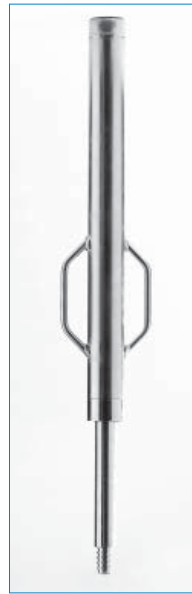


Dynamic Cone Penetrometer (DCP)



S-205



S-20000

The original Dynamic Cone Penetrometer (DCP) was developed in 1959 by the late Professor George F. Sowers. The DCP uses a 15 lb (6.8 kg) steel mass falling 20 in (50.8 cm) that strikes the anvil to cause penetration of a 1.5 in (3.8 cm) diameter cone (45° vertex angle) that has been seated in the bottom of a hand augered hole. The blows required to drive the embedded cone a depth of 1-3/4 in have been correlated by others to N values derived from the Standard Penetration Test (SPT). Experience has shown that the DCP can be used effectively in augered holes to depths of 15 to 20 ft (4.6 to 6.1 m).

Heat treated cone, zinc plated components. The cone can be replaced with a plated Drive Tube Assembly for collection of 3 x 10 in (7.6 x 25.4 cm) tube samples in hand augered holes.

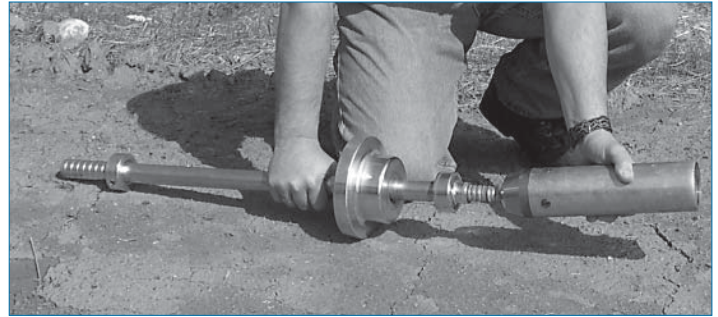
The S-200 DCP and Auger Test Set for 10 ft depth includes:

- Standard Sliding Drive Hammer Assembly
- Cone Penetrometer Point with 1-ft Adaptor Rod
- 4 each 30 in "E" Drill Rods
- Standard Auger Head
- 4 each 36-in Auger Extensions
- Tee Handle and Operating Instructions

The S-205 Cone Penetrometer Test Set for 10-ft depth is similar to the S-200 set above but does not include auger items.

As a related item, the Sleeved Drive Hammer, S-20000, provides an alternative method of conducting the DCP Test. It is designed to fit standard "E" drill rod extensions and the penetrometer point assembly. There are no exterior impact zones on the sleeved Drive Hammer sides. The 15-lb sleeved Drive Hammer unit is compact, easy to transport, zinc-plated for protection against corrosion and capable of being disassembled by the user for periodic inspection and cleaning. Patent Pending.

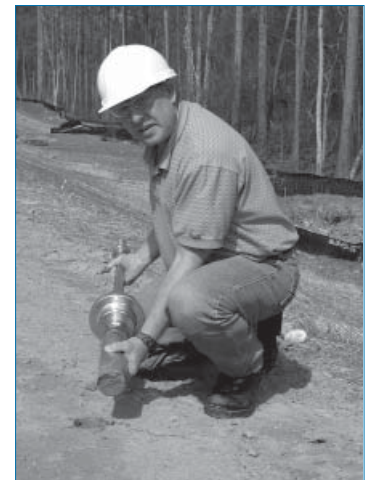
Notice: *Sleeve Drive Hammer, S-20000, is manufactured by DGSi under an exclusive license. DGSi has not performed comparative tests with Sower's hammer.*



1 - Sampler (Shelby) Tube, S-20035, already attached to the Drive Tube Head Assembly, S-20037, is being threaded onto the Sliding Drive Hammer, S-20003.



2 - Driving the Sampler Tube. The operator is about to release the 15-lb mass.



3 - Showing the filled Sampler.



S-20037 w/ 3 x 10-in Sampler (Shelby) Tube



4 - Removing the Sampler Tube.



S-200

Static Cone Penetrometer



S-215



S-21018



S-215 in use

S-200	DCP (w/ Standard Hammer) and Auger Test Set	78 lb
S-201	DCP (Sleeved Hammer) and Auger Test Set	78 lb
S-205	DCP (w/ Standard Hammer) Test Set	72 lb
S-206	DCP (Sleeved Hammer) Test Set	72 lb

Accessories

S-20010	1 ft (0.3 m) E Drill Rod Extension
S-20025	30 in (0.76 m) E Drill Rod Extension (recommended)
S-20050	5 ft (1.75 m) E Drill Rod Extension
S-20037	3 in Drive Tube Head Assembly, zinc plated
S-20035	3 x 10 in Sampler Tube, swaged end, zinc plated, (includes 10 caps)
DS-630	Plastic Cap for 3 in OD Tube

Replacement Parts

S-20000	Modified Sliding DCP Sleeved Drive Hammer
S-20001	Heat-Treated Drive Point w/ 1 ft Adaptor Rod
S-20001-1	Roll Pin for the Point
S-20002	Heat-Treated Drive Point w/ Roll Pin
S-20003	Sliding Drive Hammer Assembly
S-20003-1	Roll Pin for the Stop Block
S-20004	Operating Instructions
S-20005	#399 Publication
124803	Hammer Shaft
125101	15 lb Weight Mass
124901	Top Stop Block
601189	Hammer Stem, forged / machined, for S-20000

DGSI Static Cone Penetrometers are used to evaluate the consistency of soils, their level of compaction and the bearing capacity of shallow foundations and pavement subgrades. Specifically developed for use in fine grained soils, particularly soft soils, they use a 60° cone with a surface area of 1.5 cm². An optional cone with a 3 cm² surface area is available for use in very soft soils.

- Dual rod construction isolates cone resistance from shaft friction
- Pressure gauge ranging from 0 to 70 kg/cm² reads cone resistance directly, eliminating need for proving ring conversions
- Stainless steel and anodized aluminum construction for reliable performance
- 24-in starter rod and optional 24-in extension rods

Standard models include:

- A 60° cone with a maximum area of 1.5 cm²
- A Starter Rod Assembly designed to withstand an axial force of 250 lbf (340 N•m) maximum
- Pressure gauge marked in kg/cm²
- Operating Instructions and parts list

S-215	Static Cone Penetrometer, with 24-in Starter Rod Assembly	8 lb
-------	---	------

Replacement Parts

AP-2100-1	Head Assembly
S-21018	60° Cone w/maximum area of 1.5 cm ²
S-21511	24-in Starter Rod Assembly
S-21510	24-in Extension Rod Assembly
S-212M	Instruction Manual
S-21021	"O" Ring Packing Kit (2 ea. 2404013)

Accessory Items

S-21010	60° Cone with maximum area of 3 cm ²
S-21501	24-in Outer Rod Only
S-21502	24-in Starter Inner Rod Only (actual OAL: 24.875 in)
S-21503	24-in extension Inner Rod Only (actual OAL: 24 in)

Note: To function properly, the penetrometer gauge requires high-grade, non-detergent, hydraulic fluid. Always drain existing fluid from the gauge prior to refilling and refill the gauge with the starter rod attached w/ zero load.

Corps of Engineers Single and Dual-Mass Cone Penetrometers

ASTM D 6951

The Dual-mass Cone Penetrometer, S-218, drops an 8-kg mass a distance of 575 mm onto an anvil driving a 60° cone with a maximum diameter of 20 mm. When used in weaker subgrades having a CBR value less than 10, the driving mass is reduced to 4.6 kg. The Corps of Engineers has developed a correlation between CBR and mm/blow. S-218 includes a dual mass hammer assembly, mm scale, assorted hand tools, 25 single-use cones, data reduction program diskette and manual.



