base plate securely positioned during compaction. Shipping wt. 10 lbs. (4.5 kg)

Pedestal for 4" Hand Compactor— H-1347

Necessary to stabilize mold during compaction. Consists of 8" x 8" x 18" (203 x 203 x 457mm) ASTM-compliant oak compaction pedestal capped with 12" x 12" x 1" (305 x 305 x 25mm) steel plate. Pedestal mounts to a concrete slab with four angle brackets at bottom of pedestal. Shipping wt. 90 lbs. (40.8kg)

Adjustable Hammer Guide— H-1345.5

Guide for hand compaction hammer. Shipping wt. 3 lbs. (1.4kg)

Hammer Support Rod— H-1345.6

Support rod for hand compaction hammer. Shipping wt. 9 lbs. (4.1kg)

Marshall Mix Design and Testing Booklet— H-1328A

While the new Superpave mix design system continues to evolve, many users worldwide continue to rely on the Marshall Method for hot asphalt mix design. This booklet covers the Marshall mix design criteria; equipment necessary to perform the tests; sample preparation and testing procedures; data analysis, as well as moisture susceptibility testing methods.

See the following pages for Ovens (pgs. 246 and Hotplates (pgs 244) to facilitate the heating of molds and hammers for operation.



H-1353A



H-1341



H-1337



H-1367



H-1348
H-1363



H-1331



H-1341P
H-1361P



H-1355

Marshall Compaction Mold, 6"— H-1367

6" stability compaction mold for preparing test specimens with the H-1366 and H-1366R Compactors. Can be used with rotating or stationary base models. Comply with ASTM D5581. Shipping wt. 15 lbs. (6.8 kg)

Marshall Compaction Mold, 4" (Rotating Base)— H-1337

4" stability compaction mold for preparing test specimens with all rotating base compactors (H-1364R, H-1346 and H-1356), as well as the H-1364 stationary base compactor. Base plate of mold is designed to link with rotating base feature of compactors causing the mold to rotate during compaction. Forming mold is 4" (102mm) ID by 3" (76mm) high. Complies with ASTM D6926. Shipping wt. 10 lbs. (4.5kg)

Marshall Compaction Mold, 4" (Stationary Base)— H-1341

4" Stability compaction mold for preparing test specimens with H-1336 mechanical compactors and H-1340, H-1345 Hand Compactors. Consists of base plate, forming mold and collar. Molds are machined from seamless tubing and plated. Base plate and collar are interchangeable with either end of the forming mold. Forming mold is 4" (102mm) ID by 3" (76mm) high. Complies with ASTM D6926. Shipping wt. 10 lbs. (4.5 kg)

Paper Disks, 4" (1000 pkg)— H-1341P

Paper Disks, 6" (500 pkg)— H-1361P

Circular, smooth-edged 4" or 6" diameter disks fit in bottom of H-1337 (4"), H-1341 (4") or H-1367 (6") compaction molds before introducing mixture prior to compaction test. Facilitates removal of sample specimen from mold. Shipping wt. 4 lbs. (1.8 kg)

Marshall Sample Storage Can— H-1331

2 lb. can with lid for storing Marshall samples.

Mold Extractors, 4", Shipping wt. 2 lbs. (1.0kg).— H-1348

Mold Extractors, 6", Shipping wt. 3 lbs. (1.4kg).— H-1363

Used with compression tester for removing 4" or 6" compaction mold specimens.

Hand-Operated Sample Ejector— H-1353A

Designed for lab and field use to extract asphalt samples from either 4" or 6" compaction molds. The ejection force is generated by means of a 3-ton (27.7kN) capacity hand-operated hydraulic jack. The cast-aluminum ejector head assembly can be positioned at different heights through the use of quick release pins. This enables the operator to easily match the ejection travel to the height of the mold being used. Maximum stroke distance for this ejector is 7.5". Overall dimensions: 13"W x 6"D x 27"H (330 x 152 x 686mm). Shipping wt. 60 lbs. (27.2 kg)

Motorized Sample Ejector, 120V 60Hz— H-1355

Motorized Sample Ejector, 220V 50/60Hz— H-1355.4F

Similar in design and construction to the H-1353A series sample ejector, this model features the use of a 5-ton capacity motorized hydraulic pump and ram assembly. The unit incorporates extended upright rods in order to accommodate both standard 4" or 6" asphalt compaction molds, as well as the taller gyratory compaction molds. Maximum stroke distance for this ejector is 9.25". Overall dimensions excluding pump: 13"W x 6"D x 29"H (330 x 152 x 737mm). Shipping wt. 80 lbs. (36.3 kg)

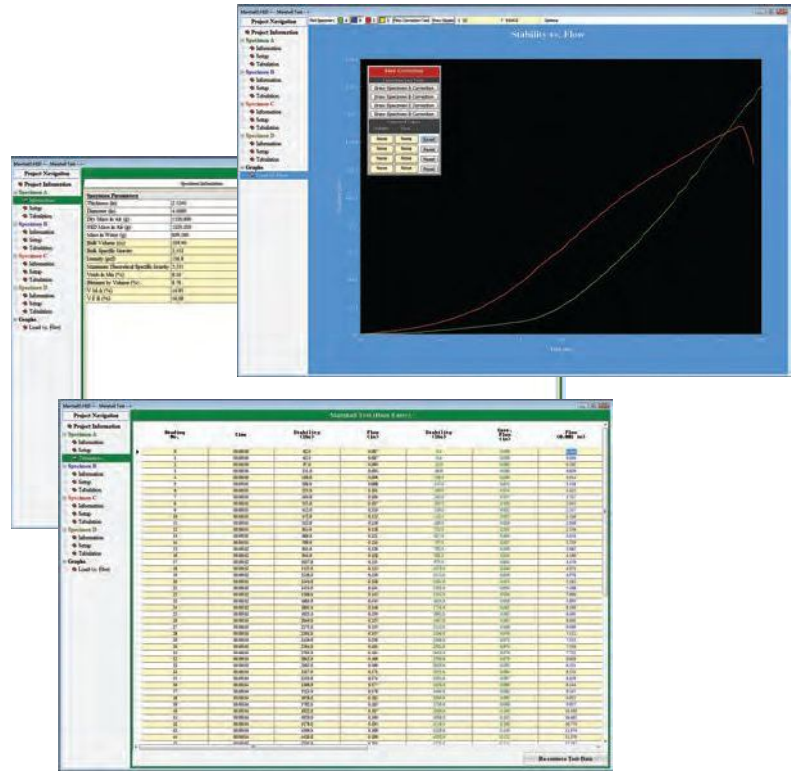
Complies with ASTM D5581, D6927 and D6931 and AASHTO T245, T283, BS 598, EN12697-34 and other applicable International standards



HM-3000.3F Marshall Testing Solution

The HM-3000 provides the ultimate lab solution of a multi-purpose load frame that can handle Marshall and Hveem tests with built-in test parameters, as well as soil tests such as CBR, UU, CU, CD and UC. The HM-3000 can work as a stand-alone unit, which can perform Marshall tests at the push of a button; or with the aid of Humboldt's HMTS software and a computer, be automated to run tests and gather data in real-time data acquisition in the form of charts and graphs. The HM-3000 is ideal for road construction projects in either mobile or fixed labs, educational institutions and consulting firms.

Description	Qty	Part #
Digital MasterLoader 110/220V 50/60Hz	1	HM-3000.3F
S-Type Load Cell, 10,000 (50kN)	1	HM-2300.100
Strain Transducer 1" (25mm)	1	HM-2310.10
Displacement Transducer Bracket	1	HM-4178BRT
Marshall Reporting Software	1	HM-3005SW



Marshall Setup using the HM-3000.3F Load Frame

Pictured is the HM-3000.3F Load frame with a typical Marshall setup. See the chart to the right for items to order for the setup shown. See page 70 for more information on the HM-3000.3F Load Frame. Shipping wt. 300 lbs. (136.1kg)

HMTS Reporting Software, Marshall Module— HM-3005SW

Humboldt Material Testing Software (HMTS) is a stand-alone application used in conjunction with Humboldt's load frames, MiniLoggers, etc. to provide real-time data acquisition. The Marshall Module provides a simple, test-specific interface to control Marshall test operations and automatically record data while also displaying it in real-time tables and graphs. Technicians can be freed-up for other duties with the assurance that all test data is being collected and saved.

- Test Information is stored, and all calculations are performed automatically
- Live tests and live graphing capabilities (real-time)
- Complete test report including all calculations and graphs required for testing
- Review and export tests using Microsoft Excel
- Smart Test Function: automatically picks up where it left off if the test was not finished due to unexpected events within your computer.

Complies with ASTM D5581, D6927 and D6931 and AASHTO T245, T283, BS 598, EN12697-34 and other applicable International standards



Features include:

- 8" platen provides roomy, stable base for test equipment
- Two channels with real-time data acquisition
- Backlit LCD displays test data and peak value at a glance
- Battery-backed, real-time clock
- RS232 interface provides computer control and downloading of test data.
- Chart recorder output.
- Nonvolatile test data storage and instrument calibration
- Auto conversion of instrument calibration between English or Imperial units and SI or metric units
- User-selectable Marshall or TSR test functions
- Machine auto reverses to home position at the end of test
- Automatic triggering of test data logging

HM-1327MAR machine shown with the optional, HM-1327.400.3F chart recorder and H-1342 Breaking Head.

The HM-1327 is a fully automatic, single-speed Load Frame, 2.0 inches/minute, (50mm/minute), designed for those who want a high-quality, application-specific Load Frame that provides simple operation with built-in data acquisition capabilities. The HM-1327 provides two channels with integral data acquisition to accommodate a load cell and transducer for Marshall testing. The machine's digital display provides the ability to monitor test data in real-time, as well as the ability to see a test's peak value at a glance.

The HM-1327 can be ordered in the following configurations:

HM-1327MAR— includes a 10,000 lb (50kN) S-type Load Cell and a 1" (25mm) Strain Transducer, as well as Humboldt's HM-3005SW Marshall HMTS Reporting Software Marshall Module.

HM-1327TSR— includes a 10,000 lb (50kN) S-type Load Cell, as well as Humboldt's HMTS Reporting Software.

HM-1327WCR— includes a 10,000 lb (50kN) S-type Load Cell, the HM-1327.400.3F chart recorder, as well as Humboldt's HMTS Reporting Software.

Description	Model
Marshall/TSR Loader with Load Cell, Strain Transducer and HMTS Marshall Module Software, 115V 60Hz	HM-1327MAR
Marshall/TSR Loader with Load Cell, Strain Transducer and HMTS Marshall Module Software, 220V 60Hz	HM-1327MAR.2F
Marshall/TSR Loader with Load Cell, Strain Transducer and HMTS Marshall Module Software, 220V 50Hz	HM-1327MAR.5F
Marshall/TSR Loader with Load Cell and HMTS Reporting Software, 115V 60Hz	HM-1327TSR
Marshall/TSR Loader with Load Cell and HMTS Reporting Software, 220V 60Hz	HM-1327TSR.2F
Marshall/TSR Loader with Load Cell and HMTS Reporting Software, 220V 50Hz	HM-1327TSR.5F
Marshall/TSR Loader with Load Cell, Chart Recorder and HMTS Reporting Software, 115V 60Hz	HM-1327WCR
Marshall/TSR Loader with Load Cell, Chart Recorder and HMTS Reporting Software, 220V 60Hz	HM-1327WCR.2F
Marshall/TSR Loader with Load Cell, Chart Recorder and HMTS Reporting Software, 220V 50Hz	HM-1327WCR.5F

Shipping wt. 248 lbs (112kg)

Description	Model
Chart Recorder for use with HM-1327 Models	HM-1327.400.3F



H-1339B



H-1335
Basic Marshall Test Set



HM-2800

Marshall Compression Machine, 120V 60Hz— H-1339B

Marshall Compression Machine, 220V 60Hz— H-1339B.2F

Marshall Compression Machine, 220V 50Hz— H-1339B.5F

Compression machine designed specifically for testing the resistance to plastic flow of bituminous paving mixtures— the Marshall Test. Machine has a one-speed motor with reversing switch that produces a uniform vertical movement of 2" (51mm) per minute. Unit includes a H-4454.100 calibrated load ring and dial indicator for determining test load. Load capacity is 11,000 lbf. (50kN). Maximum piston travel is 3-1/2" (88mm). Overall dimensions are: 18" x 18" x 38-1/2"H (457 x 457 x 978mm). Shipping wt. 185 lbs. (78.9 kg)

Basic Marshall Test Set, 120V 60Hz— H-1335

Basic Marshall Test Set, 230V, 60Hz— H-1335.2F

Basic Marshall Test Set, 230V, 50Hz— H-1335.5F

Basic Test Set for evaluating stability and plastic flow (Marshall Tests) of bituminous paving mixtures. Includes all the basic testing equipment for performing these tests. Ideal setup for field lab applications, as well as dedicated Marshall test labs. Included in the set are: (1) H-1339B— Marshall Compression Machine; (1) H-1340—4" Hand Compaction Hammer; (2) H-1341—4" Marshall Compaction Molds; (1) H-1342— 4" Marshall Breaking Head; (1) H-1343— Mold Holder for Hand Compactor; (1) H-1344—Dial Flowmeter with Guide Sleeve; (1) H-1347— Pedestal for 4" Hand Compactor; (1) H-1348—4" Mold Extractor, and (1) H-1390— Water Bath. Basic Test Sets for 230V applications, include a H-1390.4F Water Bath.

Shipping wt. 325 lbs. (147.4 kg)

Basic Marshall Test Set- Metric, 230V, 60Hz— H-1335M.2F

Basic Marshall Test Set- Metric, 230V, 50Hz— H-1335M.5F

Same Basic Set as the H-1335.2F and H-1335.5F above, except these include a H-1344M Flowmeter, H-1337MM 100mm Mold and H-1342M Breaking Head. Shipping wt. 325 lbs (147kg)

Digital Accessory Kit, 110-250V 50-60Hz— H-1324A.3F

Twin-channel digital display for use with the H-1339. Includes S-type 11,000 lbf (50kN) load cell, 0.4" (10mm) linear strain transducer, and transducer bracket. Display: 12" x 10" x 4" (304 x 254 x 102mm).

Chart Recorder Accessory Kit, 120V 60Hz— H-1329CK

Chart Recorder Accessory Kit, 220V 50Hz— H-1329CK.5F

This kit is comprised of a H-1329LR chart recorder, an LVDT and a H-2300.100 load cell for converting a H-1339B Marshall compression machine into an automatic Marshall compression tester and recorder. Includes LVDT sensor, electronic load cell and plotter assembly. Shipping wt. 18 lbs (8.2kg)

Multi-Speed Load Frame, 120V 60Hz— HM-2800

Multi-Speed Load Frame, 220 50/60Hz— HM-2800.4F

The HM-2800 is a multi-use, multi-speed machine that provides a dedicated setting for Marshall testing in addition to its ability to provide variable speeds of operation between 0.008 and 2.000 inches/minute for doing the multitude of tests required by today's labs. The HM-2800 features a quiet, direct-drive DC motor that provides a loading speed range from .008 to 1.999 in/min., controlled through the use of edit keys and a digital display. It also incorporates a separate, dedicated control to accommodate 2.00 in/min. for use in Marshall and TSR Testing for asphalt. The controls also accommodate a rapid travel speed of 2.25 in/min for moving the platen into position quickly. HM-2800.4F uses a step-down transformer for electric conversion. Shipping wt. 300 lbs (136kg)

See page 72 for more information on the HM-2800. See the chart below for items to order for the setup shown.

HM-2800 Load Frame Typical Marshall Setup for 4" Samples

Description	Qty	Part #
Multi-Speed Load Frame	1	HM-2800
Load Ring, 11,000 lbf (50kN)	1	H-4454.100
Dial Flow Meter Kit w/ Dial Gauge 1.00" x 0.01"	1	H-1344
Marshall Breaking Head, 4"	1	H-1342



Marshall Test Load Ring, 11,000 lbf (4,550kgf, 50kN)— H-4454.100

Marshall Test Load Ring, 5,500 lbf (2,500kgf, 25kN)— H-4454.050

Calibrated load rings with dial gauges for use in Marshall testing are individually serial numbered for positive identification and comes with a calibration chart showing the relationship between deflection and pounds force for the individual ring. Units are calibrated in lbs. force every 20 lbs. from 0 to 1,000 lbs. and every 50 lbs. from 1,000 to 11,000 lbs. with adequate deflection to interpolate to 10 lbs., in kg force and kN. Comes with 3/4" -16 female, threaded mount. Complies with ASTM E74. Shipping wt. 8 lbs. (3.7kg).

Digital Load Ring, 11,000 lbf (4,550kgf, 50kN)— H-4454.100D

Digital Load Ring, 5,500 lbf (2,500kgf, 25kN)— H-4454.050D

Identical to Load Rings above except they use digital indicators in place of the dial indicators.

Load Rings

Load Rings for use in various other applications. Comply with ASTM E74. Rings are individually serial numbered for positive identification and come with a calibration chart showing the relationship between deflection and pounds force for the individual ring.

Range and Measurement Units			Model	
lbf	kN	kgf	Analog	Digital
110	0.5	50	H-4454.001	H-4454.001D
220	1.0	100	H-4454.002	H-4454.002D
550	2.5	250	H-4454.005	H-4454.005D
1,100	5.0	500	H-4454.010	H-4454.010D
2,200	10.0	1,000	H-4454.020	H-4454.020D
5,500	25.0	2,500	H-4454.050	H-4454.050D
11,000	50.0	5,000	H-4454.100	H-4454.100D
22,000	100.0	10,000	H-4454.200	H-4454.200D

NOTE: ASTM recommends that load rings be recalibrated each year after they have been put into service.

Marshall Breaking Head, 4"— H-1342

Marshall Breaking Head, 6"— H-1362

Marshall Breaking Heads consist of an upper and lower cylindrical segment having an inside radius of curvature of 3" for a 6" samples and 2" for a 4" sample. The lower segment is mounted on a base with two perpendicular guide rods extending vertically from the base. One guide rod is larger than the other, with a correspondingly larger guide sleeve in the upper segment to ensure correct assembly. Guide sleeves in the upper segment bring the two sections together without appreciable binding or loose motion on the guide rods. Complies with ASTM D6927. H-1342 shipping wt. 20 lbs. (9.1kg), H-1362 shipping wt. 30 lbs. (13.65kg)

Lottman Breaking Head, 4"— H-1349

Lottman Breaking Head, 6"— H-1369

Breaking heads for testing tensile strength. H-1349 has 1/2" wide upper and lower segments for use on 4" samples. H-1369 has 3/4" wide upper and lower segments for use on 6" samples. Complies with ASTM D6931, AASHTO T283. Shipping wt. 10 lbs.

Dial Flowmeter Kit— H-1344

Dial Flowmeter Kit, metric— H-1344M

Consists of a special dial indicator with a maximum position brake assembly and a guide sleeve that fits over either guide rod of a H-1342 or H-1362 stability test mold. H-1344 has a range of 1.00" with 0.01" divisions and the H-1344M has a range of 25mm with 0.25mm divisions.

Dial Gauge For Flowmeter— H-1344.2

Dial Gauge (Metric) For Flowmeter— H-1344.2M

Replacement Dial Gauges for H-1344 and H-1344M Dial Flowmeters.

Guide Sleeve For Flowmeter Kit— H-1344.1



Water Baths with Microprocessor-based Temperature Control

- Auto-tuning is fast & effortless
- Dual, digital display simultaneously shows set point and process temperature
- Ramp-to-set point handles critical temperature processes smoothly
- Set point range limiting protects process and equipment
- Percent power limit protects components from stress
- Rapid cycling provides fast system response
- Operator lockout guards against unwanted changes
- All exposed parts are stainless steel. Front panel is water and corrosion resistant.

Humboldt waterbaths are a perfect match for Marshall and Superpave test applications and meet ASTM D6927, D5581 and D4867.

Humboldt water baths feature a microprocessor-based digital controller for precise temperature control throughout their temperature range of ambient to 180°F (82°C) at an accuracy of +/-0.1% of input span. The dual digital display simultaneously shows the set point and the process temperature at a glance.

Humboldt Water Baths are fully insulated to help maintain constant temperatures easily. Models H-1390 and H-1392 can accommodate (12) 4" diameter or (3) 6" diameter Marshall specimens at a time. And the model H-1394 can accommodate (16) 4" and (9) 6" diameter Marshall specimens at a time. All models include a stainless steel shelf, which supports specimens while allowing 2" of free circulating water above and below specimens. Models H-1390 and H-1394 also utilize a magnetic stirring bar to induce water flow within the bath and ensure a uniform temperature is maintained. Model H-1392 does not have a magnetic stirring bar.

All exposed areas are stainless steel and the front control panel is both water and corrosion resistant.


Deluxe Water Bath, 110V 60Hz— H-1390

Deluxe Water Bath, 220V 50/60Hz— H-1390.4F

Microprocessor-based control for precise temperatures throughout the range. Includes magnetic circulator, ensuring constant water temperature, and, a stainless steel shelf, which stands 2" (51mm) above the bottom of the unit for free circulation of water above and below test samples. Volume is 7.76 gallons (29.40L) and dimensions are: ID: 19.5" W x 11.5" D x 8" H (495.3 x 292.1 x 203.2mm). Shipping wt. 47 lbs. (21.4kg)

Large Deluxe Water Bath, 110V 60Hz— H-1394

Large Deluxe Water Bath, 220V 50/60Hz— H-1394.4F

Microprocessor-based control for precise temperatures throughout the range. Includes magnetic circulator, ensuring constant water temperature, and, a stainless steel shelf, which stands 2" (51mm) above the bottom of the unit for free circulation of water above and below test samples. Volume is: 17 gallons (63.4L) and dimensions are 20" x 20" x 10" deep (508 x 508 x 254mm). Shipping wt. 74 lbs. (33.5kg) 

Water Bath, 110V 60Hz— H-1392

Water Bath, 220V 50/60Hz— H-1392.4F

Same as H-1390, except it does not have a magnetic circulator. Shipping wt. 47 lbs. (21.4kg)

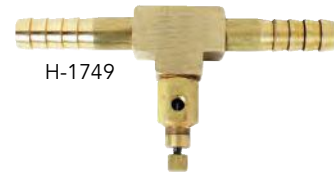
Economy Water Bath, 110V 60Hz— H-1380

Economy Water Bath, 220V 50/60Hz— H-1380.4F

Low-cost alternative water bath for heating specimens holds eight standard 4" stability molds. Supporting shelf above the bottom allows water circulation around specimens. Automatic thermostatic control with a range of 150° to 500°F (65° to 160°C). ID 11-1/2 x 19-1/2 x 5-1/2" (293 x 497 x 140mm) deep. H-1380.4F uses a step-down transformer, which is included, for electric conversion. Shipping wt. 28 lbs. (12.7kg)



Typical Rice Test Setup



H-1749



H-1754D



H-1750



H-1755A

H-1750

H-1751

Available Pycnometer Size Comparison.



H-1820

Vacuum Pycnometer Set (4.34L) for Rice Test— H-1750

Used in Rice testing to determine the maximum specific gravity of bituminous paving mixtures with maximum aggregate size up to 19.1mm (3/4in.). The H-1750 provides a 4.34L volume with a 2.9L max. sample volume and a 2500g typical required sample size and a 7-1/2" ID x 6" depth. Set includes aluminum volumetric canister; volumetric lid; flat, Plexiglas vacuum lid with O-ring and a metal water vacuum aspirator with 3/8" IPT and 6' hose with release valve and fittings. Unit achieves vacuum using an aspirator or optional vacuum pump. Use with H-1756A Vibrating Apparatus or H-1782 De-Airing Device, and H-1754D manometer, sold separately. See page 158-159 for vacuum pumps. Replacement parts are available, please inquire. Complies with ASTM D2041; AASHTO T209, T283.

Shipping wt. 12 lbs (5kg)

Stainless Steel, Vacuum Pycnometer Set— H-1750SS

Same as H-1750 except stainless steel vessel.

Small Vacuum Pycnometer Set (2.9L)— H-1751

The H-1751 provides a 2.9L volume with a 1.9L max. sample volume and a 1500g typical required sample size and a 7-1/2" ID x 4" depth. Non-ASTM tests.

Vacuum Pycnometer Set (5.8L)— H-1755A

The H-1755A provides a 5.8L volume with a 3.9L max. sample volume and a 4000g typical required sample size and a 7-1/2" ID x 8" depth. Shipping wt. 12 lbs (5kg)

Aluminum Lid— H-1750.2

Replacement lid for models H-1750 and H-1751.

O-Ring— H-1750.3

Replacement o-ring for models H-1750 and H-1751.

Large-Capacity Vacuum Pycnometer Set— H-1820

Large-capacity unit, 10L (2.64 gal.), 6000g (13.2 lbs.) sample weight, with maximum aggregate size of 50mm (2in.). Set features domed transparent cover for easy observation of sample testing, perforated plastic shelf, which some States require; water inlet valve and 1/4" ID hose, quick-disconnect, vacuum gauge, vacuum hose and aspirator with 3/8" NPT fitting. Flange OD is 10-3/4" (273mm); maximum clearance above plate is 7-3/4" (197mm). Use with H-1826A vibrating table, and H-1754D manometer, sold separately. See page 158-159 for vacuum pumps. Replacement parts are available, please inquire. Dimensions: 9-7/16" ID x 12-1/8" (240 ID x 311mm). Complies with AASHTO T209, T283. Shipping wt. 10 lbs (5kg)

Digital Manometer, 120V 60Hz— H-1754D

Digital Manometer, 120V 50/60Hz, Certified— H-1754D-CA

Digital Manometer, 220V 60Hz— H-1754D.4F

Digital Manometer, 220V 50/60Hz, Certified— H-1754D.4F-CA

A precise measurement device designed to replace mercury-filled manometers used in Rice test applications. This portable, hand-held device can be easily moved around the laboratory. Holes are provided for bench or wall mounting and a 3/8" barb fitting is used for quick connections. The instrument features a digital display range of 0 to 1000mm Hg (absolute) at a resolution of 0.1mm Hg. The device has a rated accuracy of +/-0.5% full scale and is powered by one 9V battery or AC adapter, both are included. Shipping wt. 5 lbs (2kg)

Slow Release Valve for Vacuum Pycnometers— H-1749

For use with H-1750, H-1751 and H-1820 for greater accuracy and shorter dry back time. Brass valve maintains 30mm vacuum pressure on sample. Complies with ASTM D2041, AASHTO T283.



H-1782



H-1756A



H-1826A



H-1753 shown in use with H-1782



H-4296A



H-4296



H-1759



H-1758

H-1757



H-1763A

Vibrating Apparatus for Pycnometer, 120V 60Hz— H-1756A**Vibrating Apparatus for Pycnometer, 220V 50Hz— H-1756.4F**

Heavy-duty Vibrating Apparatus for use with H-1750, H-1755A and H-1751 pycnometers keeps sample material loose for more reliable test results. Strong, rugged-duty vibrators and sturdy bases having integral, heavy-duty on/off switches. Exclusive quick-release cam/lock fasteners allow quick placement and removal of canister. Shipping wt. 15 lbs (7kg)

Vibrating Apparatus for H-1820, 120V 60Hz— H-1826A**Vibrating Apparatus for H-1820, 220V 50Hz— H-1826.4F**

Heavy-duty vibrating Apparatus keep sample material loose for more reliable test results. Strong, rugged-duty vibrators and sturdy bases having integral, heavy-duty on/off switches. Exclusive quick-release cam/lock fasteners allow quick placement and removal of canister. The open-end model has a sliding scale and is graduated above and below zero to 130 x 1mm. Shipping wt. 48lbs (22kg)

Flask Attachment— H-1753

For use with H-1756A and H-1782, flask not included.

Orbital De-Airing Device for Pycnometer, 120V 60Hz— H-1782

The Humboldt Orbital De-Airing Device is designed for use in maximum specific gravity and density determinations of bituminous paving mixtures. Through the use of an orbital shaking action, material densification that entraps air is virtually eliminated, resulting in more accurate and uniform test results. The front panel incorporates a variable speed controller with a range of 10 to 250 rpm and an LED programmable timer with an accuracy of better than $\pm 0.1\%$. The orbital diameter of the 11" x 12" (279 x 305mm) platform is set at 1-1/2" (38.1mm). Taking up little counter space, the base is 10" x 10" (154 x 154mm) and has an overall height of 16" (406mm). Quick release clamps are used to permit quick mounting and removal of the pycnometer. The optional H-1753 Flask Attachment allows the user to conduct tests using a laboratory flask. Shipping wt. 38lbs (17kg)

Note: For 220V operation, order Model H-1042 Transformer.

Universal Digital Timer, 120V 60Hz— H-4296A**Universal Digital Timer, 220V 50/60Hz— H-4296A.4F**

Portable timer automatically shuts off electrical apparatus at set time up to 60 minutes. Features easy-to-use digital interface and two-plug AC receptacle. Shipping wt. 6 lbs (3kg)

Universal Analog Timer, 120V 60Hz— H-4296**Universal Analog Timer, 220V 50/60Hz— H-4296.4F**

Portable timer automatically shuts off electrical apparatus at set time up to 60 minutes. Features two-plug AC receptacle.

Indicating Drierite Air Drying Unit— H-1759

Easily installs in-line between vacuum pump and rice test equipment. This refillable unit measures 2-5/8" by 11-3/8" (667 x 289mm) with hose barbs at both ends, which can accept 1/4" to 3/8" flexible tubing. Supplied complete with 650g of 8 mesh, indicating desiccant. Shipping wt. 3 lbs (1kg)

Drierite Desiccant, 1 lb/ 8 mesh— H-1757**Drierite Desiccant, 5 lb/ 8 mesh— H-1767**

Replacement desiccant for air drying unit. Protects vacuum pump by removing final traces of moisture. Complies with ASTM D2041.

Indicating Drierite Desiccant, 1 lb/ 8 mesh— H-1758**Indicating Drierite Desiccant, 5 lb/ 8 mesh— H-1761**

Indicating Drierite is impregnated with cobalt chloride. This desiccant is blue when dry and changes to pink upon absorption of moisture. The color change is pronounced and clearly visible. This makes Indicating Drierite valuable when it is necessary to know with certainty that dryness is being maintained and to signal when the drying agent should be replaced. It has the same efficiency as Regular Drierite and can be regenerated for reuse. Complies with ASTM D2041.