S-218 in use

The Single Mass Cone Penetrometer, S-216, has a fixed 8-kg mass and is recommended for pavement sections with anticipated CBR values between 10 and 100. The kit includes the sliding mass assembly, mm scale to measure penetration, 25 single-use cones, data reduction program diskette and instruction manual.

S-216	Single Mass Cone Penetrometer	26.0 lb
S-218	Dual Mass Cone Penetrometer	35.0 lb

Replacement Parts

S-21601	Single Use Cones, pack of 25
S-21602	Adapter to connect Single Use Cone to shaft

Accessory Items

S-21802	Re-useable Cone, hardened, individual
S-21605	Carrying Case

Pocket Penetrometer

DGSI's Pocket Penetrometers are commonly used on split spoon and thin-walled tube samples to evaluate consistency and approximate unconfined compressive strength of saturated cohesive soils. They may also be used for the same purpose in freshly excavated trenches or test pits.

We offer two models of Pocket Penetrometers, each has the scale marked in kg/cm² and TSF (i.e., 1 kg/cm² = 1 TSF) and is supplied with a carrying pouch, operating and calibration instruction sheet.



(L-R) S-170 and S-170B

- The S-170 has a Delrin® body and laser etched markings on the scale.
- The S-170B has a nickel plated brass body and laser etched markings on the sliding scale.
- Both have the same stainless steel shaft and internal components.

An optional foot adapter is available for use with both models. This increases the piston area 16 times, making it suitable for use in very soft clays.

S-170	Pocket Penetrometer, Delrin™ body	1 lb
S-170B	Pocket Penetrometer, nickel plated body	1 lb
Related Item		
S-17010	Foot Adapter, 1 in diameter	

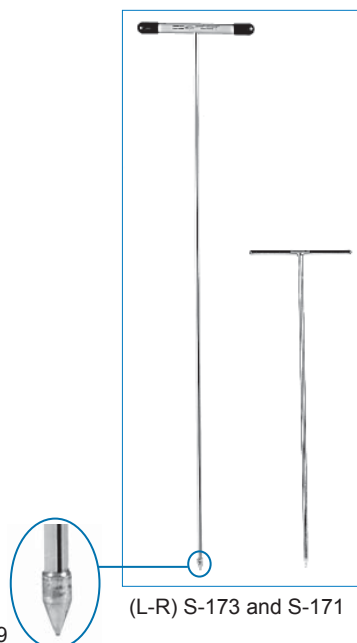
Probe Rods

Safe, non-conducting probe is ideal for locating irrigation, power and water lines. The shaft diameter is 1/2 inch and has a zinc tip and a 13 3/4-in Tee Bar Handle. The Steel Probe Rod is used to locate soft zones in and under compacted areas or sub grades, footing excavations, etc. The S-171 Steel Probe Rod has a 3-ft long shaft by 1/2-in. diameter. It is zinc plated.

S-171	Steel Probe Rod	5 lb
S-173	Fiberglass Probe Rod, 60 in	2.5 lb
S-17348	Fiberglass Probe Rod, 48 in	2.3 lb

Replacement Part

S-17399	Steel tip replacement for fiberglass probe rod
---------	--



(L-R) S-173 and S-171

S-17399

TORVANE®

The TORVANE is a hand held vane shear device for rapid determination of shear strength in cohesive soils either in the laboratory or the field. The TORVANE allows shear strength to be measured in the sides of test pits, trenches or excavations. It may also be used on the ends of thin wall or split spoon samples and soil chunks removed from test pits, etc. The TORVANE set includes three vanes with conversion dial and carrying case:



S-160

- **Standard vane** (0 to 1 kg/cm²): used for fully saturated cohesive soils with undrained strength independent of normal pressure. The stress range permits it to be used for clays varying in consistency from very soft to stiff.
- **Large vane** (0.2 kg/cm²): use with remolded samples
- **Small vane** (2.5 kg/cm²): for stiffer clays

The index mark on the dial will indicate the maximum shear value. This number must be multiplied by the vane ratio (1, 0.2 or 2.5) to obtain the actual shear strength.

S-160	Torvane Shear Measurement Device	1.0 lb
Replacement Parts		
S-16001	Vane Adapter, 2.5 kg/cm ² (small)	
S-16002	Vane Adapter, 1.0 kg/cm ² (standard)	
S-16003	Vane Adapter, 0.2 kg/cm ² (large)	

Torvane is a registered trademark of Durham Geo Enterprise, Inc.

Vane Shear Test Kit with Adapters

For operation in three sizes of pipe or casing.

The Vane Shear Test Kit has everything needed to obtain fast, accurate "in-place" shear readings to depths of 100 feet. Two torque wrenches are included in the kit with a high and low range for shearing soft, cohesive materials or heavier clays. Designed to accept standard AW drill rod.



DS-41003-16

DS-41003-16	Vane Shear Test Kit with Adapters. Complete Kit Assembly with Case	95 lb
-------------	--	-------

Vane Shear Test Kit with Calibrated Torque Head

For extreme accuracy and where extensive testing justifies additional equipment expense, the calibrated torque head is recommended. The high ratio geared head permits even angular rotation of the vane.

Readings are shown on a precision force gauge that features a maximum reading hand for precise accuracy without guess work! The torque arm has 3 positions for shearing soft, medium or stiff soils. The base is divided into 10 degree intervals for ease in recording data. Designed to accept standard AW drill rod.

DS-41003-3	Vane Shear Test Kit with calibrated torque head. Complete kit assembly with case.	204 lb
------------	---	--------

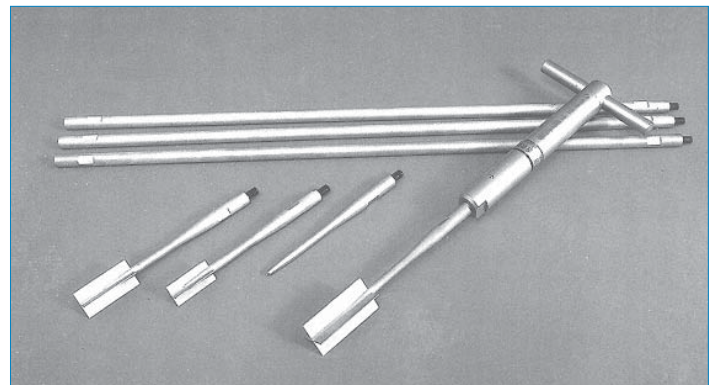
Hand Held Field Vane Shear Tester

The Vane Shear Tester takes direct readings of shear strength to depths up to 3 meters (10 ft). Three vane sizes allow for the direct determination of undrained shear strength of soft to stiff clays. The peak vane value is determined by a calibrated scale ring built into the head assembly. The tee handle is used both to push the vane to the desired test depth and apply the shearing torque.

To correct for the skin friction of the extension rods, a dummy probe replaces the vane and a skin friction test is performed adjacent to the vane test location.

The Field Vane Shear Tester includes:

- Torque Head Assembly
- Six Extension Rods, 50 cm long by 1 cm diameter
- Three Vanes, 16 x 32 mm, 20 x 40 mm, 25.4 x 50.8 mm, (0.63 x 1.25 in, 0.79 x 1.58 in, 1 x 2 in)
- Skin Friction Probe
- Double Ended Wrench and Leather Carrying Pouch



S-162

S-162	Hand Held Vane Shear Tester	12 lb
Related Items		
S-16201	Extension Rod, 50 cm x 1 cm	
S-16202	Vane, 16 x 32 mm, 0-200 kPa capacity	
S-16203	Vane, 20 x 40 mm, 0-100 kPa capacity	
S-16204	Vane, 24.4 x 50.8 mm, 0-50 kPa capacity	

DGSI Hand Augers

S-11008



S-11010

S-11012

S-11004



The DGSI Hand Auger with unique hard-faced and cupped blades is ideal for shallow holes in fine grained soils. Little effort is needed to turn the auger and advance the hole as the blade diameter exceeds the bucket diameter by 3/8 in to reduce friction. S-110 and S-111 Hand Auger Assemblies consist of an auger head, tee handle and an extension with quick connectors. A tee handle with rubber grips is optional (see right column).