High Vacuum Pump, 120V 60Hz— H-1763A**High Vacuum Pump, 230V 50/60Hz— H-1763A.4F**

Direct-drive two-stage rotary sliding vane high vacuum pump features gas ballast and trap to reduce risk of oil being sucked into the system. Produces free air displacement 85L per minute (3 cu. ft. per minute) and maximum vacuum 29-30". Operating temperature is 30 to 170°F (-1.11 to 76.6°C). Has 1/4" OD intake ports for 1/4" ID tubing. Dimensions: 11-1/4" x 15-1/2" x 6-1/2" (28.6 x 39.4 x 16.5cm). Shipping wt. 26 lbs (13kg)



H-1762



H-1770



H-1766.2



H-1768.3



H-1766.3



H-1764



HM-9110
HM-9111



HM-9113

Two-Stage Oil-less Vacuum Pump, 120V 60Hz— H-1762

Two-Stage Oil-less Vacuum Pump, 230 50/60Hz— H-1762.4F

Split-capacitor four-pole, two-stage oil-less diaphragm vacuum pump pulls 29" Hg maximum-obtainable vacuum. Shipping wt. 25 lbs (11.36kg)

Two-Stage Vacuum Pump, 120V 60Hz— H-1764

Two-Stage Vacuum Pump, 230 60Hz— H-1764.2F

Two-Stage Vacuum Pump, 230 50Hz— H-1764.5F

Designed for continuous use, this two-stage, belt-driven pump operates on the oil-sealed rotary vane principle and is ideal for distillation, filtration, degassing and as a roughing pump for high-vacuum systems. Pumps are mounted on rectangular steel base plate and include V-belt and belt guard that totally encloses belt and pulleys. Pump pulls 29-30" maximum vacuum. Includes initial supply of oil plus an extra quart of HyVac® oil. Shipping wt. 80 lbs (36kg)

Vacuum Pump, 120V 60Hz— H-1770

High-vacuum, small capacity, general-purpose vacuum pump with belt guard has two-stage construction for efficiency with low maintenance. Features metal vanes and vented exhaust for introduction of air to remove condensable vapors. Pump is filled with oil; an extra quart is included. Exhaust filter is available separately. Guaranteed ultimate vacuum is 25-29" (635-736mm) mercury, and free-air displacement is 25L/min. (0.9cfm). Shipping wt. 80 lbs (36kg)

Vacuum Pump Oil

High purity oil with low vapor pressure that does not materially increase at temperatures up to 50°C (122°F) and viscosity sufficiently low for use at 125°C (59°F). Oil remains fairly constant up to 50°C (122°F).

Vacuum Pump Oil, 1 Quart— H-1766.2 Shipping wt. 2 lbs (1kg)

Vacuum Pump Oil, 1 Gallon— H-1766.3 Shipping wt. 8 lbs (4kg)

Vacuum Pump Oil, 5 Gallon— H-1766.4 Shipping wt. 40 lbs (18kg)

Vacuum Pump Oil, 12 Quart Case— H-1766.5 Shipping wt. 24 lbs (11kg)

Vacuum Pump Oil, 6 Gallon Case— H-1766.6 Shipping wt. 50 lbs (23kg)

Flushing Oil for Vacuum Pumps— H-1768.3

Purges contaminants and condensables, such as water & solvents from all mechanical vacuum pumps. Use between oil changes minimizes contamination of new oil by residue from old oil; extends pump life. Shipping wt. 9 lbs (4.1kg)

Asphalt Permeameter, 4"— HM-9110

Asphalt Permeameter, 6"— HM-9111

These asphalt permeameters are compact, self-contained, easy-to-use units, which can be used in the lab or in the field. They are used to test the permeability of a compacted asphalt paving mixture by using the falling head method to determine hydraulic conductivity of saturated 4" or 6" samples. To use, place the specimen inside the metal cylinder, where it is held in place by a latex membrane. The unit is then pressurized by the built in hand pump. The expanding membrane pushes against the outer edge of the sample, filling in voids and preventing flow down the side of the core. The sample is then saturated from the bottom, and 500cc of water is allowed to flow through the sample while being timed. Both permeameters include a 500cc manometer with 15 ft of 1/4" OD water line, built-in hand pump and a pressure gauge. Shipping wt. 24 lbs (11kg)

4" Membranes— HM-9110.2

4" O-rings— HM-9110.1

6" Membranes— HM-9111.2

6" O-rings— HM-9111.1

NCAT Field Permeameter— HM-9113

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. Testing and subsequent calculations can usually be completed in 10-15 minutes by one technician.

The HM-9113 Permeameter is supplied in two sections and constructed of rugged plastic. In use, sealing material is placed on the base plate and the unit seated against the pavement using gentle foot pressure and included base weights. After filling with water, outflow is observed using the clearly marked graduations. The smallest, uppermost tier allows rapid determinations in low-porosity pavements. The larger diameter tiers are used to accurately read flow on more porous pavements. Alternate top section HM-9113 replaces 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.



ASTM-Compliant Mixer, 5-Qt. (4.73L), 120V 60Hz— H-3841
 ASTM-compliant mixer for mixing hydraulic cement pastes and mortars of plastic consistency. Mixer includes H-3844 Bowl Positioning Adapter, a 5-qt. (4.73L) stainless steel bowl and 1 flat, stainless steel beater for mixing heavy materials. Hobart Model No. N-50 operates on principle of planetary action—beater reaches every part of the batch, rotating on its axis in opposite directions as it moves around the bowl. Thoroughly blends, mixes and aerates all ingredients for consistent, predictable finished batches. Selective agitator transmission has 3 speed settings: 139, 285 and 591 RPM. Base dimensions: 10-3/8 x 15" (264 x 381mm). Height: 17" (432mm). Features U/L listed cord and plug. Complies with ASTM C227, C305; AASHTO T162. Shipping wt. 55 lbs (25kg)

Mixer, 5-Qt. (4.73L), 230V 60Hz— H-3841.2F
Mixer, 5-Qt. (4.73L), 230V 50Hz— H-3841.5F
 Identical to H-3841 mixer above, except that the electrical configurations cause the mixer to run at a slightly slower speed, which renders them non-ASTM compliant.

H-3841—5-Qt. Mixer Accessories and Replacement Parts

Description	Model
Bowl Positioning Adapter	H-3844
Bowl Lid, acrylic	H-3846L
Beater—Stainless Steel, Flat-type	H-3841.1
Bowl—Stainless Steel, 5 qt. (4.73L)	H-3841.2
Wire Loop Whip—Stainless Steel	H-3841WW

Humboldt Extreme-Duty 12 Qt. Whisk— H-3842HW
Humboldt Extreme-Duty 20 Qt. Whisk— H-3843HW
 Custom, hand-made extreme duty whisks are formed from 1/4" dia. stainless steel rod. Designed to stand up to the abuse of mixing heavy aggregate asphalt mixes in the Mixers listed above. Shipping wt. 15 lbs (7kg)



12-Qt. (11.35L) Laboratory Bench Mixer, 120V 60Hz— H-3842A
Bench Mixer, 230V 50/60Hz— H-3842A.4F

The Hobart Model HL-120 bowl has a 12-qt. (0.401 cu. ft.) mixing capacity and a 15-minute motor-driven timer. Planetary action of the beater assures thorough blending and mixing. Selective agitator transmission has 3 speed settings: 106, 196 and 358 RPM. Includes stainless-steel bowl, flat-type aluminum grid beater and aluminum dough hook. Base dimension: 14-3/4" x 20" x 29-9/16" (375 x 508 x 750cm). Shipping wt. 185 lbs. (83.9 kg)

20-Qt. (18.92L) Laboratory Bench Mixer, 120V 60Hz— H-3843A
Bench Mixer, 230V 50/60Hz— H-3843A.4F

The Hobart HL-200 mixer has a positive gear drive and planetary mixing action to deliver positive results. Selective agitator transmission has 3 speed settings: 107, 198 and 361 RPM. Exclusive stirring switch provides low (53RPM) speed to facilitate adding liquids to semi-solids. Includes stainless-steel bowl and flat-type aluminum grid beater. Base dimension: 21" x 21-1/2" x 41-1/4" (533 x 546 x 1048cm). Shipping wt. 226 lbs. (102kg)

H-3842A—12-Qt. (Hobart HL-120) Mixer Replacement Parts

Description	Model
Aluminum Beater	H-3842A.1
12-Qt. Stainless Steel Bowl	H-3842A.2
Aluminum Dough Hook	H-3842ADH
Stainless Steel Wire Loop Whip	H-3842AWW

H-3843A—20-Qt. (Hobart HL-200) Mixer Replacement Parts

Description	Model
Aluminum Beater	H-3843A.1
20-Qt. Stainless Steel Bowl	H-3843A.2
Aluminum Dough Hook	H-3843ADH
Stainless Steel Wire Loop Whip	H-3843AWW

Replacement parts for previous models, H-3842 (Hobart A-120) and H-3843 (Hobart A-200) are available, please call.

Humboldt Extreme-Duty Whisks

Description	Model
For H-3843A (Hobart HL-200 1/2HP) Current	H-3843AHW
For H-3842A (Hobart HL-120 1/2HP) Current	H-3842AHW
For H-3841 (Hobart N-50A-10) Current	H-3841HW
Hobart 20-Quart Mixer Old Model (prior to 2007)	H-3843HW
Hobart 12-Quart Mixer Old Model (prior to 2007)	H-3842HW

Extreme-duty Whisks for previous models, H-3842 (Hobart A-120) and H-3843 (Hobart A-200) are available, please call.





H-1690



H-1692



H-1691



H-1690.1



H-1692.5



H-1690.3



H-1690.2



H-1692.9



H-1692.6



Asphalt/Concrete Mixer, 5 gal., Stationary, 120V 60Hz— H-1690
Asphalt/Concrete Mixer, 5 gal., Stationary, 220V 50Hz— H-1690.5F
 Chain-drive mixer, ideal for sample batch mixing in either laboratory or field. Separate utility bucket cradles securely inside enameled-steel mixer frame. Maximum capacity 70 lbs (50lb recommended). Built for continuous duty performance. Choice of 4 Mixing angles. Mix bucket speed is 60 rpm with 1/2 HP motor. Configuration includes bucket, H-1690.2 paddle and accessory chain guard. Shipping wt. 45 lb (20kg).

Asphalt/Concrete Mixer, 5 gal., Mobile, 120V 60Hz— H-1691
Asphalt/Concrete Mixer, 5 gal., Mobile, 220V 50Hz— H-1691.5F
 Direct-drive, 5 gallon, portable mixer with 8-inch semi-pneumatic wheels for mobility. Mix bucket speed is 60 rpm with 1/2 HP motor. Includes mix bucket only. **Order desired paddles separately, see below.** Shipping wt. 81 lb (37kg).

Asphalt/Concrete Mixer, 10 gal., Mobile, 120V 60Hz— H-1692
10 gal. Mixer, Mobile, 220V 50/60Hz— H-1692.4F
 10 gallon, portable mixer with 8-inch semi-pneumatic wheels for mobility. Mix bucket speed is 60 rpm with 1/2 HP motor. Includes mix bucket only. **Order desired paddles separately, see below.** Shipping wt. 97 lb (44kg).

H-1690 Asphalt/Concrete Mixer Accessories

Description	Model
Mixing Paddle for 5 gal. H-1690 Mixer	H-1690.2
Deluxe Mixing Paddle for 5 gal. H-1690 Mixer	H-1690.3
Bucket & Cover for 5 gal. H-1690 Mixer	H-1690.1

H-1691, H-1692 Asphalt/Concrete Mixer Accessories

Description	Model
Asphalt Paddle for 5 gal. Portable Mixer	H-1691.6
Asphalt Paddle for 10 gal. Portable Mixer	H-1692.6
Concrete Paddle for 5 gal. Portable Mixer	H-1691.8
Concrete Paddle for 10 gal. Portable Mixer	H-1692.9
Mix Bucket for 5 gal. Portable Mixer	H-1691.4
Mix Bucket for 10 gal. Portable Mixer	H-1692.5



H-4122



H-4122QF



H-1304



AY1087X1



F85930-33

F85938

QuarterMaster™ Hot Asphalt Mix Sample Splitter— H-4122

The QuarterMaster™ is ideal for dividing the larger asphalt mix samples required in Superpave specifications. The hopper accepts samples up to 120 lb (54kg) of any mix with aggregate between 9.5 to 37.5mm and quarters it into four equal parts. In operation, a simple throw of a lever divides the sample. Using the device ensures greater control, consistency and uniformity in the preparation of test samples.

The unit is supplied complete with four sample buckets. Dimensions are 14" W x 17" D x 48" H (356 x 432 x 1219mm). To assist operation, order a H-1702 materials handling scoop. Shipping wt. 84 lb (38kg)

QuarterMaster™ Quick Funnel Insert— H-4122QF

Use Funnel to significantly reduce the hopper size when reduction of smaller samples is desired.

QuarterMaster™ Replacement Bucket— H-3372

Rhoma-Sol™ Specialty Emulsifier— H-1304

Spray-on solution used to remove bituminous deposits and stains from test equipment, contains no hazardous petroleum solvents and is 100% biodegradable.

Asphalt Content/Binder Ignition Furnace— F85930-33

240V 50/60Hz, 20 amp, 4,800 watt operation, includes Accessory Package AY1087X1

Asphalt Content/Binder Ignition Furnace— F85938

208V 60Hz, 23 amp, 4,800 watt operation, includes Accessory Package AY1087X1

The Asphalt Content/Binder Furnace with internal automatic balance is an environmentally-friendly and cost-effective method for the accurate determination of asphalt content. Developed by NCAT, the National Center for Asphalt Technology. Furnace's large capacity handles samples up to 4,000 grams. Ignition method reduces testing time compared to solvent testing methods and automatic operation frees technicians for other tasks. Temperature range is: 392 to 1202°F (200 to 650°C). Accurate internal balance monitors weights automatically throughout ignition to within ±0.1 gram. Easy operation— simply enter sample weight, calibration factor, load the sample, and push start, when unit beeps at test end, push stop, and sign receipt. Door safety features, such as a software-activated door lock, an automatic interlock that cuts power when door is open, full 180 degree door opening and door hinge lock eliminate harmful solvents and make operation easy. Ignition Furnace comes complete with Accessory Package AY1087X1. Complies with ASTM D6307. CE-Approved.

Chamber dimensions: 14" W x 10.5" H x 14" D (355 x 266 x 355mm).

Shipg. dimensions: 32" W x 32" D x 60" H (813 x 813 x 1524mm).

Shipping wt. 376 lb (171kg)

Asphalt Content/Binder Ignition Furnace— F85930-33X

Furnace only. 240V 50/60Hz, 20 amp, 4,800 watt operation.

Asphalt Content/Binder Ignition Furnace— F85938X

Furnace only. 208V 50/60Hz, 20 amp, 4,800 watt operation.

Accessory Package for Ignition Furnaces— AY1087X1

Accessory package includes: 4 baskets, 2 trays, 2 covers, handle, cooling cage, insulated plate, gloves, face shield, 4 rolls of printer tape, balance calibration plate and anderol oil.

Shipping wt. 132 lb (60kg)

F85930-33 & F85938 Accessories

Description	Model
Exhaust Tubing (per foot)	H-1515
Exhaust Tubing, Stainless Steel (per foot)	H-1515SS
Printer Paper	PRX2
Baskets (set of 2)	AY1087X6

Specifications

Operating Pressure	2.10 ±0.05 MPa (304 psi)
Temperature Range	90°C to 110°C (194°F to 230°F)
Temperature Control Resolution	±0.1°C
Test Temperature Uniformity	±0.5°C
Time to Setpoint	3 hours from ambient
Return to Setpoint	120 min. after preheating and loading of specimens
Pressure Vessel	ASME code section VIII, division 1; 1992 A 93
Maximum Pressure	325 psi (2.24 MPa) at 120°C (250°F)
Pressure Safety Release	325 psi (2.24 MPa)

H-1640.4F

**Pressure Aging Vessel, 230V 50/60Hz— H-1640.4F**

The Pressure Aging Vessel (PAV) is used to simulate in service oxidative aging of asphalt binder according to procedures developed by the Strategic Highway Research Program (SHRP). The H-1640 is fully compliant with the most recent ASTM and AASHTO standards for these tests. (Refer to ASTM designation D6521-05 and AASHTO method R28-06). The complete PAV system consists of an ASME-code stainless steel pressure vessel in a stainless steel cabinet with encased band heaters, a precision sample holder for simultaneous testing of ten specimens, a set of ten TFOT specimen trays, a pressure controller, temperature controller, pressure and temperature measurement devices, temperature recorder, and a specimen loading and unloading tool.