- Heavy gauge, heat-treated carbon steel bucket for long life.
- Carbon steel auger heads, extensions and tee handle are zinc electroplated for rust resistance
- All-stainless steel hand auger assembly is available for environmental sampling
- A special "windowed" (open) bucket is available for use in sticky clay soils

S-110	3¼-in Standard Hand Auger Assembly	6 lb
S-11004	3¼-in Standard Hand Auger Assembly with (3) extra extensions	10 lb
S-110M	3¼-in Mud (Windowed) Hand Auger Assembly	6 lb
S-11004M	3¼-in Mud (Windowed) Hand Auger Assembly with (3) extra extensions	10 lb
S-111	3¼-in Stainless Steel Hand Auger Assembly	6 lb

Replacement Parts

S-11010	3¼-in Standard Auger Head with Connector
S-11020	Standard Tee Handle with Connector
S-11030	Standard 36-in Extension with Connector
S-11040	Standard Quick Connector
S-11050	3¼-in Standard Mud (Open) Auger Head with Connector
S-11110	3¼-in Stainless Steel Auger Head with Connector
S-11120	Stainless Steel Tee Handle with Connector
S-11130	Stainless 36-in Extension with Connector
S-11140	Stainless Quick Connect
S-11150	3¼-in Stainless Steel Mud (Windowed) Auger Head

Accessory Items

S-11008	2¼-in Standard Auger Head
S-11012	4-in Standard Auger Head
S-11021	Tee Handle with rubber grips
S-11048	2¼-in Mud (Windowed) Auger Head
S-11052	4-in Mud (Windowed) Auger Head
S-11099	Polycanvas Case for Hand Augers
S-11121	Stainless Steel Auger Tee Handle with rubber grips
S-11160	5/8-in Adapter, NC BX x BK Quick BX S/S
S-11170	3/4-in Adapter, NC BX x BK Quick BX S/S
S-11060	5/8-in Adapter, NC BX x BK Quick BX
S-11070	3/4-in Adapter, NC BX x BK Quick BX
S-11061	5/8-in Adapter, Male-to-Male, QC

Tee Handle with Rubber Grips

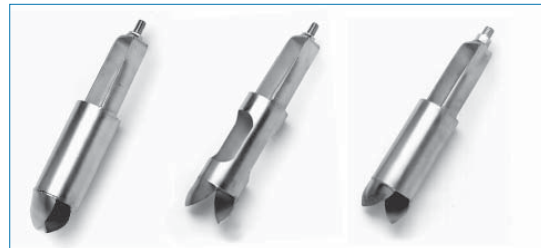
S-11021 is an optional Tee Handle for DGSI Hand Augers. The rubber grips provide added comfort and control.



S-11021

S-11021	Tee Handle	3 lb
---------	------------	------

AMS Hand Augers



AMS Regular, Mud and Sand Auger Heads

The AMS Hand Augers with threaded connections are available in models designed for regular, mud/clay and sandy soils as shown above. These Standard Augers are made with a stainless steel cylinder, formed carbon steel bail and hand forged, heat treated, high carbon steel bits. The bits dig in as the auger is turned and cut a hole from 3/8 to 3/4 inch (1-2 cm) larger than the cylinder to reduce the effort required. Available in nine cylinder sizes from 1½ to 6 in (3.8 to 15.2 cm), popular sizes are detailed in the table.

A threaded coupling is used to connect the auger head and cross handle to the extension. The Extensions are available in lengths of 3, 4 or 5 ft (91, 122 or 152 cm) and are made from strong, but lightweight, chrome molybdenum steel. Select from the available standard, rubber coated or ratcheting cross handles. Available in stainless steel.

S-11403	Regular Auger, 3¼ inch threaded, AMS	3 lb
---------	--------------------------------------	------

Accessory Items		
S-11433	AMS Extension, 3 ft, threaded	2 lb
S-11434	AMS Extension, 4 ft, threaded	3 lb
S-11435	AMS Extension, 5 ft, threaded	3 lb
S-11453	18-in Cross Handle, rubber ctd., ½ in threaded	2 lb
S-11454	16-in Cross Handle, ratchet, threaded	3 lb

For other sizes, please call.

Soil Color Chart Set

New water-resistant, washable color sheets are now standard in this improved Munsell Soil Guide. The guide has been developed in cooperation with the U.S. Soil Conservation Service guidelines for classifying colors of various soils. Can also be used for rocks, archaeological specimens, animal pelage and other natural products in this color range. The new Munsell guide comes in loose-leaf binder with waterproof, washable text pages. One Rite-in-the-Rain text page also features a small ruler for on-the-spot measuring. Matte color chips are mounted on 9 washable tabbed charts: 10R, 2.5YR, 5YR, 7.5YR, 2.5Y, and 5Y, plus two Gley (blue and green colors, and gray scale for submerged soils). Has two washable masks (black/gray). Illustrations of soil grain structures and charts for estimating proportions of mottles and coarse fragments, color name diagrams and instructions. Chart size: 4.25" x 7.25". Chip size 1/2" x 5/8".



S-176

S-176	Soil Color Chart Set	1.0 lb
Related Items		
S-17620	Soil Chart from above collection, specify hue	
S-17621	Supplementary Chart 7.5 R for tropical & semi-tropical soils, with color name diagram	
S-17623	Supplementary Chart Gley, submerged soils: weak chromas and neutrals on value levels 4/-7/, for hues 5Y, 5GY, 5G, 5BG & 5B, with color name diagram	

Field Classification Tester

The Classification Tester is used to obtain a quick estimate of unconfined compressive strength in the laboratory or the field. One common application is the testing of a trimmed portion of a split spoon sample taken during drilling operations. This tester has a 4 1/4 in (10.8 cm) dial face with graduations in pounds and kilograms, and a maximum load pointer. The testing capacity is 350 lb with an accuracy of $\pm 1\%$. The body is made from cast aluminum, with the base plate drilled for bench mounting.



S-165

S-165	Field Classification Tester	32.0 lb
Related Item		
S-16510	Calibrated springs to provide given loads at predetermined heights	

Drive Pin Hammer for Nuclear Gauges



(L-R) N-205 and N-210



N-200

The Drive Pin Hammer is designed to safely and efficiently prepare probe transmission holes for density testing with nuclear gauges. Using a drive pin and sledge hammer to make probe holes can be tiring and difficult, especially in cohesive and rocky soils. The Drive Pin Hammer is designed to eliminate these problems.

The Drive Pin Hammer uses a sliding weight to strike an anvil to drive the probe to the desired depth. The operator stands rather than stooping to drive the pin. A stop at the upper end of the shaft allows the impact hammer to be used as a convenient extraction tool. Two handles are provided for safety and ease of operation. The all-steel construction is zinc-plated to resist rust.

N-200	Drive Pin Hammer	23.0 lb
N-210	Forged Steel Drive Pin and Extraction Rod	2.0 lb
Related Item		
N-205	Aluminum Footplate	7.0 lb

Leak Test Kit for Nuclear Gauges

Radioactive material license regulations require that the sealed sources used in nuclear moisture/density gauges be "leak tested" either once or twice a year (depending on the governing agency in your area) to ensure that the radioactive material is secure in the source capsule and is not leaking. These leak test kits contain all the necessary materials for performing the test as well as materials and instructions for mailing the obtained sample to the proper facility for analysis and certification.

N-400	Leak Test Kit	1.0 lb
-------	---------------	--------

Density Drive Sampler

ASTM D 2937

AASHTO T 204

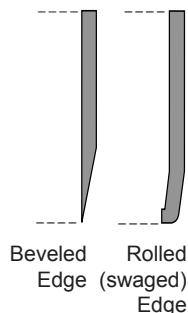
The Density Drive Sampler is used to determine the in-place density of soil by driving a thin-walled tube to obtain a soil sample of known volume. The Sampler consists of a zinc-plated steel drive head and sliding 10-lb hammer. The drive head is provided with a shock spring. Wall thickness is .083 in.

Drive tubes are zinc plated and are available in three sizes:

- 2 in x 6.25 in (0.01 ft³)
- 3 in x 2.75 in (0.01 ft³)
- 4 in x 5 in (0.033 ft³)

Note: Only 4-in tube meets ASTM D 2937

Note: Because of the difficulty sometimes encountered with sample removal from the tube, swaged end tubes are not recommended in stiff soils.



(L-R) S-103, S-104



S-104 in use

Sand Cone Apparatus

ASTM D 1556 AASHTO T-191

The Sand Cone Apparatus is used to determine the in-place density of any soil that can be excavated to a stable condition with hand tools. This method is generally limited to materials with a maximum particle size of 2 in (5.1 cm).

The Sand Cone Density Apparatus consists of a one-gallon plastic container and a 6 1/2 in (16.5 cm) detachable metal cone with valve.

The cone assembly is corrosion resistant. The Density Base Plate, also shown in the picture, provides a stable base for the Sand Cone. A center flanged 6 1/2 in (16.5 cm) diameter hole receives the standard Sand Cone Funnel (S-120). The center hole may also be used as a template to gauge the diameter of the test hole. The flanged Density Base Plate also helps in preventing loss of soil removed from the test hole. It is made from cast aluminum alloy. Size 12 x 12 in (30.5 x 30.5 cm).

Ottawa Density Sand is used with the Sand Cone Density Apparatus to determine the volume of the excavated test hole.



S-120, with S-121

S-120	Sand Cone Apparatus, 6.5 in	2 lb
S-12000	Sand Cone Density Kit: (includes 1 ea) S-120 Sand cone and jug, S-121 Field density plate, S-127 Plastic jug for sand cone, G-29201 Small round bottom scoop, 2 D x 5 L (No. 0), G-510 Rubber mallet, G-29101 SS Sampling spoon, GW-130 Field scale (36 lb), G-515 1-in steel chisel, G-311 Field can (gallon, 12 ea) and 2190B Density sand, (50 lb, 2 ea, paper bag). Carrying case included.	

S-121	Density Base Plate	5 lb
S-125	Ottawa Density Sand (100 lb), w/ vinyl bag	105 lb
2190B	Sand, paper bag	50 lb

Related Items

S-127	One Gallon Plastic Container
S-147	6 g Speedy 2000 w/ 200 g Balance & Plastic Case
S-142	20 g Speedy 2000 w/ 200 g Balance & Plastic Case
G-500	Density Pick/Hammer
G-515	Steel Chisel
G-29101	Sampling Spoon
G-29001	Brush
GW-130	Field Scale, 36 lb capacity
GW-50030	Electronic Balance, 15 Kg (30 lb)
GW-50099	Carrying Case for GW-50030
G-510	Rubber Mallet
GW-115	Triple Beam Scale, 2610 g capacity
G-311	Field Can, 4 qt capacity

S-103	Density Drive Sampler with 3-in Head	22 lb
S-104	Density Drive Sampler with 4-in Head	23 lb

Related Items

S-10220	Drive Tube, 3 in (7.6 cm) dia. (0.01 ft ³ vol), Beveled, Box of 10
S-10230	Drive Tube, 4 in (10.2 cm) dia. (0.033 ft ³ vol), Beveled, Box of 10
S-10220A	Drive Tube, 3 in dia., Swaged end, Box of 10
S-10230A	Drive Tube, 4 in dia., Swaged end, Box of 10
DS-610	Plastic Cap, 2 in
DS-630	Plastic Cap, 3 in
DS-634	Plastic Cap, 4 in
S-35710	Straight Edge
GW-115	Triple Beam Scale & Weights, 2610 g.
GW-11905	Plastic Carrying Case for GW-115
GW-2600	Compact Digital Scale, 2600 x 0.1 g, AC/Battery
GW-26099	Carrying Case for GW-2600 Scale

Balloon Density
Available upon request

Moisture Testing Kits

ASTM* D 4944 AASHTO T 217

* See Standards Buyer's Guide at www.DGSI.info/3000.



S-142

Determine the moisture content as percent water of most soils in about 3 minutes. The measured sample is placed in the pressure chamber with calcium carbide reagent. The water in the soil and the reagent react to produce acetylene gas. The gauge reads the percent water content from 0-20% based on weight with an accuracy of 0.5%.

The original Moisture Testing Kit (S-142) is comprised of a large, highly polished pressure chamber with dial gauge for 20 g samples, a 200 g electronic balance, cleaning brushes, cloth and measuring scoop packed in a sturdy plastic case.

The 20 gram Aqua-Check (S-142A) is similar but is supplied with a tough wear-resistant coated canister instead of the polished one that is supplied with the S-142.

Moisture testing kits are available in two sizes, 6 gram for fine grained materials and powders and 20 gram for sand, aggregates and lumpy materials. Reagent and calibration kit are available separately.

DGSI maintains a full line of repair parts, accessories and service for the Testing Kits.

S-147	6 g Speedy® 2000 w/ 200 g balance and plastic case	14 lb
S-142	20 g Speedy® 2000 w/ 200 g balance and plastic case	18 lb
S-142A	20 g Aqua-Check w/ 200 g balance and plastic case	18 lb

Related Items

S-144	Calcium Carbide Reagent, 24 x 1-pint cans*
S-145	Calibration Kit
S-14144	Pulverisers, 1-1/4 in (3.2 cm)
S-14044	Pulverisers, 5/8 in (1.6 cm)

* Keep Calcium Carbide sealed and dry as it forms acetylene gas when wet. Use only in ventilated area. Shipment made only by surface truck or authorized hazardous material carrier.



(L-R) 20 g and 6 g canisters

Parts, Repair and Calibration for Speedy® Moisture Tester

DGSI is an authorized repair and calibration facility for Speedy Moisture Devices.

DGSI maintains a spare parts inventory for the 6 and 20 gram Speedy Moisture Devices. A limited number of parts are shown here. Contact us for your specific needs.

VM-620	Speedy Moisture Tester Calibration (6 or 20 g version), per ASTM standard, (1/2 division)
VM-625	Speedy Moisture Tester Calibration (6 or 20 g version), (1/4 division)

Most Commonly Used Parts

S-14001	Top screw
S-14005	Rubber Washer
S-14012	Gauge Type D.2 - 0-20%
S-14020	Measuring Scoop
S-14022	Cleaning Cloth
S-14030	6 g Brush
S-14117	Brass Weight, 10 g
S14130	Large Brush
GW-205	Replacement Scale for S-142

Portable Soil Resistivity Meter

ASTM G 57-78

AASHTO T 288

The S-298 Soil Resistivity Meter is a battery operated, solid state device to evaluate ground conductivity as well as a tool for performing shallow subsurface surveys. Useful in many field studies such as geotechnical site characterization, soil conductivity for corrosion potential and groundwater depth or extent of contamination. Range from 0.01 ohm to 1.1 megohm in 8 ranges with 10% overlap on all ranges. Can be used with 4-, 3-, or 2-pin methods. Single 100 division dial balance for easy readability.

Rugged, weatherproof case protects instrument that weighs 7.5 lb and measures

9 (L) x 6 (W) x 8 (D) in.

Powered by one 12-V lantern battery.

The S-298 Soil Resistivity Meter includes: Instrument in rugged carrying case with shoulder strap, four electrode rods, cable storage reel and four lengths of cable (5, 25, 45, or 65 ft).

The S-297 Soil Moisture Box is made of plexiglass. Inside dimensions are 1.5 in W x 8.75 in L x 1.5 in deep. Capacity: 323 ml

For detailed specifications, see www.DGSI.info/3092.



Soil Resistivity Meter only.