The H-1640 PAV takes the hassle out of running and documenting asphalt binder aging operations. Three easy, non-complicated steps produce accurate and reliable results. Just press the "heat" button, inset specimens when prompted and press the "Age" button and let the PAV do the rest.

Custom status screens guide the user step-by-step through the entire process. Each display screen (preheat start-up, preheat ready, aging heat up, aging pressurized, and aging complete) is simple and direct, with detailed process and status information. The final output screen, when the test is complete, shows the current vessel pressure, as well as minimum and maximum temperatures achieved during the test procedure. Process data (temperature and pressure) is continually stored at regular intervals in the programmable logic controller (PLC) that controls and monitors the process.

The H-1640 PAV features a compact, benchtop design with integral pressure vessel. Its rotating vessel lid with rounded support block provides easy opening and closing.

A built-in timer accumulates and records out-of-range time (out-of-range time for the PAV is typically less than 10 minutes during a 20-hour test) Minimum and maximum temperature data is recorded and displayed at the end of each test. Optional remote control operation and data access is also available, please contact Humboldt. This new control setup has many exciting prospects, including improved productivity and tighter

process control, with the ability to control testing and to access data from a single remote location. With the appropriate hardware, a single user is able to initiate or cancel a test, monitor test progress, and view test results on any number of PAVs located anywhere in the world.

Shipping Weight 425 lbs. (193kg) 

UPS Battery Backup System— H-1640.1

Prevents power failures, sags, surges, under and over voltages. Includes extended battery module EDM, and provides 4 hours of backup at full load. Provides three-stage charging, doubling battery life and optimizing recharge times. Provides 60-day advanced notification of end of useful battery life. Power Requirements: 230 VAC, 1 Ph. 60 Hz.

PAV Verification Kit— H-1640.2

Provides NIST-traceable temperature and pressure verification and includes a calibration block. Temperature range is -201 to 1210°C with a ± 0.03°C accuracy. Pressure range is 0 to 500 psi with an accuracy of ± 0.25% full scale (ANSI/ASME B40.1 Grade 4A)

PAV O-Ring— H-1640.3

Single-stage air pressure regulator (for external use on air tank)

- 0-4,000 psi high pressure gauge.
- 0-600 psi low pressure gauge includes relief valve.

CGA Adapter— H-1640.4

For use with bottles using 346 CGA connection

High Pressure Hose— H-1640.5


6 ft. stainless steel braided sheath pressure hose. Includes fittings and quick connect coupling.

Specimen Pans Set— H-1640.6

Set of 10 AASHTO T179 pans reduces down time between aging samples.



Vacuum Degassing Oven (VDO), 120V 60Hz— H-1641
Vacuum Degassing Oven, 230V 50Hz— H-1641.5F

The Vacuum Degassing Oven (VDO) is used to precisely and accurately degas pressure-aged binder samples to meet AASHTO R28-06 and ASTM D6521-05 standards. The compact, table-top unit is constructed of stainless steel with a hinged lid to conserve space while allowing easy access to the stainless steel vacuum chamber. The oven holds up to (4) specimen containers and features a self-contained, automatic vacuum system. The high-precision controller features a digital display indicating time, temperature and the current stage of each process, as well as illuminated pre-heat, degas and end/stop buttons. It also features audible and visual alarms, indicating end of process. Over temperature protection is provided by a pressure safety release solenoid valve. The VDO includes (4) specimen containers and a specimen removal tool. Dimensions: 37" x 25" x 27" (94 x 63.5 x 68.5). Shipping wt. 185 lbs (84kg) 

Specifications

Operating Pressure	Adjustable from 15 KPA to Atmosphere
Temperature Range	175° C ± 5° C
Temperature Control Resolution	0.1° C
Test Temperature Uniformity	± 5° C

Verification Kit— H-1641.7

Vacuum Degassing Oven (VDO) verification kit.

Specimen Mold Set for BBR— H-1642.1


Set is for 5 complete specimen molds and includes: aluminum casing bars, mylar strips, holding bands 127mm length with end piece location marks, 6.4 mm thick, 12.7 mm wide.

Specimen Mold Set for BBR— H-1642.2

Mylar Strips. 5 sets of 3 each.



Bending Beam Rheometer, 120V 60Hz— H-1642
Bending Beam Rheometer, 230V 50Hz— H-1642.5F

The Bending Beam Rheometer (BBR) performs flexural tests on asphalt binder and similar specimens per ASTM D6648-01 and AASHTO T313-02. These tests, initially developed by the Strategic Highway Research Program (SHRP), consist of a constant force being applied to a specimen in a chilled fluid bath in order to derive specific rates of deformation at various temperatures. The complete BBR system consists of a fluid bath base unit, a three-point bend test apparatus, which is easily removed from the base unit for specimen loading and unloading, an external cooling unit with temperature controller and a calibration hardware kit with carrying case. The unit features an integral, stainless steel load frame and In-line, blunt-point loading shaft. The large, easy-to-read digital display shows load, displacement, and bath temperature for ease of setup and operation. Real-time displacement, loading, and temperature graphs are displayed during the test cycle and can be re-plotted and re-scaled as needed for easy viewing. Unit includes ASTM/AASHTO-compliant specimen molds and complete calibration kit with carrying case. Dimensions: 37" x 25" x 27" (94 x 63.5 x 68.5). Shipping Weight 250 lbs. (115kg) 

System Features:

- Durable, corrosion-resistant construction
- Computerized control, data acquisition, and analysis
- PID temperature controller with digital display
- Two independent platinum RTDs for precise control
- Mechanically-refrigerated cooling bath with environmentally-safe non-CFC coolant
- Integral LVDT and temperature-compensated load cell for accurate test results
- Patented air bearing ensures reliable loading with accurate, repeatable results

Specifications

Test Load	0 to 200g
Test Cycle Control	±0.5g
Cycle Times	Operator Adjustable
Load Cell (temp. compensated)	500g
Sample Supports	25mm (0.98 in.) dia. spaced 4.00 in. (101.6mm) apart
Operating Temperature	Ambient to -40°F (-40°C)
Compressed Air Requirements	50 psi (0.34 MPa) clean, dry



H-1635

AFGB Superpave Gyrotory Compactor, 110V 60Hz— H-1635
AFGB Superpave Gyrotory Compactor, 230V 50/60HZ— H-1635.4F


The AFGB is a completely self-contained SGC that weighs only 304 pounds. Just roll it into the bed of a pickup or into a minivan and take it anywhere. Ideal for onsite testing and mobile labs, this SGC can handle design and QC/QA work with equal ease.

The AFGB Superpave Gyrotory Compactor measures the mold angle during compaction. This angle, along with the consolidation pressure, gyration number, and specimen height is displayed throughout the compaction process. The tubular frame design and patented method of inducing gyrotory motion ensures an accurate angle every time.

Designed for Ease of Use the AFGB has an integrated industrial computer control the compaction of the specimen from start to finish. Simply enter the compaction parameters, lower the prepared mold into the compaction chamber, secure the gyrotory head, and press Start. The system then applies the consolidation pressure, induces the angle, and gyrates the mold until the specified number of gyrations or specified height is reached. Extrude the specimen after compaction with the same hydraulic ram used to compact the specimen.

The 215mm of internal height available in the AFGB molds is enough for most performance testing specimens. During compaction, the specimen height is sent (once per gyration) to a printer or directly to a computer through the serial port. In addition, the compactor stores the data from last 10 tests, marking each with the date and time. These saved results can be sent to a printer or transferred to a computer as needed.

AFGB Superpave Gyrotory Compactor Specifications

Dimensions	30.0"W x 21.3"D x 55.4"H (760mm x 540mm x 1410mm)
Weight	Approx. 304 lb (138 kg) 
Applied Pressure:	300 – 1000 kPa
Angle of Gyration:	0.82° Internal; 1.16° Internal, or 1.25° External Specify at time of order.
Speed of Gyration:	30 gyrations per minute
Number of Gyrations:	0-299
Mold Dimensions:	150.0mm +0.0/-0.1 mm ID x 280 mm tall (215mm internal height) 10.0mm minimum specimen height
Max. Mold Temp.	200°C
Mode of Operation	Compact to Number of Gyrations, Compact to Specified Height
Data Acquisition:	Gyration Number Specimen Height (mm)
Data Output Options:	RS232 Serial Communication, Serial Printer Kit (optional)




H-30068.2F

Oven Interior



Rolling Thin Film Oven, 208-230V 60Hz— H-30068.2F

Rolling Thin Film Oven, 208-230V 50Hz— H-30068.5F

The rolling thin film oven is used to measure the effect of heat and air on a moving film of semi-solid asphaltic material. The results of this treatment are determined from measurements of the asphalt properties before and after the test. Through the use of a programmable temperature controller and 4-digit digital display system, the oven accurately maintains the specified test temperature of 163°C. The oven includes a 200 to 14,000 ml/min flow meter, 0 to 100 psi air pressure gauge, rotating test rack and eight glass specimen jars. Overall dimensions 40"W x 36"H x 26"D (1016 x 3292 x 660mm). Complies with ASTM D2872, AASHTO T240 and California test method 346. A clean, dry compressed air source is required for oven operation. Shipping wt. 440 lbs. (200kg) 

Glass Container for Rolling Thin-Film Oven— H-30068.12

Heat-resistant, glass, oven jar. 64mm OD (2.52") x 139.7mm H (5.50"). Complies with ASTM D2872, AASHTO T240.

AFGB Superpave Gyrotory Compactor Accessories

150mm Mold Assembly for AFGB— H-1635.1

Includes top and bottom plates.

Calibration Kit for AFGB— H-1635.2

Force, Height and External Angle.

Printer Kit with Cable— H-1635.3

Force, Height and External Angle.

150mm Paper Disk— H-1635.4

Pack of 500

150mm Specimen Lift Handle— H-1635.5

Ductility Testing Machines

These machines determine ductility of formed asphalt/cement or semi-solid bitumen by measuring the distance of elongation before reaching the breaking point of a briquet sample, which is pulled apart at a specific speed and temperature.

Comply with ASTM D113, D5892, D6084, AASHTO T51

Ductility

166

Asphalt



Humboldt Ductility Machine, 120V 60Hz— H-1068X Humboldt Ductility Machine, 220V 50Hz— H-1068X.5F

The H-1068X is a three-speed machine designed for Standard and Force Ductility tests. The unit tests three briquets simultaneously and its DC, direct-drive motor maintains constant speed, entirely vibration-free. Speeds of 1/4, 1 or 5cm per minute are selected via lever shift on mechanical gear box.

A single brass lead screw mounted above water level prevents agitation of water and premature rupture of specimens. A traveling pointer adjusts to zero starting position and indicates exact position of carriage on a linear centimeter scale attached to trough's front edge. Maximum carriage travel (elongation) is 150cm with an automatic stop.

The Unit has a stainless steel interior with an overflow connection, and a baked enamel stainless steel-wrapped exterior. Gears are bronze or brass; all other parts are solid brass to prevent rusting. Finned stainless steel tubes beneath a false bottom provide efficient thermal transfer. Includes a 6' (183cm) cord, feed-through switch and 3-prong plug. Includes 3 standard H-1080 briquet molds with H-1090 plates. Trough overall dimension: 11-3/4 x 74 x 6-3/8" H (30 x 188 x 16cm). **H-1068PC Acrylic Cover is recommended to maintain constant tank temperatures.** Shipping wt. 350 lbs. (159kg)

Temperature Controlled Ductility Machine, 120V 60Hz— H-1068B Temp Control Ductility Machine, 220V 60Hz— H-1068B.2F Temp Control Ductility Machine, 220V 50Hz— H-1068B.5F

The H-1068 Ductility machine takes our H-1068X machine and adds a circulating temperature control unit. Solid-state thermostatically controlled bath and circulator maintain water temperature within a $\pm 0.18^\circ\text{F}$ ($\pm 0.1^\circ\text{C}$). All features identical to the H-1068X. Includes three H-1080 molds. H-1068PC Plastic Cover is recommended to maintain constant tank temperatures. Shipping wt. 430 lbs. (195kg)

Basic Ductility Machine, 120V 60Hz— H-1050 Basic Ductility Machine, 220V 60Hz— H-1050.2F Basic Ductility Machine, 220V 50Hz— H-1050.5F

The H-1050 is a three-speed machine designed for Standard and Force Ductility tests. The unit is a lower cost machine, identical to the H-1068X except that it does not include the baked enamel stainless steel-wrapped exterior or the thermal finned stainless steel tubes in the bottom for enhanced thermal transfer. Shipping wt. 200 lbs. (90.7kg)

Circulating Temperature Controller, 120V 60Hz— H-1068CB Circulating Temp. Controller, 220V 50Hz— H-1068CB.5F

The H-1068CB Circulating Temperature Controller is designed for use with the H-1068X Ductility Machine. It provides a solid-state, thermostatically controlled bath and circulator to maintain water temperature within a $\pm 0.9^\circ\text{F}$ ($\pm 0.5^\circ\text{C}$). Temperature range is: -10°C to 80°C . 1000W heating capacity with 0.1°C stability. Dimensions: 25" x 9" x 19" (635 x 229 x 483cm) Shipping wt. 75 lbs (34kg)

Clear Acrylic Cover for Ductility Machines— H-1068PC

Temperature control cover made from clear Acrylic Sheet. Can be used with all ductility machines. Shipping wt. 40 lbs (18kg)

Ductility Machine Stand— H-1068.100

Designed for use with Humboldt Ductility Machines, places machine at working height and includes a shelf for Circulating Temperature Controller. Features square steel legs. Needs assembly. Shipping wt. 200 lbs (91kg)





Refrigerated Machine, 220V 60Hz— H-1060.2F
Refrigerated Machine, 220V 50Hz— H-1060.5F

This Refrigerated Ductility Machine features the H-1050 machine mounted into a polypropylene bath designed for use with sodium chloride solutions. The heavy-gauge, enamel-finish steel cabinet is fully-insulated and the sealed space between the inner and outer walls protects the low-thermal conductivity properties of the foam and fiberglass combination (tested and proven to have the best K factor). High-capacity pump assures positive circulation in bath to give close temperature control. Three-direction flow regulation is handled with flow cut-off valves that engage when equilibrium is reached. Sensitive magnetic setting transistorized electronic relay control panel for heat and refrigeration maintains temperature range of 32°F (0°C) to 86°F (30°C) by 0.1°F (0.1°C. Cabinet is 90 x 41 x 23" (229 x 104 x 58cm). Includes 3 H-1080 molds. Shipping wt. 1066 lbs. (484kg)

Ductility Briquet Mold— H-1080

Mold for making test briquets for use with any ductility testing machine. H-1080 Briquet Mold has angled sides for use in standard test. Four accurately machined interlocking brass segments are interchangeable with same parts from different molds; no parts identification marks are needed for matching. End pieces, designed to hold specimens being elongated, are provided with mounting holes. Complies with ASTM D113

Elastic Recovery Mold— H-1030

Mold for making test briquets for use with any ductility testing machine. H-1030 Briquet Mold has straight sides for use in forced tests. Requires H-1090 or H-1090.3 base plates. Four accurately machined interlocking brass segments are interchangeable with same parts from different molds; no parts identification marks are needed for matching. End pieces, designed to hold specimens being elongated, are provided with mounting holes. Complies with ASTM D5892, D6084, AASHTO T301.

Base Plate— H-1090

Brass base plate for single mold. Flat surface provides uniform contact with bottom surfaces mold. 5-1/2" x 2" x 1/8" (140 x 51 x 3mm)

Base Plate, Triple Mold— H-1090.3

Brass base plate for triple mold. Flat surface provides uniform contact with bottom surfaces mold. 5-1/2" x 8" x 1/8" (140 x 203 x 3mm)

Force Determination Adapter, 120V 60Hz— H-1021

Force Determination Adapter, 220V, 50/60Hz— H-1021.4F

Provides precise tensile strength measurement of any material, preparation, procedure or type of test to an accuracy of 0.01 lbs. Attaches over existing pin in ductilometer without tools or machine modification, eliminating need for dedicated equipment for standard and force ductility testing. Stainless steel unit has spring-loaded movable platform to which sample is attached and stationary L-shaped base that incorporates LVDT sensor. LVDT can accommodate two adapters simultaneously. Electric components are located out of the water bath. Digital display is calibrated in pounds. Includes power supply to serve LVDT, digital display, calibration stand to ensure consistent results, one 4-lb. and five 5-lb. slotted weights and standard 0-2 VDC analog output; 60ma DC power supply provides constant voltage excitation with adjustable voltage. Analog output provides easy interface with chart recorder, computer or other readout devices via RS232 port. H-1030 mold is recommended for use with this equipment. Adapter overall dimension: 6" x 5-3/8" x 1-3/4" (152 x 137 x 44mm). Shipping wt. 20 lbs. (9kg)

Chart Recorder, 120V 60Hz— H-1026

Chart Recorder, 220V, 50/60Hz— H-1026.4F

For accurate, permanent graphic record of the input signal on single-channel, multi-range potentiometric null balance servo recorder. Versatile precision instrument records a wide range of laboratory test results. Writing width is 7-3/4" (200mm). Dim. 15" x 4-1/4" x 10" (380 x 108 x 254mm). Shipping wt. 11 lbs. (4.9kg)



H-1200



H-1240



H-1240D



H-1250

Universal Penetrometer— H-1200

Direct-reading instrument for precision penetration measurements of bituminous materials, cement, petrolatum and waxes, as well as food, cosmetics and pharmaceutical products. Unit has 5" diameter indicator dial, graduated in 400 divisions of 0.1mm, corresponding to 40mm penetration. Zero preset to eliminate errors. Includes 47.5g plunger with 3.2mm hole, and two loading weights (50g and 100g). Overall dim. 10-1/2" x 13" x 22" (266.7 x 330.2 x 558.8mm). Complies with ASTM D5, D217, D1168, D1191, D1321, D1403, D1831, D1855; AASHTO T49, T187 and others. Shipping wt. 25 lbs (11kg)

Electric Penetrometer, 120V 60Hz— H-1240

Electric Penetrometer, 220V 50/60Hz— H-1240.4F

Takes our H-1200 Universal Penetrometer and adds an automatic digital timer to it. The timer's release mechanism is switchable between seconds minutes, or hours. Timer may be set in 1/10th second intervals. Plunger releases with push of a button, and automatically stops after the preset time duration. H-1240.4F adds a voltage adapter and internal switch on the timing mechanism to change cycle to 50Hz. Shipping wt. 32 lbs (15kg)

Digital Penetrometer, 120V 60Hz— H-1240D

Digital Penetrometer, 220V 50/60Hz— H-1240D.4F.

The H-1240D Penetrometer adds a digital gauge to the H-1240 electric penetrometer to provide precise at-a-glance readings, as well as the ability to automatically start a test with a button push and have the test end after a preset duration. Shipping wt. 32 lbs. (14.5kg)

Portable Penetrometer— H-1250

Lighter and smaller than H-1200 for field work, unit's micrometer adjusts for accurate settings, as well as coarse adjustment for approximate settings. Only one additional 50g loading weight is included with a H-1280 needle. Overall dim. 7" x 7" x 16" (178 x 178 x 406mm). Shipping wt. 8 lbs. (3.6kg)

Portable Penetrometer— H-1252

Battery Paste Penetrometer combines the H-1250 and a H-1255 Grease Cone.

Tin Sample Cups

Flat-bottom, seamless tin sample cups have telescoping covers. Hold samples for determining penetrations.



H-1350.70



H-4929

Capacity	Dimensions	Set Quantity	Model
2.5 oz (71g)	1.87" (47.5mm) ID, 1.42" (36mm) deep	48	H-1350.3A
3 oz (85g)	2.25" (57.1mm) ID, 1.42" (36mm) deep	36	H-1350.3
4.7 oz (133g)	2.42" (61.5mm) ID, 1.67" (42.6mm) deep	36	H-1350.4A
5.6 oz (159g)	2.59" (66mm) ID, 1.72" (43.4mm) deep	36	H-1350.6A
8.2 oz (232g)	3.05" (77.5mm) ID, 1.97" (50mm) deep	18	H-1350.8A
16 oz (454g)	4" (102mm) ID, 2.375" (60.3mm) deep	1	H-1350.16
42.3 oz (1200g)	6.12" (155mm) ID, 3" (76.2mm) deep	1	H-1350.42
70.5 oz (2000g)	6.12" (155mm) ID, 5" (127mm) deep	1	H-1350.70

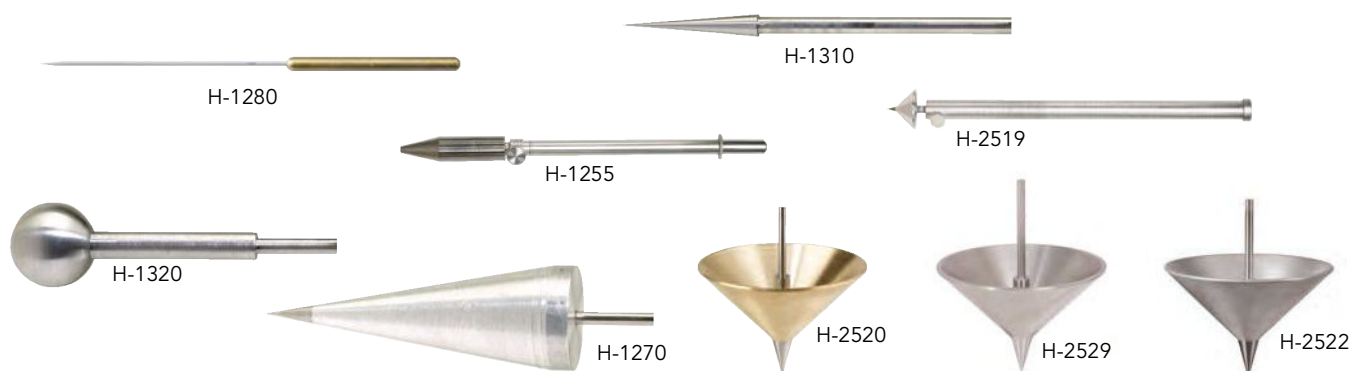
Aluminium Moisture Boxes

Flat-bottom, straight-side seamless aluminium box has tight fitting cover, which fits bottom of box as well. Protects sample from exposure during storage and weighing operations.

OD	ID	Height	Inside Ht.	Volume cu. in.	Volume fl. oz.	Model
2" (51mm)	1.975 (50mm)	.875" (22mm)	0.865" (22mm)	2.650 (44cc)	1.47 (44ml)	H-4926
2.5" (64mm)	2.470 (63mm)	1.75" (44mm)	1.746" (44mm)	8.366 (137cc)	4.64 (137ml)	H-4927
3" (76mm)	3.000 (76mm)	1" (25mm)	0.985" (25mm)	6.963 (114cc)	3.86 (114ml)	H-4928
3.5" (89mm)	3.490 (89mm)	2" (51mm)	1.990" (51mm)	19.037 (312cc)	10.55 (312ml)	H-4929



Penetration Needles and Cones



Bituminous materials ASTM D5; AASHTO T49, IP49; ASA Std. A37.1; Fed Spec. SS.R. 406C, Meth. 214.01	H-1280	Standard hardened stainless steel needle, 40-45mm exposed needle length. Wt. 2.5g.
	H-1300	Standard hardened stainless steel needle, 40-45mm exposed needle length. Certified to ASTM accuracy by independent laboratory. Wt. 2.5g.
	H-1290	Long hardened stainless steel needle, 50-55mm exposed needle length. Wt. 2.5g.
	H-1302	Long hardened stainless steel needle, 50-55mm exposed needle length. Certified to ASTM accuracy by independent laboratory. Wt. 2.5g.
Waxes with 250 or less penetration ASTM D1321	H-1310	Hardened stainless steel wax penetration needles with tapered point, blunt tip of truncated cone. Ferrule is approx. 3.2mm dia. Wt. 2.5g.
	H-1317	Same as H-1310. Certified to ASTM accuracy by independent laboratory.
Battery paste	H-1255	Hardened stainless steel tip with special plunger. Total wt. 60g ± .050g.
Joint sealant for asphalt & concrete pavements ASTM D5329	H-1320	Resilience ball penetration tool. Total wt. 27.5g.

Measuring firmness of solid and plasticized fats: shortenings, butter, margarine. AOCS Cc 16-60	H-1270	20° aluminum cone, 3.2mm ferrule, 0.8mm stainless steel blunt tip. Overall length 106mm. Wt. 45g.
Recovery of used grease, small obtained samples ASTM D1403	H-2519	1/4 scale. (Not considered a substitute for full-size cone specified in ASTM D217.) Wt. 9.38g
Grease testing penetrometers ASTM D217, D937 ASA Std. Z11.3	H-2520	Hollow 90° brass cone, highly polished stainless steel tip. Removable nut and stem. Wt. 102.5g.
	H-2522	Hollow 90° stainless steel cone, highly polished stainless tip. Removable nut and stem. Wt. 102.5g.
ASTM D2884	H-2524	Hollow 90° Magnesium cone and plunger. Total Cone wt. 30.0g.
Applications requiring 90° cones ASTM D217, D937 ASA Std. Z11.3	H-2525	Stainless steel replacement tip, nut and stem.
Food, Paste, Paints U. S, Dept of Agriculture	H-2529	Hollow 90° Aluminum cone and tip. Total wt. 35g

Heater/Circulator, 120V 60Hz— H-2266

Heater/Circulator, 230V 50/60Hz— H-2266.4F

Immersion circulator suitable for use with any tank or jar style bath to create a highly accurate constant temperature circulating system at above ambient temperatures. Minimum immersion depth 3" (8cm), maximum immersion depth 7" (17cm). Clamp-on style fits up to 1-3/16" (3cm) wall thickness, or rod type lab stand. All stainless steel construction. Two-speed pump minimizes turbulence in small tanks, maintains greater uniformity in large tanks. Adjustable flow director accepts 1/2" (13mm) ID tubing for external circulation. Suitable for use with wide variety of fluids. LED set and read. Adjustable PID parameters and very precise temperature control under changing heat loads, plus great temperature stability over a broad range. 6"H x 5"D x 13"D (15.2 x 12.7 x 33cm). Shipping wt. 10 lbs. (4.5kg)

Acrylic Tank— H-2267

See-through acrylic tank is ideal for applications where visibility is desired. Temperature range up to 70°C maximum. Capacity 5-1/2 gal. (21 liters). ID, 7-1/2"H x 13-1/8"W x 18"D (190 x 333 x 457mm).

Transfer Dish— H-1352

Plastic transfer dish has flat bottom, straight sides and metal centering lugs with magnet in the bottom. Size is: 3-3/4" dia. x 3-1/4" deep (95 x 83mm). Complies with ASTM D5.



H-2266



H-1352



H-1720



H-1745
H-1735



H-1730

Constant Temperature Bath, 120V 60Hz— H-1720
Constant Temperature Bath, 240V 50/60-Hz— H-1720.4F
 (Cannon Model CT-500)

Specifically designed for precise viscosity determination with glass capillary viscometers, the H-1720 baths offer superior temperature control to 100°C. The H-1720 offers a 12" Dia x 12" H (305mm x 305mm) bath jar that can accommodate most viscometers.

These baths maintain accurate temperature control of $\pm 0.01^\circ\text{C}$ within the range of 20°C to 100°C ($\pm 0.01^\circ\text{C}$), providing the temperature sensitivity required by ASTM D445 for kinematic viscosity measurements with glass capillary viscometers. Two electric heating elements inside the bath rapidly heat the medium to any desired temperature within the range.

The H-1720 bath chamber is a cylindrical clear 17L Pyrex glass vessel 12" Dia x 12" H (305mm x 305mm). A Teflon®-coated stainless steel baffle located in the center of the bath provides a plain reflective background to aid in viewing instruments. The top cover contains seven round holes 2" (51mm) in diameter for insertion of viscometer holders, allowing up to seven viscosity measurements to be made simultaneously. Covers are supplied for capping unused holes. Two additional holes 10mm in diameter, are provided for thermometers. All wetted parts of the Constant Temperature Baths are made of stainless steel, glass, or Teflon. The frame is fabricated from heavy aluminum and coated with a corrosion-resistant epoxy finish. Viscometers, holders, bath oil, and thermometers must be purchased separately. Dimensions: 16"W x 14.25"D x 24" H (407 x 362 x 610mm). Shipping wt. 75 lbs (34kg).

Constant Temperature Bath, 120V 60Hz— H-1730
Constant Temperature Bath, 240V 50/60Hz— H-1730.4F
 (Cannon Model CT-1000)

The H-1730 Constant Temperature Bath maintains the accurate control required by ASTM D445 for kinematic viscosity measurements with glass capillary viscometers. Within the range of 20 to 100°C, temperature is controlled to 0.01°C; above 100°C temperature it is controlled to 0.03°C.

The H-1730 bath chamber is a cylindrical clear 17L Pyrex glass vessel 12" Dia x 12" H (305mm x 305mm). A stainless steel baffle coated with white Teflon® is located in the center of the bath to provide a good background for viewing viscometers. Two fluorescent lamps illuminate the interior of the bath brightly and uniformly, without glare. Two heating elements inside the bath rapidly heat the bath medium to any temperature within the bath range. The top cover contains seven round holes 2" (51mm) in diameter. Up to seven glass capillary viscometers (in holders) can be placed in the bath. Other hole configurations can be supplied on special order.

A solid-state control circuit, equipped with a stainless steel-encased thermistor provides proportional control of temperature. A motor-driven stirrer ensures a uniform temperature throughout the bath. All wetted parts of the bath are made of stainless steel, glass, or Teflon®. The bath housing is fabricated from heavy aluminum and coated with a corrosion-resistant epoxy finish. Viscometers, holders, bath oil, and thermometers must be purchased separately. Dimensions: 17.25"W x 18.25"D x 23" H (438 x 464 x 584mm). Shipping wt. 123 lbs (56kg).

Viscosity Bath Accessories

Description	Model
Vacuum Manifold (Canon Model 3VM for H-1720)	H-1745
Vacuum Manifold (Canon Model 3VM for H-1730)	H-1735
UBF Bath Oil for temp. <121°C, 6 gal. (23L)	H-1732
High-Temp. Bath Silicone for temp. > 125°C, .5 gal. (2L)	H-1733



H-1746.7



H-1747.1



H-1741H



H-1741V

Zeitfuchs® Cross-Arm Viscometer and Holder

These models are used to determine kinematic viscosity of liquid asphalts, road oils and distillation residues of liquid asphalts at 140°F (60°C) and of asphalt cements at 275°F (135°C), requiring a charge of only 1 to 3ml can easily be filled and cleaned while immersed in a temperature bath and need not be removed. Requires a liquid depth of 9" (229mm). Includes round metal holder for 2" (51mm) dia. hole and certificate of calibration. Complies with ASTM D2170; AASHTO T201.