S-297

Blast and Vibration Monitoring



FS-700

Instantel's MiniMate Plus™ is a compact, full-featured, advanced vibration and overpressure monitor. It provides manual, single-shot, continuous, and programmed waveform recordings and histogram recordings. Key features include:

- * Compact size with easy-to-use keyboard and display.
- * Autocall Home feature transfers event data from the field to the office via cell, satellite, RF, GSM, or phone modems.
- * Histogram Combo mode allows full waveform recording while in histogram mode.
- * Sample rates from 1 to 16K samples per second for each channel, and up to 65K samples per second for a single channel.
- * Stores 300 one-second waveform events or 1500 events with memory upgrade.
- * Stores 46K histogram intervals.
- * Available 8 channel option allows simultaneous recording of two microphones and two geophones.
- * Zero dead-time between events.
- * Individually configurable channels.

For detailed specifications, see www.DGSI.info/3091.

S-298 K	Soil Resistivity Meter Set, with Nilsson 400, cable, 24 lb reel, and 4 electrodes	24 lb
RNTL-NEL400	Monthly rental for FR-400	

Replacement Parts

S-29800	Meter only	
S-29805	Wire head only (reel-to-meter)	
S-29801	Copper soil pin	
S-29802	Cable reel with cable and wire leads	

Accessory Items

S-297	Soil moisture box (large)	8 lb
S-29750	Soil moisture box (small)	7 lb

FS-700	MiniMate Plus™ Base Unit (w/o microphone). Built-in three-axis seismic transducer, 300 event capacity, 4 channels, AC power, charger, RS-232 cable, compliance module software, manual and case.	5 lb
FS-705	MiniMate Plus™ Base Unit to use external sensors: (w/o sensors or microphone), 300 event capacity, 4 channels, AC power, charger, RS-232 cable, compliance module software, manual and case.	5 lb
FS-710	Stand, 3-axis transducer	3 lb
FS-714	Microphone Assembly, Linear, Range 100 to 142 db, w/2 m cable	3 lb
FS-715	Microphone Assembly, A Weight, Range 50 to 110 db, w/2 m cable	3 lb
FS-720	Advance Module Software. Requires MS Windows 3.1 or higher	3 lb

Sand Content Set

For determining the sand content of drilling fluid. The Set contains a sand screen (a sieve mounted in a plastic cylinder, 2¼ in dia x 3¾ in L), a plastic funnel that fits over the end of the screen cylinder with a small end fitting into a glass measuring tube and a wash bottle. The measuring tube has a scale that is graduated from 0 to 20% to measure percentage of sand by the volume of drilling fluid.



DE-11600

DE-11600 Sand Content Set

3.0 lb

Sample Jars

Glass jars have a white threaded metal cap with inner waxed liner.

Capacity: 8 oz; 1½ in. dia. x 5¼ in. H. Box of 12.



G-305

G-305 8 oz Sample Jar, Box of 12 w/Caps

8.0 lb

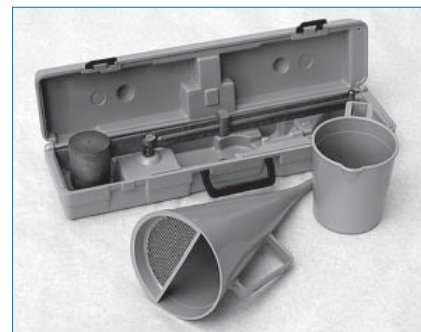
Related Items:

G-30510 Lid for G-305

Marsh Funnel Viscometer

The 1000 cc high-impact plastic measuring cup, which is graduated in cubic centimeters and fluid ounces, is designed specifically for use with the Marsh Funnel Viscometer. Lines are molded in at 350 ml and 1 quart (32 fl oz) to aid in these tests. The funnel's metal orifice assures accurate readings.

Durable, break resistant construction. Resists temperature change and maintains volumetric accuracy. Consists of a base, graduated arm and cup, lid, knife edge, rider, built in spirit level, and a counterweight. Plastic carrying case provided.



DE-11000

DE-11000 Marsh Viscosity Kit

6 lb

DE-11010 Marsh Funnel

DE-11020 Marsh Funnel Cup

DE-11500 Mud Balance with Case

Thin-Walled Sampling ("Shelby") Tubes

ASTM D 1587

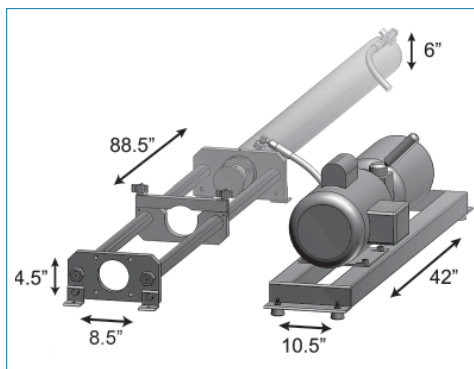
Shelby tubes are packaged 9 per box but sold individually.

Diedrich 2 x 24-in Heat Treated (HT) Heavy Duty ("Lynac") Split-Spoon Samplers are available. See www.DGSI.info/30089

Tube Dia. (in)	2		2.5		3					
Tube Length (in)	30	36	30	36	10	12	18	24	30	36
Galvz. Tube (ea)	DS-15130	DS-15136	DS-15230	DS-15236	DS-20035	DS-15312	DS-15318	DS-15324	DS-15330	DS-15336
E Head Ass'y	N/A		N/A		DS-20037	DS-20037	N/A			
AW Head Ass'y	DS-171		DS-172		DS-173					
AWJ Head Ass'y	DS-171J		DS-172J		DS-173J					
Plastic Caps	DS-610		DS-620		DS-630					

Sample Extruder

The DGSI Sample Extruder will efficiently extrude samples up to 3 x 36 inches from Shelby tubes. It is powered by a 2-hp electric motor driving a hydraulic ram with 38 in (96.5 cm) of travel and a force of up to 11,000 lbf (49.5 kN). It extends at a rate of 52 in/min (133 cm/min).



S-240

Designed for bench mounting, an optional leg assembly allows it to be free standing. An adapter set is available for use with 2 in (5.1 cm) sample tubes.

The unit can be adapted for mounting on truck-mounted drill rigs and be powered by the drill's hydraulic system.

S-240*	Sample Extruder, 2 hp, 120 V, 60 Hz	295 lb
S-240X	Sample Extruder without pump and motor	

Accessories:

S-24010	Leg Assembly
S-24020	2 in (5.1 cm) Adaptor Set
S-24030	Sample tray for extruded samples (30 in)

*Other voltages available.

Also available: Static compactor/extruder (S-242) to compact 2.8-in x 5.6-in specimens (AASHTO T 307). See page 30.

Permeability and Triaxial Shear Test Equipment

ASTM D 5084, D 2850, D 4767
AASHTO T 296, T 297

The DGSi permeability and triaxial test panels provide excellent quality for all applicable ASTM tests. They are built with a light-weight, durable aluminum frame. Standard features include acrylic burette housings, plated quick-connect fittings, standard brass compression fittings and pressure-rated poly tubing for all plumbing.

! For permeability / triaxial testing you will need the following sources:

- Clean, dry, air
- Drain
- Water supply
- Vacuum



The S-502 Extension Panel offers two additional test positions (cells) when connected to an S-500 master panel.



S-500 Master panel for one test cell. Shown with membranes, permeability cell and deairing tank (sold separately).



Close-up of the differential regulator (E-656) which is unique to the DGSi permeability / triaxial panel.

! Answer the following before making your selection.

- What type of test(s) will you be performing?
 - Triaxial?
 - > Unconsolidated Undrained, (UU)?
 - > Consolidated Undrained, (CU)?
 - > Consolidated Undrained, (CU) with pore pressure?
 - Permeability?
 - Triaxial and permeability?
- What size samples will you be testing?
- How many simultaneous tests will you be performing?

Typical equipment / setup for permeability testing

Vacuum

Vacuum Pump, G-402*



*Part number suitable for 110 V, 60 Hz power source. Other models available.