Zeitfuchs® Cross-Arm Viscometer and Holder

Size	Approximate Constant Cs/Sec.	Range of Centistokes	Model
1	0.003	0.6 to 3	H-1746.1
2	0.01	2 to 10	H-1746.2
3	0.03	6 to 30	H-1746.3
4	0.1	20 to 100	H-1746.4
5	0.3	60 to 300	H-1746.5
6	1.0	200 to 1,000	H-1746.6
7	3.0	600 to 3,000	H-1746.7
8	10	2,000 to 10,000	H-1746.8
9	30	6,000 to 30,000	H-1746.9
10	100	20,000 to 100,000	H-1746.10

Asphalt Institute Vacuum Viscometer

Designed for highly viscous materials, such as asphalt cement, viscometer contains a graduated capillary instead of timing bulbs. Requires 7" (178mm) bath depth and 3ml sample size. Includes

Asphalt Institute Vacuum Viscometer

Viscometer Size/No.	Viscosity Range (Poise)	Approx. Constant poise/second at 300mm Hg Vacuum			Model
		at B	at C	at D	
25	42 to 800	2	1	0.7	H-1747.1
50	180 to 3,200	8	4	3	H-1747.2
100	600 to 12,800	32	16	10	H-1747.3
200	2,400 to 52,000	128	64	40	H-1747.4
400R	9,600 to 140,000	500	250	160	H-1747.5
800R	38,000 to 5,800,000	2000	1000	640	H-1747.6

Digital Vacuum Pressure Regulators, (Solid-State, Use no Mercury)
Horizontal, 120V 60Hz— H-1741H
Horizontal, 220V 50/60 Hz— H-1741H.4F
Vertical, 120V 60Hz— H-1741V
Vertical, 220V 50/60 Hz— H-1741V.4F
 (Cannon DVR-1000 Series)

For precise measurement and control of vacuum at 300mm Hg below atmospheric pressure. Use with Cannon-Manning, Asphalt Institute, or Modified Koppers vacuum viscometers for measurement of asphalt cement and in other laboratory applications where accurate measurement and control of vacuum is required.

In normal mode, the amount of vacuum in mm Hg is displayed on the LCD screen. Or, user may select from nine other units of measurement via a membrane touchpad. Internal set points are preset to regulate vacuum at 300 +/-0.5mm Hg below atmospheric pressure. Set points may be altered to fit user's specific needs within the operating range of 1 to 410mm Hg below atmospheric pressure.

Reading accuracy: ±0.05% of reading ± the least significant digit (includes combined effects of linearity, repeatability, hysteresis, and temperature). NIST certification is supplied. Vacuum regulation accuracy: ±0.5mm HG. Operating temperature: 0 to 40°C (32 to 104°F). Upper/lower safety limit: 746mm HG below atmospheric pressure. Choice of horizontal: 18.5"w x 18"d x 6.75"h (470 x 457 x 171mm) or vertical: 6.75"w x 18"d x 18.5"h (171 x 457 x 470mm). Shipping wt. 55 lbs (22.7kg).


NOTE: Prices and delivery on Cannon-Manning, Cannon-Fenske, Lantz-Zeitfuchs, Modified Koppers and other viscometers are available upon request.



Saybolt Viscometer Bath, 120V 60Hz— H-2165
Saybolt Viscometer Bath, 220V 50/60Hz— H-2165.4F

Designed for Saybolt Universal and Furol viscosity testing, this constant temperature bath meets all ASTM and AASHTO requirements for precise temperature control. The micro-processor PID circuitry assures accurate temperature control within ASTM tolerances throughout the range of ambient to 464°F (240°C).

Simple push-button controls and dual digital displays are used for easy setting and monitoring of the baths temperature. With a capacity of four viscometers and 60ml receiving flasks, the bath features sliding draft shields, chemical-resistant alignment plates for handling of flasks and a glare-free fluorescent backlight for easy viewing of test sample. The insulated bath interior is constructed entirely of heavy-gage stainless steel and the built-in overflow pipe and drain valve simplifies filling the bath oil to the required level.

A chemical resistant top plate provides insulation and is easily removed to allow for cleaning of the bath interior. The bath is supplied complete with four thermometer supports, four port covers, four chained corks, two port closures, tube nut wrench, orifice wrench, withdrawal tube and oil strainer. Viscometer tubes, orifices, receiving flasks, oil and thermometers are not included and must be ordered separately. Complies with ASTM D88, D244, E102, AASHTO T72. Shipping wt. 58 lbs. (26.3kg) 

Accessories

Description	Model
Tube cleaner	H-2175
Sayboldt viscosity flask, graduated 60ml volumetric receiving flask	H-2176
Sayboldt withdrawal pipette and aspirator	H-2177
White mineral oil, suitable for use up to 230°F (110°C)	H-2189
Strainer	H-2178
High-temp. Dow-Corning 200 Fluid, 100 centistroke oil, 5 gallon (wt.40lb (18kg)	H-2199
Displacement ring	H-2194
Thermometer support	H-2195
Orifice wrench	H-2196
Tube wrench	H-2197
Sayboldt viscosity thermometer (66 to 80°F)	H-2600.17F
Sayboldt viscosity thermometer (19 to 27°C)	H-2610.17C
Sayboldt viscosity thermometer (94 to 108°F)	H-2600.18F
Sayboldt viscosity thermometer (34 to 42°C)	H-2610.18C
Sayboldt viscosity thermometer (120 to 134°F)	H-2600.19F
Sayboldt viscosity thermometer (49 to 57°C)	H-2610.19C
Sayboldt viscosity thermometer (134 to 148°F)	H-2600.20F
Sayboldt viscosity thermometer (57 to 65°C)	H-2610.20C
Sayboldt viscosity thermometer (174 to 188°F)	H-2600.21F
Sayboldt viscosity thermometer (79 to 87°C)	H-2610.21C
Sayboldt viscosity thermometer (204 to 218°F)	H-2600.22F
Sayboldt viscosity thermometer (95 to 103°C)	H-2610.22C

Components

Description	Model
Orifices	
Stainless steel universal orifice only	H-2173
Stainless steel Furol orifice only	H-2174
Tubes with Orifices	
Brass Sayboldt viscometer tube w/ stainless steel universal orifice	H-2180
Brass with stainless steel Furol orifice Sayboldt viscosity tube	H-2182
Stainless steel with stainless steel Furol orifice Sayboldt viscosity tube, includes wrench	H-2183
Brass with stainless steel universal and Furol orifice Sayboldt viscosity tube, includes wrench	H-2184
Stainless steel with stainless steel universal and Furol orifice Sayboldt viscosity tuber, includes wrench	H-2185
Tubes	
Stainless steel Sayboldt viscometer tube	H-2171
Brass Sayboldt viscometer tube	H-2172

CAUTION

Many State and Local laws prohibit the sale or shipment of mercury thermometers. Please check laws in your area or contact us before ordering.





Ford Viscosity Cup—

Used in determining viscosity of paint, lacquers and related coatings. Cup body is machined from aluminum; orifice is brass. Orifice not included with H-1530 cup, order from chart below. Cup-orifice combination (Ford 2, 3 or 4) should be selected to provide an efflux time within the 20 to 100-second range. Measurements with the Ford viscosity cup should be made at temperature of 25°C ±0.1° (77°F ±0.2°) with H-2610.17C (or H-2600.17F) thermometer. **Order thermometers and stand separately.** Complies with ASTM D333, D365, D1200.

Description	Model
Ford Viscosity Cup w/ No. 1 Orifice	H-1530.1
Ford Viscosity Cup w/ No. 2 Orifice	H-1530.2
Ford Viscosity Cup w/ No. 3 Orifice	H-1530.3
Ford Viscosity Cup w/ No. 4 Orifice	H-1530.4
Ford Viscosity Cup w/ No. 5 Orifice	H-1530.5

Viscosity Cup Stand— H-1535

Features leveling base and adjustable support bracket for H-1530 Ford viscosity cup.

Asphalt Viscosimeter Float Test Set— H-1400

Used to test flow behavior or consistency of certain bituminous materials and tar products via a float test. Includes calibrated aluminum float and three brass collars. Individual components can be ordered. **Order thermometer separately.** Complies with ASTM D139, AASHTO T50.

Description	Model
Float only	H-1410
Collars only (set of three)	H-1420

Cloud and Pour Point Apparatus Set— H-2560

Used to test flow characteristics of petroleum oils using cloud and pour points. Includes glass bath jar, polished brass cylinder mounted on metal tripod base, glass test cylinder, cork bottom disc and top rings. Complies with ASTM D97, D117, D2500. Shipping wt. 6 lbs. (2.7kg)

Order thermometer separately.

Description	Model
Metal tripod base	H-2560.1
Glass test jar	H-2560.3
Glass battery bath jar	H-2560.5
Brass cylinder	H-2560.2
Cork disks	H-2595
Cork rings	H-2598
Thermometer, -36 to 120°F	H-2600.5F
Thermometer, -38 to 50°C	H-2610.5C
Thermometer, -112 to 70°F	H-2600.6F
Thermometer, -80 to 20°C	H-2610.6C

Spot Test Set of Asphaltic Materials— H-1510

Spot test set only for asphaltic products derived from petroleum not to be used for natural asphalts containing nonbituminous matter insoluble in xylene. Includes 250ml flask, box of filter paper, cork stopper and 10ml pipette. Complies with AASHTO T102. Shipping wt. 5 lbs. (2.2kg)

CAUTION

Many State and Local laws prohibit the sale or shipment of mercury thermometers. Please check laws in your area or contact us before ordering.

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Shown with
Thermometers,
not included,
order separately

H-1595

H-1596

Single, Softening Point Apparatus Set— H-1595

Ring and ball method softening point apparatus used for single determinations, asphalts, pitches, tars and most resins. Includes burner, beaker, support stand, 1 ring, wire gauze with ceramic center, thermometer clamp, 1 shouldered ring and stem with hardened steel ball. Complies with ASTM D36, E28; AASHTO T53.

Shipping wt. 12 lbs. (5kg) **Order thermometer separately.**

Single, Softening Point Apparatus Set, 120V 60Hz— H-1596

Single, Softening Point Apparatus Set, 220V 50/60Hz— H-1596.4F

Uses a 6" x 6" hotplate as a heat source rather than a gas burner. The hotplate provides an easy-to-set analog temperature control knob with graduated scale and LED display. Temperature range is: ambient to 540°C (Ambient to 1004°F) Shipping wt. 15 lbs. (6.8kg)



H-1575



H-1588



H-8900



H-8980



H-1569

Double, Softening Point Apparatus— H-1569

Includes 800ml beaker with brass, double set-up fixture with cover and thermometer port with stopper, 2 shouldered rings, 2 ball centering guides and 2 standard balls.

Order thermometer separately.

Quad, Softening Point Apparatus— H-1570

Includes 800ml beaker with brass, quad set-up fixture with cover and thermometer port with stopper, 4 shouldered rings, 4 ball centering guides and 4 standard balls. **Order thermometer separately.**

See all hotplates available on Page 244.

Thermometers for Softening Point Apparatus

Description	Model
30 to 180°F (ASTM 15F)	H-2600.15F
-2 to 80°C (ASTM 15C)	H-2610.15C
85 to 392°F (ASTM 16F)	H-2600.16F
30 to 200°C (ASTM 16C)	H-2610.16C
30 to 350°F (ASTM 113F)	H-2600.113F
-1 to 175°C (ASTM 113C)	H-2610.113C

CAUTION

Many State and Local laws prohibit the sale or shipment of mercury thermometers. Please check laws in your area or contact us before ordering.

Softening Point Test Individual Components

Description	Model
Brass, shouldered ring, Top: 23mm OD, 19.8mm ID; Bottom: 19mm OD, 15.9mm ID; Top to Shoulder: 4.4mm High; Shoulder to Bottom: 2mm High, 10 per package	H-1575
Hardened steel ball, 3/8" 99.5mm dia.; weight between 3.45 and 3.55g, 10 per package	H-1580
Ball centering guides for shouldered rings, ball is centered on specimen by 3 locator pins	H-1588
Ring and stem assembly with 16" (406mm) long brass wire stem with shouldered brass ring	H-1602
Steel clamp hook support suspended thermometers, locks into any position with check nut, Maximum distance from center of muff to hook: 4-1/4" (108mm), minimum distance is: 3-7/8" (89mm)	H-8900
Thermometer clamp with adjustable 360° muff, phosphor-bronze jaws, 3-1/2" (89mm) long	H-8950
Thermometer clamp similar to H-8950, but holds H-1602 ring and stem and thermometer together	H-8980
Base (Cast iron) and Support Rod	H-21220
Burner	H-6220
Beaker, 800ml, Graduated range	H-4911.800
Hot plate, 6" x 6" with LED Display	H-4942
Wire Gauze, 5" x 5" w/ceramic material center	H-25865



H-2405B



H-2400



H-2495



H-1990

8oz. (237ml) Bacon Bomb Sampler, Brass— H-2405B

8oz. (237ml) Bacon Bomb Sampler, Stainless Steel— H-2405S

Obtains samples from storage tanks, tank cars and drums using thief method. Plunger opens to admit the sample when bomb is lowered to the bottom or when plunger is released at any desired level. Plunger seals tight when bomb is withdrawn; features o-ring-type valve seal. Available in plated brass or stainless steel. 2" dia. x 10" L. (51 x 254mm) Complies with ASTM D117, D270, D923, D943. Shipping wt. 5 lbs. (2.3kg)

16oz. (473ml) Bacon Bomb Sampler, Brass— H-2406B

16oz. (473ml) Bacon Bomb Sampler, Stainless Steel— H-2406S

Larger capacity with same features as H-2405B. Dimensions: 2-3/4" dia. x 12" L (70 x 305mm). Shipping wt. 9 lbs. (4.1kg)

32oz. (946ml) Bacon Bomb Sampler, Brass— H-2407B

32oz. (946ml) Bacon Bomb Sampler, Stainless Steel— H-2407S

Larger capacity with same features as H-2405B. Dimensions: 2-3/4" dia. x 15.25" L. (70 x 387mm) Shipping wt. 15 lbs. (6.8kg)

ASTM Oil Sampler, 3/4" Neck Opening— H-2400

ASTM Oil Sampler, 1-1/2" Neck Opening— H-2401

Weighted beaker ASTM oil sampler collects crude petroleum, petroleum products, butane, propane and other petroleum products that are gases at atmospheric temperature and pressure. Copper construction with lead-weighted bottom and bail handle. Chained cork stopper seals tight. Brass disc and loop on top allow easy removal. Corrosion-resistant paint finish. 3/4" neck opening; body is 3-3/8" dia. x 14" L. (86 x 356mm) Complies with ASTM D270. Shipping wt. 6 lbs. (2.7kg)

Conradson Carbon Residue Apparatus— H-2495

Tests petroleum products to determine the amount of carbon residue left after evaporation and pyrolysis of an oil and to indicate relative coke-forming propensities. Includes burner, tripod, refractory block, nickel chrome triangle, nickel crucible and cover, Skidmore crucible, porcelain crucible and monel hood and bridge. Component parts available separately. Complies with ASTM D189, D2416. Shipping wt. 7 lbs. (3.2kg)

Replacement Parts

Description	Model
Porcelain crucible	H-2494
Skidmore crucible and cover	H-2497
Carbon residue apparatus hood	H-2496
Nickle crucible with cover	H-2498
Refractory block insulator ring	H-2505

Tag Open-Cup Flash Tester, Electric, 120V 60Hz— H-1990

Tag Open-Cup Flash Tester, Electric, 230V 50/60Hz— H-1990.4F

For determination of flash points of liquids having a flash point up to 230°F (110°C) and cutback asphalts with flash points of less than 200°F (93°C). Includes Pyrex cup, base and liquid bath with overflow, pivoting ignition taper with pilot light and reference bead and thermometer holder. Order H-2610.9C thermometer, leveling device and draft shield separately. Complies with ASTM D1310, D3143; AASHTO T79. Shipping wt. 9-1/2 lbs. (4.3kg)

Tag Open-Cup Flash Tester, Gas— H-1995

Same unit as above, but uses gas to operate.