Deairing

Deairing tank, S-505

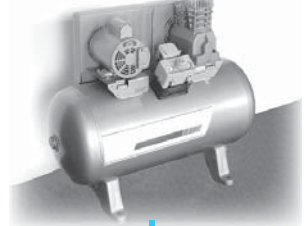


Pressure / vacuum

Water in / out

Air Supply Sources

Air Compressor, G-410*



Filter / Regulator, G-41020



Air Dryer, G-420*

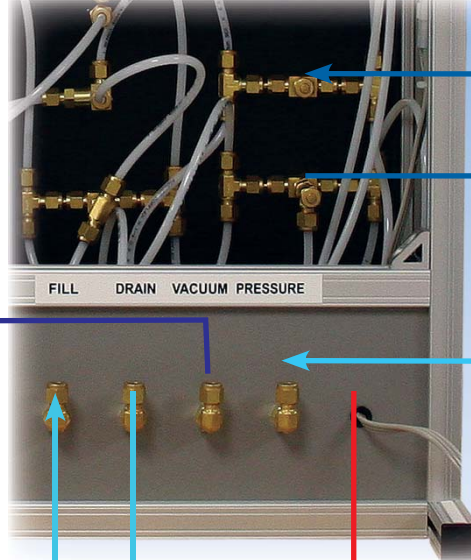


*Part number suitable for 110 V, 60 Hz power source. Other models available.

S-500 Permeability Panel



Rear view of S-500 Permeability Panel

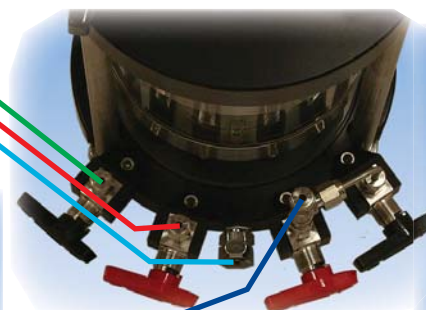


Water in

Water out (drain)

Electrical Outlet

Chamber Water (blue)
Bottom Sample (red)
Top Sample (green)



Top view of
Permeability Cell, S-480



Smart Digital Indicator, E-405



Pore Pressure Transducer, E-124

Permeability Cell, S-480

Permeability and Triaxial Test Sets

DGSI Test Sets are available with many different options to accommodate most situations. These sets offer a convenient way to select products as might be the case for new laboratories or new set-ups.

To obtain a quote on one of the following test sets, please first know what size samples you will be testing and what type of test you will be performing.

Permeability Test Sets

S-480-1P	One-Position Permeability Set with S-480 Permeability Cell
S-480A-1P	One-Position Permeability Set with S-480A Permeability Cell
S-480-3P	Three-Position Permeability Set with S-480 Permeability Cells
S-480A-3P	Three-Position Permeability Set with S-480A Permeability Cells
S-480-5P	Five-Position Permeability Set with S-480 Permeability Cells
S-480A-5P	Five-Position Permeability Set with S-480A Permeability Cells

Contents of Permeability Test Sets		S-480-1P	S-480A-1P	S-480-3P	S-480A-3P	S-480-5P	S-480A-5P
E-124	Pore Pressure Transducer, 0-150 psi (1034 kPa)	1	1	1	1	1	1
E-405	Smart Digital Indicator, 5 digits	1	1	1	1	1	1
S-480	Permeability Cell, stainless steel cap and pedestal, 2.8 in (71 mm)	1	-	3	-	5	-
S-480A	Permeability Cell, brass valves, acrylic cap and pedestal, 2.8 in (71 mm)	-	1	-	3	-	5
S-500	Permeability / Triaxial Master Panel, 110 V*	1	1	1	1	1	1
S-502	Permeability / Triaxial Extension Panel	-	-	1	1	2	2
S-505	Deairing Water Tank	1	1	1	1	1	1

Triaxial Shear Test Sets

S-510-1P	One-Position Triaxial Shear Set with S-510 Triaxial Cell
S-510A-1P	One-Position Triaxial Shear Set with S-510A Triaxial Cell
S-510-3P	Three-Position Triaxial Shear Set with S-510 Triaxial Cells
S-510A-3P	Three-Position Triaxial Shear Set with S-510A Triaxial Cells
S-510-5P	Five-Position Triaxial Shear Set with S-510 Triaxial Cells
S-510A-5P	Five-Position Triaxial Shear Set with S-510A Triaxial Cells

Contents of Triaxial Shear Test Sets		S-510-1P	S-510A-1P	S-510-3P	S-510A-3P	S-510-5P	S-510A-5P
E-124	Pore Pressure Transducer, 0-150 psi (1034 kPa)	1	1	1	1	1	1
E-405	Smart Digital Indicator, 5 digits	1	1	1	1	1	1
S-500	Permeability / Triaxial Master Panel, 110 V*	1	1	1	1	1	1
S-502	Permeability / Triaxial Extension Panel	-	-	1	1	2	2
S-505	Deairing Water Tank	1	1	1	1	1	1
S-510	Permeability Cell, stainless steel cap and pedestal, 1.4 to 2.8 in (36 to 71 mm)	1	-	3	-	5	-
S-510A	Permeability Cell, brass valves, acrylic cap and pedestal, 1.4 to 2.8 in (36 to 71 mm)	-	1	-	3	-	5

* Other voltages available. Contact DGSI for more details.

How To Order

Step 1. Select Permeability and/or Triaxial Cells

ASTM* D 2850, D 4767, D 5084 AASHTO* T 296, T 297

* See Standards Buyer's Guide at www.DGSI.info/3000.

The DGSI Triaxial and Permeability Cells are designed to accommodate samples with diameters from 1.4 to 12 in (35 mm to 305 mm). They feature no-volume-change valves and removable base pedestals to accommodate various sample sizes and the piston housing features linear bearings for reduced friction. Two top and two bottom drainage lines are provided with through-base-sealing to avoid air traps.

S-480 is the standard model for testing test specimens up to 4-in diameter and about 6-in in length. It is equipped with both 1.4 and 2.8-in cap and pedestal set made of series 303 stainless steel (SS). In addition, the valves are stainless steel and tubing is Teflon. These are for customers that might be testing material where the permeant is corrosive or they need to test both 1.4 and 2.8-in specimens. Finally, the customer may decide on the standard models because the SS valves will not tarnish with age. Note: If the permeant is corrosive the customer will require the S-470 permeant interface device to protect the control panels.

Designed to provide outstanding service and performance. The cells have hard-coated, black anodized aluminum bases and cell tops, while remaining parts are made of stainless steel, brass or acrylic.

Measuring changes of the test specimen length during testing:

- S-500 series triaxial cell equipped with bracket for mounting dial indicator (E-814) or displacement sensor LDT E-311.
- S-480 series triaxial cells do not have that provision. To measure height change during testing, use S-500 series triaxial cells.

When using corrosive permeants, always select permeability cells with stainless steel valves. In addition, the Permeant Interface Device, (S-470) is recommended to prevent the permeants from entering the panels. See page 26 for details.

Note: All cells include cap and pedestal set (sizes and type below), one pair of porous stones, two plastic discs, Nylon tubing and O-rings.