Replacement Parts

Description	Model
Replacement Pyrex cup	H-1990.1
Leveling device	H-1990.2
Draft shield	H-1990.3
Thermometer, range: 20 to 230°F	H-2600.9F
Thermometer, range: -5 to 110°C	H-2610.9C



H-2095

Cleveland Flash and Fire Point Tester, Natural Gas— H-2095

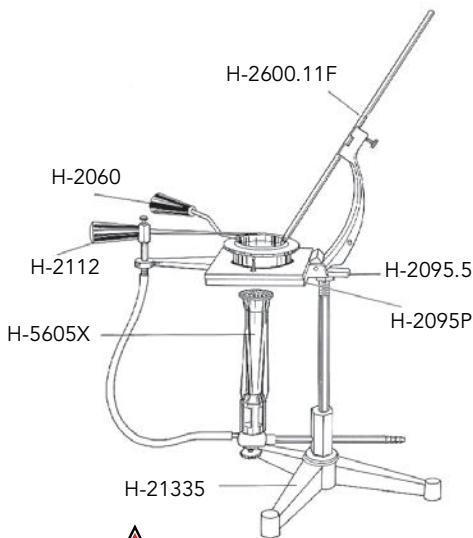
One source supplies gas for both heating and test flame. Complies with ASTM D92, D117; AASHTO T48.

Order thermometer separately

Shipping wt. 20 lbs. (9.1kg)

Replacement Parts

Description	Model
Cast-Iron Support Base	H-21335
High-Temp Burner w/ Adjustable Valve Orifice	H-5605X
Test Burner w/ holder	H-2112
Flash-Point Platform	H-2095P
Supra-Board Plate	H-2095.4.2
Platform Coupling Assembly	H-2095.5
Flash Cup	H-2060
Thumb Screw	H-3050.7
Thermometer	H-2600.11F



CAUTION
 Many State and Local laws prohibit the sale or shipment of mercury thermometers. Please check laws in your area or contact us before ordering.



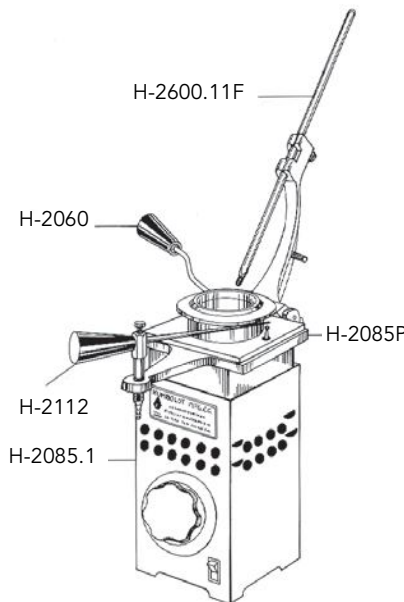
H-2085

Cleveland Open Cup Flash Tester, 120V 60Hz— H-2085
220V 50/60Hz— H-2085.4F

Thermometer position is adjustable. Complies with ASTM D92, D117; AASHTO T48. **Order thermometer separately**
 Shipping wt. 20 lbs. (9.1kg)

Replacement Parts

Description	Model
Electric Heater with Rheostat	H-2085.1
Flash-Point Platform	H-2085P
Test Burner w/ holder	H-2112
Flash Cup	H-2060
Supra-Board Plate	H-2095.4.2
Thermometer	H-2600.11F



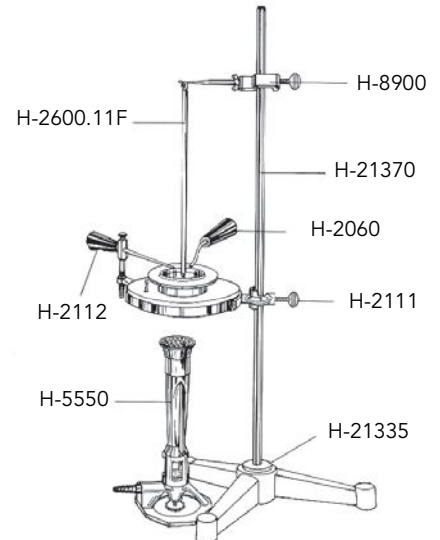
H-2100

Cleveland Flash and Fire Point Tester Natural Gas— H-2100

Thermometer and cup platform positions are adjustable up and down on support rod. Complies with ASTM D92, D117; AASHTO T48. **Order thermometer separately**
 Shipping wt. 17 lbs. (7.7kg)

Replacement Parts

Description	Model
Cast-Iron Support Base	H-21335
Support Rod	H-21370
High-Temp. Burner	H-5550
Test Burner	H-2112
Flash Cup Platform	H-2111
Flash Cup	H-2060
Thermometer clamp	H-2113
Thermometer	H-2600.11F



**Aluminum Tar Still— H-1871**

Used with H-2290 for determining water in crude petroleum, tars and derivatives of those materials. Cover has 1 tubulure. Dimensions: 3-1/2" (89mm) ID x 6" (152mm) Inside depth. 1 qt. (0.9 liter) capacity. Cast aluminum. Complies with ASTM D95, D370, D1461, AASHTO T55, T59, T83, T110.

Aluminum Alloy Still— H-2345

Used with H-2285 for identifying cationic emulsions and as a container to determine water content and residue by distillation and evaporation. Cover has 3 tubulures (2 drilled 10/18 and 1 drilled 24/40), 3-3/4" (95mm) ID x 9-1/2" (241mm) inside depth. Complies with ASTM D95, D244, AASHTO T55, T59, T110.

Aluminum Alloy Still— H-2346

Same as H-2345, except cover has 4 tubulures (3 drilled 10/18 and 1 drilled 24/40)

Stoppers for use with above Stills:

Teflon, Glass Tube Stopper— H-2345TS

Teflon, Thermometer Stopper— H-2345TTS

Ring Burner— H-1876

Can be used with all gases. 4-3/4" (121mm) ID x 5-1/2" (140mm) OD. Overall shank length is 11" (279mm) with 3/8" (10mm) serrated hose connection. Guide pins keep burner equidistant around still. Fletcher attachment regulates gas and air. Complies with ASTM D244, AASHTO T59.

Distillation Shield— H-1940

Use with H-1880. Flanged, open-end, stainless steel cylinder with 1/8" ceramic lining and two-part cover. For use with 500ml flask. Flame distillation only. Complies with ASTM D402, AASHTO T78.

Flame Shield— H-1945

Use with H-1880. Stainless steel, spot-welded cone 2" (51mm) dia. at bottom with spring clip to fit 7/16" to 5/8" (11 to 16mm) burner tubes. Complies with ASTM D402, AASHTO T78.

Burner Chimney— H-1946

Fits standard 4" (102mm) rings.

Condenser Jacket— H-2340

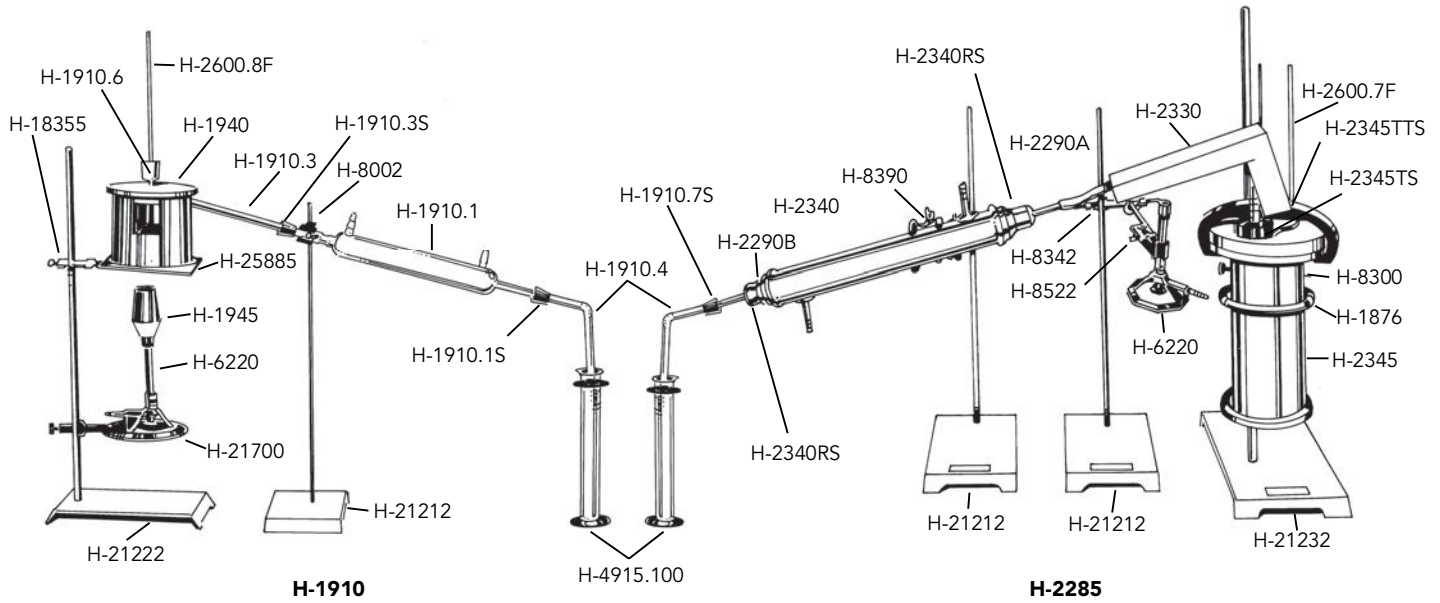
For use with H-2285 and H-2290. Brass, 15" long inlet/outlet tubulures on opposite sides of jacket. Complies with ASTM D244, AASHTO T59.

Connecting Tube Shield— H-2330

For use with H-2285 and H-2290. Stainless steel. Complies with ASTM D244, AASHTO T59.

Still Cleaner— H-2348

Use with H-1871 and H-2345. Tool to remove residue from interior of still, 13" x 4" (328 x 101mm) dia.



Distillation of Cut-Back Asphaltic (Bituminous) Products— H-1910

Distillation apparatus accurately determines residue content and separates volatile and non-volatile cut-back asphaltic products. **Order H-2600.8F thermometer separately.** Complies with ASTM D402; AASHTO T78. Shipping wt. 18 lbs. (8.2kg)

Individual Items Included in H-1910

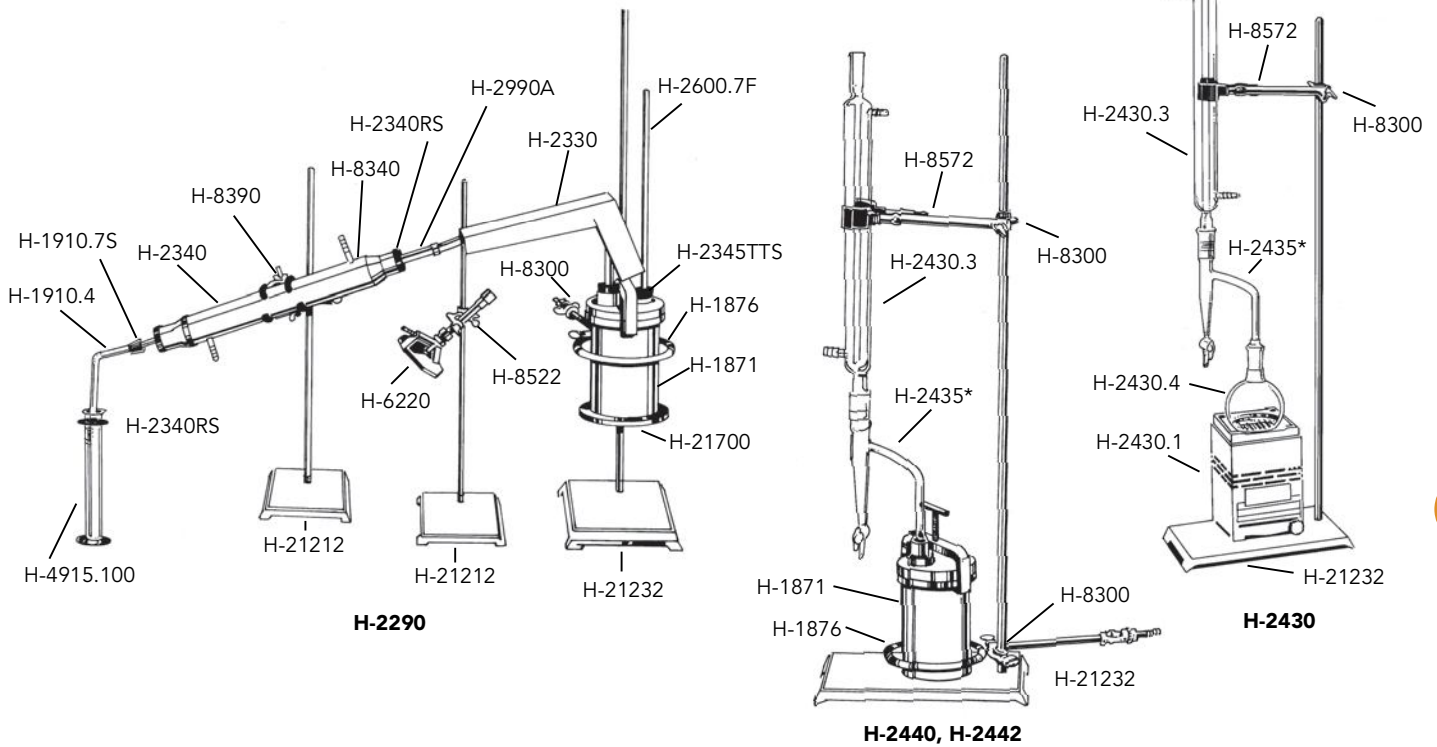
Description	Model
Flask	H-1910.3
Condenser	H-1910.1
Adapter	H-1910.4
Distillation Shield	H-1940
Flame Shield	H-1945
Graduated Cylinder	H-4915.100
Burner	H-6220
Clamp	H-8002
Support Ring	H-18355
Support Stand	H-21212
Support Stand	H-21222
Support Shelf	H-21700
Wire Gauze	H-25885

Emulsified Asphalts Distillation Apparatus— H-2285

Distillation apparatus accurately determines representative portion of residue in emulsified asphalts. **Order H-2600.7F thermometer separately.** Complies with ASTM D244; AASHTO T59. Shipping wt. 30 lbs. (13.6kg)

Individual Items Included in H-2285

Description	Model
Ring Burner	H-1876
Adapter	H-1910A
Bent Glass Tube	H-2290A
Funneled Tube	H-2290B
Tube Shield	H-2330
Condenser	H-2340
Aluminum Still	H-2345
Graduated Cylinder	H-4915.100
Burner	H-6220
Clamp	H-8300
Clamp Holders (2 in set)	H-8342
Clamp	H-8390
Clamp	H-8522
Ring	H-18355
Support Stands (2 in set)	H-21212
Support Stand	H-21232
Support Shelf	H-21700



**Emulsified Asphalts Water Content
Distillation Apparatus— H-2290**

Same as H-2285 with smaller still, H-1871, substituted for H-2345 still. Complies with ASTM D244; AASHTO T59. Shipping wt. 30 lbs. (13.6 kg)

Dean-Stark Gas-Heated Apparatus— H-2440

Gas heated apparatus determines water content in petroleum products and other bituminous materials. Uses the same component parts as the H-2430, except instead of an electric heater and flask, it includes a Tar Still and Ring Burner (listed below). Complies with ASTM D95, D244, E123; AASHTO T55, T59. Shipping wt. 30 lbs. (13.6kg)

Items Included in H-2440

Description	Model
Tar Still	H-1871
Ring Burner	H-1876

Distillation Apparatus for Volatile Distillates— H-2442.25

Same components as the H-2440, but the distilling receiver is a trap for volatile fractions of bitumen. Includes a 25ml Trap, graduated 0 to 5ml in 0.1ml divisions. Meets ASTM D1461; AASHTO T110. Shipping wt. 25 lbs. (11.3kg)

Distillation Apparatus for Moisture Distillates— H-2442.10

Same components as the H-2440, but the distilling receiver is a trap for moisture distillates of bitumen. Includes a 10ml Trap, graduated 0 to 5ml in 0.1ml divisions. Complies with ASTM D1461; AASHTO T110. Shipping wt. 25 lbs. (11.3kg)

**Dean-Stark Electric Apparatus, 120V 60Hz— H-2430
Dean-Stark Electric Apparatus, 220V 50Hz— H-2430.4F**

Electrically heated apparatus determines water content in petroleum products and other bituminous materials. Complies with ASTM D95, D244, E123; AASHTO T55, T59. Shipping wt. 30 lbs. (13.6kg)

Individual Items Included in H-2430

Description	Model
0 to 750W Electric Rheostat Heater	H-2430.1
Condenser	H-2430.3
Flask	H-2430.4
20ml Distilling Receiver Trap with Stopcock	H-2435.20
Clamp	H-8300
Burette Clamp	H-8572
Rectangular Support Stand with Rod	H-21232

*There are several choices of Traps for H-2435, see page 180.