Item #	Cell Type		Accessories Supplied	Cap and Pedestal		Valves		Can Accomodate	Shipping Weight
	Permeability	Triaxial	Inches (mm)	Acrylic	Stainless Steel	Brass	Stainless Steel	Inches (mm)	lb
S-480A	✓		2.8 (71)	✓		✓		1.4 to 4.0 (36 to 102)	16
S-483A	✓		3.0 (76) (extended chamber)	✓		✓		1.4 to 4.0 (36 to 102)	21
S-480	✓				✓		✓	1.4 to 4.0 (36 to 102)	16
S-510A	✓	✓	2.8 (71)	✓		✓		1.4 to 2.8 (36 to 71)	21
S-510	✓	✓	1.4 (36), 2.8 (71)	✓			✓	1.4 to 2.8 (36 to 71)	21
S-511	✓	✓	4.0 (102)	✓			✓	1.4 to 4.0 (36 to 102)	35
S-516	✓	✓	6.0 (152)	✓			✓	2.8 to 6.0 (71 to 152)	58
Special Order Products (Contact DGSI for details)									
S-484	✓		6.0 (152)		✓		✓	2.8 to 6.0 (71 to 152)	58
S-485	✓		12.0 (305)		✓		✓	4.0 to 12.0 (102 to 305)	78
S-518	✓	✓	12.0 (305)	✓			✓	4.0 to 12.0 (102 to 305)	78
Resilient Modulus Testing Cell (See p. 26 for more info)									
S-517	✓	✓	6.0 (152)		✓		✓	4.0 to 6.0 (102 to 152)	56
Related Items for Cell Types (optional)									
S-51001	Triaxial Cell Top w/ Loading Rod				S-51050	Resilient Modulus Kit for S-510 cell			
S-51003	Converts S-480/S-480A -to- S-510/S-510A. includes triaxial cell top, chamber (10¾ in long) and tie rods				S-51150	Resilient Modulus Kit for S-511 cell			



S-511 Triaxial and Permeability Cell



S-480 Permeability Cell shown with a Pore-Pressure Transducer (sold separately).



Know the following before making your selection:

- Will you be performing triaxial tests, permeability tests, or both?
- What size samples will you be testing?
- How many simultaneous tests will you be performing?

Step 2. Choose your panel(s)

Note: Select the type and quantity of each panel based on the number of cells needed for simultaneous testing. One S-500 panel can support up to two S-502 extension panels. The S-502 extension panels cannot operate independently from the S-500. All DGSI panels are built with quality gauges, valves, and fittings. Contact DGSI to request a quote to meet your needs.

The DGSI master panel (S-500) and extension panel (S-502) control the pressure and permeant flow to and from the triaxial or permeability cell. The S-500 contains the main operation panel which includes air and vacuum gauges to monitor the main supply, de-airing tank fill, vacuum, and pressure controls, an auxiliary vacuum port, and a pressure transducer and digital readout with a selector valve for monitoring pressure to each burette.

Each cell being tested requires three individual burette assembly used to monitor the cell pressure, sample bottom pedestal, and sample top cap. The S-500 can supply one cell and the S-502 can supply up to two cells. The S-502 is connected to the S-500 using tee fittings and tubing from the back of the S-500 panel. Pressure readings from the S-502 are displayed on the S-500 readout via momentary switches.

Each burette assembly is constructed with acrylic tube and top and bottom blocks with stand-off fittings for easy removal to clean or service as needed. A standard glass pipette (25 ml with 0.1 ml markings) is supplied inside each burette assembly. Optional pipettes of 10ml, 5ml, or 1ml are available upon request. All pipette markings are factory calibrated.



S-500 Permeability / Triaxial Master Panel

Item	Description	Cells / Panel
Master Panels:		
S-500	Permeability / Triaxial Master Panel, 110 V	1
S-50010	Permeability / Triaxial Master Panel, 220 V	
S-50033	Permeability / Triaxial Master Panel, 300 psi (CE Compliant)	1
Extension Panel:		
S-502	Permeability / Triaxial Extension Panel (S-500 Required)	2
Optional:		
442001	10 ml burette assembly	

Specifications	S-500 and S-50010
Air Regulators:	(3) Precision bleed-type, 0.1 cfm (0.00005 m ³ /s), 0.2 psi (1.4 kPa) stability. (1) Precision bleed-type differential, 0.1 cfm (0.00005 m ³ /s), 0.2 psi (1.4 kPa) stability.
Burettes:	(3) Fitted with 25 ml pipettes, 0.1 ml graduations.
Mechanical Gauges:	(1) Vacuum gauge, 0-30 in Hg (0-760 mm Hg). (1) Supply pressure gauge, 0-300 psi (0-2068 kPa)
Digital Readout:	(1) With pressure transducer calibrated to read 0-150 psi (0-1034 kPa), sensitivity to 0.1 psi (0.7 kPa). Sensitivity 0.2%. Self calibrates every 4 secs. Calibration held in non-volatile memory.
Rotary Valve:	(1) 4 positions enables each regulator to be read individually to allow burette pressure setting. 4th position for connecting to the S-502 Extension Panel.
Special Valve:	Allows filling of annulus of burette, pipette or both
Working Pressure:	150 psi (1034 kPa) maximum
Required Utilities:	Air, water, vacuum and drain all provided with 1/4-in tubing connectors located on back panel.
Construction:	Durable aluminum frame with sturdy plastic sides. Hard coated aluminum front panel with screen printed text. All valves are no-volume change-type.
Dimensions: (W x D x H)	25 x 7 3/4 x 37 1/2 in (63.5 x 20 x 95 cm) Footprint: 25 1/4 x 15.5 in (64 x 39 cm)
Ship. Vol.	15 ft ³ (0.425 m ³)
Ship Weight:	70 lb (32 kg)

Specifications	S-502
Air Regulators:	(4) Precision bleed-type, 0.1 cfm (0.00005 m ³ /s), 0.2 psi (1.4 kPa) stability. (2) Precision bleed-type differential, 0.1 cfm (0.00005 m ³ /s), 0.2 psi (1.4 kPa) stability.
Burettes:	(6) Fitted with 25 ml pipettes, 0.1 ml graduations
Momentary Valves:	(6) Situated above each air regulator to permit pressure to be set and monitored by the S-500 Digital Pressure readout.
Manifold Block:	6-way, with tubing to connect to the S-500 Rotary Valve
Special Valve:	Allows filling of annulus of burette, pipette or both
Working Pressure:	150 psi (1034 kPa) maximum
Required Utilities:	Air, water, vacuum and drain all provided with 1/4-in tubing connectors located on back panel.
Construction:	Durable aluminum frame with sturdy plastic sides. Hard coated aluminum front panel with screen printed text. All valves are no-volume change-type.
Dimensions: (W x D x H)	36.4 x 15.8 x 36.8 in (92.5 x 40 x 93.5 cm)
Ship. Vol.	17 ft ³ (0.481 m ³)
Ship Weight:	100 lb (45 kg)

Step 3. Select Utilities for Panel

Selection of proper permeability/triaxial support equipment is essential for ensuring proper panel operation and accurate results. DGSI panel setups require a suitable deairing tank, vacuum pump, compressed air and accessories for proper operation. Clean, dry air and vacuum sources are strongly recommended to maintain consistent performance. Consider adding a vacuum pump water trap kit (G-39620), air dryer w/oil extractor (G-420), and a filter regulator (G-41020) to maximize panel efficiency.

Nold Water Deaerator

The self-contained Nold deairing system deairs six liters of water to less than 0.5 ppb dissolved oxygen in 4 min. It operates by mechanical agitation with the application of a vacuum. The agitation / vacuum system is significantly more efficient than conventional methods using heat-boiling methods. The system uses a 0.02 hp electric motor and is great for labs that have to perform tests quickly. Dimensions: 7.5 in x 7.5 in x 20 in (19 x 19 x 51 cm).



S-530

S-530	Nold Deaerator Water System, 115 V	19 lb
S-530-A	Nold Deaerator Water System, 220 V	19 lb

⚠ Permeability / Triaxial Panels require the following:

- Deairing Tank • Vacuum Pump • Water
- Drain • Clean, Dry, Compressed Air

Deairing Water Tank

The chamber is 6-in dia. by 16-in high and is made from clear, cast acrylic. The head and base are anodized aluminum and are connected by stainless steel tie rods. The head has two fittings, one to allow a tube to pass through to the bottom of the chamber for filling and extracting water, and the other to allow connection to a vacuum pressure source.