Note: See following page for distillation accessories and replacement parts.



H-2435.25



H-2435.20



H-2435.10



H-2435.5



H-2450

25ml Cap Trap For Volatile Distillates— H-2435.25

25ml cap trap graduated 0.1ml from 0 to 25ml. Complies with ASTM D95, D1461.

20ml Distillation Trap— H-2435.20

20ml distillation trap graduated in 0.2ml. Optional for ASTM D95

10ml Cap Trap For Moisture Distillates— H-2435.10

10ml cap trap graduated 0.1ml from 0 to 1ml, 0.2ml from 1ml to 10ml. Complies with ASTM D95, D1461.

5ml Cap Distillation Trap— H-2435.5

5ml cap distillation trap, graduated 0.1ml. Meets ASTM D95, D1461.

Particle Charge Meter, 110V 60Hz— H-2450

Particle Charge Meter, 220V 50/60Hz— H-2450.4F

Particle charge meter identifies cationic emulsified asphalt, using 0-10DC millimeter controlled by variable resistor. Fail-safe design prevents exceeding meter capacity. Includes positive- and negative-identified test clips and 3-wire plug.

Shipping wt. 5 lbs. (2kg)

Order stainless steel plates separately.

Complies with ASTM D244; AASHTO T59.

Particle Charge Meter Plates— H-2452

Set of two 1" x 4" (25.4 x 101.6mm) stainless steel plates for use with H-2450.

Bitumen Soluble in Organic Solvents Set— H-1550

Used to determine solubility of asphalt cement materials.

Complies with ASTM D4, D2042; AASHTO T44. Shipping wt. 9 lbs.



H-1550

Replacement Parts, Model H-1550

Description	Model
Gooch crucible	H-1550.1
Crucible holder	H-1550.2
Buchner funnel	H-1550.3
Glass fiber filters	H-1550.8
Chapman filter pump	H-12020
3/8" Threaded coupling	H-12155
Flask filter ring	H-4913.500
Stopper #7	H-1550.5
Tubing	H-1448PT

Centrifuge Extractors

For quantitative determination of bitumen content in paving mixtures, centrifuge extractor operation requires relatively short time. Sample is weighed, heated slightly until it starts crumbling, cooled, placed in rotor bowl and solvent is added. Centrifugal action forces liquid through a filter paper ring at bowl's periphery, and process is repeated until expelled solvent is clear color.

Aggregates are weighed and graded. Weight before and after extraction determines constituent proportions.

All motorized units have accurate, dependable electronic solid state speed control; rotation speed adjusts up and down.

Electric brake stops rotation in less than 10 seconds. Explosion-proof motorized units offer same features along with greater safety.

Hand-driven unit is ideal for field application or labs with light duty. Units are corrosion-resistant lightweight cast aluminum.

Includes 10 filter rings. Extra bowls recommended to speed multiple batching; order separately. Complies with ASTM D2172 (Method A).



H-1451
H-1452
H-1474



H-1456

Centrifuge Extractors, Analog Control, Value Line

Dimensions are: 12" x 22" x 20" (304 x 559 x 508mm)

Capacity	Open Motor		Explosion-Proof Motor		Shipping Wt.	Filter Ring Replacements
	115V 60Hz	220V 50/60Hz	115V 60Hz	220V 50/60Hz		
1500g	H-1452	H-1452.4F	H-1451	H-1451.4F	85 lb (39kg)	H-1481.627 6 micron retention 9-3/4" OD x 1-3/4" ID Package of 100
3000g			H-1474	H-1474.4F	140 lb (64kg)	H-1485.627 6 micron retention 11-5/8" OD x 5" ID Package of 100

Centrifuge Extractors, Analog Control, Cast Aluminum Construction

Dimensions are: 18" x 18" x 18" (457 x 457 x 457mm)

Capacity	Open Motor	Explosion-Proof Motor		Shipping Wt.	Filter Ring Replacements
	115V 60Hz	115V 60Hz	220V 50/60Hz		
1500g	H-1456	H-1466	H-1466.4F	75 lb (33kg)	H-1487.627 4 micron retention 10" OD x 5" ID Package of 100
3000g	H-1471	H-1473	H-1473.4F	80 lb (36kg)	H-1489.627 4 micron retention 12-1/4" OD x 5" ID Package of 100

Replacement Parts, Models H-1456 to H-1473

Description	Model	Description	Model
Aluminum Bowl, Model H-1456, H-1466	H-1456B	Clamp for all models	H-1471C
Aluminum Bowl, Model H-1471, H-1473	H-1471B	Rubber Viton O-ring for all models	H-1471RV
Bowl Cover, Model H-1456, H-1466	H-1456 BC	Brake band for all models	H-1456BB
Bowl Cover, Model H-1471, H-1473	H-1471BC	Brake Band Assembly for all models	H-1471BBA
Cover Nut	H-1456N		





H-1461

Centrifuge Extractors, Digital Control, Cast Aluminum Construction

Controller can be wall mounted to minimize vibrations. Push button and walk away while machine runs unattended. Memory holds "last test" cycle settings. Shuts off automatically at end of test cycle. Dimensions are: 18" x 18" x 18" (457 x 457 x 457mm)

Centrifuge Extractors, Analog Control, Cast Aluminum Construction

Dimensions are: 18" x 18" x 18" (457 x 457 x 457mm)

Capacity	Open Motor	Explosion-Proof Motor		Shipping Wt.	Filter Ring Replacements
	115V 60Hz	115V 60Hz	220V 50/60Hz		
1500g	H-1460	H-1461	H-1461.4F	76 lb (35kg) 	H-1487.627 4 micron retention 10" OD x 5" ID Package of 100
3000g	H-1464	H-1465	H-1465.4F	80 lb (36kg) 	H-1489.627 4 micron retention 12-1/4" OD x 5" ID Package of 100

Filter Papers For use with Centrifuge Extractors and Reflux Extraction Sets

Size	Filter Speed	Flow Rate (ml/min.)	Thickness	Retention (µm)	Per Pkg.	Model
9-3/4" x 2-1/2"	medium	85	0.71	4	100	H-1480.627
9-3/4" x 1-3/4"	medium	85	0.71	4	100	H-1481.627
10" x 5"	medium	85	0.71	4	100	H-1487.627
12-1/4" x 5"	medium	85	0.71	4	100	H-1489.627
11-5/8" x 1-3/4"	medium	85	0.71	4	100	H-1485.627
33cm dia.	Very Fast	360	0.51	48	50	H-1497.617
33cm dia.	Very Fast	435	1.02	31	100	H-1497.633
33cm dia.	Fast	235	0.25	24	100	H-1497.615
33cm dia.	Medium	60	0.17	6	100	H-1497.613
33cm dia.	Medium	85	0.71	4	100	H-1497.627
40cm dia.	Medium	85	0.71	4	100	H-1498.627
40cm dia.	Medium Fast	60	0.17	6	100	H-1498.613
40cm dia.	Medium Fast	235	0.25	24	100	H-1498.615
40cm dia.	Very Fast	300	0.51	48	50	H-1498.617



Vacuum Extractor— H-1449

Used for quantitative determination of bitumen in hot-mixed paving mixtures and pavement samples. Use with a H-4913.4M Erlenmeyer Flask. The H-1449 provides a 12" (305mm) dia. filtering surface. The unit includes connecting hose, (100) H-1497.613 filter papers and test procedure. For replacement filter paper, use H-1497 series. Complies with ASTM D2172 (Meth. E); AASHTO T164 (Method E). Shipping wt. 60 lbs. (27.2kg)

For vacuum pump, order H-1763A pump separately.

4000cc Erlenmeyer Flask— H-4913.4M

Meets ASTM D2172; AASHTO T164 (Method E)

8" Sieve Adapter for Vacuum Extractor— H-1447

Description	Model
Fluorosilicone o-ring	H-1448.1
Free-flow vacuum plate	H-1448GS
Stainless Steel Plate, as provided	H-1448P
Stainless Steel Plate, Heavy-Duty	H-1448HP
Rubber Tubing	H-1448RT
Clear, Heavy-wall, Vacuum Tubing	H-1446
4,000cc Erlenmeyer Flask, meets ASTM D2172 and AASHTO T164 (Method E)	H-4913.4M
8" Sieve adapter	H-1447

Free-Flow Vacuum Plate— H-1448GS

Prevents vacuum flow problems when performing vacuum extractor tests. This heavy-duty stainless steel plate won't draw down when vacuum is applied. Prevents blockage of flow holes. Solvent always passes through freely for consistently accurate test results. Eliminates problems and speeds testing. Can be used with the H-1449 Vacuum Extractor.

Filterless Centrifuge Extractor, 120V 60Hz— H-1857

Filterless Centrifuge Extractor, 230V 60Hz— H-1857.2F

Filterless Centrifuge Extractor, 230V 50Hz— H-1857.5F

The Continuous-flow Filterless Centrifuge Extractor is ideally suited for use in the extraction of mineral fines from bitumen-laden solvents obtained from standard asphalt extraction tests. In operation, the solvent suspension is fed through the top funnel into a special aluminum beaker. Using the high, 11,000 rpm centrifugal force, the liquid moves up the beaker wall and out the overflow tube while the solids remain for easy removal at test completion. The system allows the continuous feeding of the suspension until the solids-retaining capacity of the beaker is reached. The unit is supplied complete with a No. 18 (1.0mm) and No. 200 (75µm) sieve for placement at the top of the inlet funnel. Using this arrangement, an asphalt mix extraction test can be carried out by pre-dissolving the mix with solvent and then pouring the sample into the sieve. Complies with ASTM D1856; AASHTO T164, T170. Dimensions: 20" x 15" x 33" (508 x 380 x 840mm). Shipping wt. 150 lbs. (68kg)

Aluminum Beaker— H-1857.5



H-1499

H-1495

Reflux Extractor Set, 1000g, 120V 60Hz— H-1495
Reflux Extractor Set, 220V 50/60Hz— H-1495.4F

Used to determine the percentage of bitumen in a paving mixture using hot solvent extraction. Each cone has 500g capacity. Set includes: 2 Wire Screen Cones, Copper Condenser with 1/2" inlet/outlet water tubes, Glass Jar 6" OD x 18" H (152mm x 457mm) with ground open edges for a tight fit, a H-4942, 7" square Hot Plate and a 100-pack of 33cm Filter Paper. Components are available individually below. Complies with ASTM D2172; AASHTO T164 (Method B). Shipping wt. 30 lbs. (14kg)

H-1495 Extractor Components

Description	Model
Wire Screen Cone Sample Holder (set of 2)	H-1495.1
1/2" Tube Copper Condenser w/ inlet/outlet water tubes	H-1495.2A
Glass Jar with ground open edges	H-1495.3
Electric Hot Plate	H-4942
Filter Paper, 33cm, 100-pack	H-1497.613
FibreChem Circle, 8.5"	H-1496

Reflux Extractor Set, 2000g, 120V 60Hz— H-1499
Reflux Extractor Set, 220V 50/60Hz— H-1499.4F

Similar to H-1495 except cones have 1000g capacity. Set includes: 2 Wire Screen Cones, Copper Condenser with 1/2" inlet/outlet water tubes, Glass Jar 8-3/4" OD x 18" H (222mm x 457mm) with ground open edges for a tight fit, a H-4943 10" square, digital Hot Plate and a 100-pack of 40cm Filter Paper. Components are available individually below. Complies with ASTM D2171; AASHTO T164 (Method B). Shipping wt. 50 lbs. (23kg)



H-1495.1
H-1499.1



H-1495.2A
H-1499.2A



H-1494A



H-1440



H-1499 Extractor Components

Description	Model
Wire Screen Cone Sample Holder	H-1499.1
1/2" Tube Copper Condenser w/ inlet/outlet water tubes	H-1499.2A
Glass Jar with ground open edges	H-1499.3
Electric Hot Plate	H-4943
Filter Paper, 40cm, 100-pack	H-1498.613
FibreChem Circle, 8.5"	H-1496

Pressure Limit Device— H-1494A

For use with Reflux Extractor Kits to protect copper condenser from excessive pressure. For use with 1/2" tubes.

Asphalt Dispenser, 6 Qt., 120V 60Hz— H-1440

Asphalt Dispenser, 6 Qt., 220V 50/60Hz— H-1440.4F

Round melting pot has stainless steel crucible (18 gauge) & shell (20 gauge) to facilitate easy clean up. Choice of 6 quart, or 12 quart model. Includes heavy duty, adjustable bench mounting stand which fits either size. Dual-point temperature control allows independent temperature for pot (0-350°) and for valve (1-10°). Digital display may be read in either Centigrade or Fahrenheit. Other features include: multiple-circuit blanket heater for very uniform heat; no-drip 1" ball valve dispenser, 7-1/4" (184mm) above work surface; 50 watt valve heater; 3" (76mm) fiberglass insulation; separate aluminum cover; 6' power cord. 6-qt Capacity— 800 watts; OD = 10-1/4" dia. x 14" height (260 x 356mm). ID = 6-3/4" dia. x 7-1/4" depth (171 x 184mm). 12-qt Capacity— 1,200 watts; OD = 15" dia. x 17" height (381 x 432mm). ID = 10" dia. x 9-1/2" depth (254 x 241mm). (Valve & controls excluded from dimensions.) Shipping wt. 30 lbs. (13.6kg)

Asphalt Dispenser, 12 Qt.— H-1442

Asphalt Dispenser, 12 Qt., 220V 50/60Hz— H-1442.4F

Like H-1440, but has 12 quart capacity. Shipping wt. 43 lbs. (19.5kg)