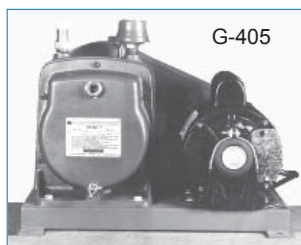
S-505

S-505	Deairing Water Tank	13 lb
-------	---------------------	-------

Vacuum Pumps

Models G-400 and G-405 are designed for laboratory distillation, filtration, degassing, vacuum deposition and as roughing pumps in high vacuum systems.

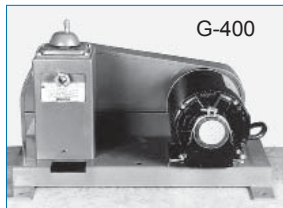
The relatively low pump operating speeds and large oil reservoirs ensure long and trouble-free operation. Both pumps are mounted on rectangular steel base plates and have V-belts and guards. They are supplied with a quart of oil.



G-405



G-402



G-400

Specifications:	G-400	G-402	G-405
Drive type	Belt driven	Direct drive	Belt driven
Voltage*	115 V, 60 Hz*	110 V, 60 Hz*	115/230 V, 60 Hz
Vacuum capacity	3 x 10 ⁻⁴ Torr	1 x 10 ⁻⁴ Torr	1 x 10 ⁻⁴ Torr
Free air capacity	0.35 cfm	3 cfm	2.8 cfm
Motor power	1/4 hp	1/3 hp	1/2 hp
Operating speed	350 rpm	1725 rpm	525 rpm
Inlet fitting	3/8 NPT	1/4 barb	7/8 NPT
Oil capacity	1 qt	26.4 oz	1.5 qt
Length	18½ in	15½ in	17¼ in
Width	10 in	6½ in	11½ in
Height	10¾ in	11¼ in	13 in
Weight	44 lb	28 lb	40 lb

(*) Other voltages available

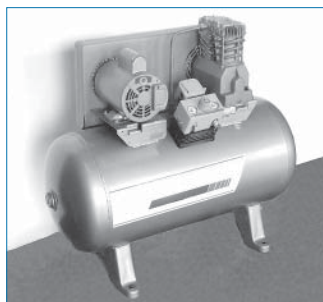
Related Items for Vacuum Pumps (Optional)

Item	Description	Purpose
G-39620	Vacuum Water Trap Kit	Used to keep condensate out of vacuum pump
G-40020	Vacuum Pump Oil, 1 US gallon	Pump maintenance
G-40030	Vacuum Regulator Gauge and Filter Assembly	Used to regulate vacuum flow
G-40050	Vacuum Pump Flushing Oil, 1 US gallon	Pump maintenance
G-409	Vacuum Bleed Valve	To bleed off vacuum on system
G-40910	Tubing, Vacuum, 3/8 in ID x 1/4 in wall (sold per foot)	To connect vacuum pump to panel
G-40911	Tubing, Vacuum, 1/4 in ID x 1/2 in OD (sold per foot)	To connect vacuum pump to panel

Step 3 (Continued). Select Utilities for Panel

Air Compressor

The G-410 air compressor provides 6.2cfm @ 100psi, with a maximum of 10.3cfm. It features a cast iron crankcase and cylinder with needle roller bearings for extended life. The G-410 conforms to CA code 462 (L) (2). See chart for specifications.



G-410

Heavy Duty Air Compressor

The G-414 air compressor provides 17.1cfm @ 175psi, with a maximum of 21.1cfm. It features a gear driven oil pump for long life and low RPM for cooler operation and longer valve life. The tank is provided with three feet that may be anchored. See chart for specifications.



G-414

Air Compressor (Select One)

	G-410	G-41010	G-414	G-415*
Tank Size (gallons)	30, horizontal	30, horizontal	80, vertical	80, vertical
Hp / Voltage	2 Hp, 110 V, 60 Hz	2 Hp, 230 V, 60 Hz	5 Hp, 208-230 V, 60 Hz, 1 ph	5 Hp, 460 V, 60 Hz, 3 ph
Stages	1	1	2	2
Outlet (inches)	1/4 NPT, male	1/4 NPT, male	3/4 NPT, female	3/4 NPT, female
Preset (on/off)(psi)	95/125	95/125	145/175	145/175
Weight	195	195	593	593
Dimensions (inches) (LxWxH)			33 x 25 x 79	33 x 25 x 79
CFM	6.2	6.2	17.1	17.1

*Other voltages available.

Compressed Air Dryer

Remove water vapor and oil from compressed air supplies with this chiller. Non-cycling, 1/6 hp motor operates continuously at 175 psi or less. Comes with power-on and high-air temperature indicators and 3/8-in NPT fittings. Dimensions (HxWxD): 14 x 16 x 15 in. (36 x 41 x 38 cm).



G-420

Extractor with Regulator and Gauge

The G-41020 is mounted in-line with the air compressor to help remove oil and water droplets. Includes a pressure gauge, regulator and a wall mounting bracket.



G-41020

Related Items for Air Supply (Optional)

Item	Description	Purpose
G-420	Air dryer with oil extractor	Drops air temp. to - 4 °F, removing moisture and oil particulates.
G-42001	Air dryer only (No oil extractor)	Drops air temp. to - 4 °F, removing moisture.
G-41020	Extractor with regulator, gauge and bracket	Regulates air flow to panel and extracts particulates from the air source.

Balston Filter

Designed to remove oil and water droplets as well as solid particles. Allows a flow of 20 scfm at 100 psig with a pressure drop of <1 psi. Filter retention efficiency 93% at 0.1 micron.



G-425

Moisture Absorbent (Desiccant)

Model G-430 is a blue desiccant material that turns pink when spent. User can replace or revive the granular material by drying at 200 °C for one hour. Net weight of 5 lb (2.3 kg).

Model G-435 Desiccant Air Dryer provides in-line drying of gas or air at pressures up to 90 psig. Unit is a plastic canister with 1/4-in NPT fitting near the top and bottom. Canister is 2½-in (67 mm) diameter by 11½-in (289 mm) long.

G-425	Balston Filter with automatic float drain	2 lb
Related Item		
G-42520	Replacement filter elements, box of 10	

G-430	Desiccant, 5-lb container	5 lb
G-435	Desiccant Canister, 90 psig maximum	5 lb

Step 4. Select Triaxial Load Frame

S-600 Triaxial Load Frame

ASTM* D 2850, D 4767 AASHTO T 296, T 297

* See Standards Buyer's Guide at www.DGSI.info/3000.

The electronically-controlled Triaxial Load Frame has a compression capacity of 10,000 lbf (45 kN). The user friendly Interface/Controller allows the user to set speed and distance of travel and observe actual platen position during the test. The display may be configured in the engineering units of choice and is used to simplify set-up by using screen prompts. Modular construction enhances the reliability of the system and keeps service and maintenance to a minimum. Belt driven for smooth load rates.

Standard features:

- Precision DC motor for vibration-free operation
- Motor and reduction box grease-packed for long life
- Micro-switch protection to prevent overtravel
- Microprocessor based Controller provides:
 - Visual LCD display for data and screen prompts
 - Set speed from 0.0001 to 0.2 in/min
 - Set travel distance to stop automatically
 - Display of platen position in engineering units during test
 - Visual overtravel alarms
- All exposed parts are either painted or plated. Cover, base and cross beam are texture painted
- Two auxiliary power sockets provided for accessories

Note: Model S-600, S-60010 and S-6100E Triaxial Load Frames includes the frame and controller only. Test cells, transducers and readouts must be purchased separately.

S-600	Triaxial Load Frame, 110 V, 60 Hz* Min. Speed: 0.0001 in/min.	200 lb
S-60010	Triaxial Load Frame, 220/240 V, 50/60 Hz* Min. Speed: 0.0001 in/min.	200 lb
S-6100E	S-610 Load Frame, 110 V, 60 Hz* with extended strain rods for triaxial shear testing. Min. Speed: 0.005 in/min.	200 lb

Specifications	Value
Load Capacity:	10,000 lbf (44.5 kN)
Speed Range:	S-600: 0.0001 to 0.2 in/min (0.00254 - 5 mm/min) S-6100E: 0.005 to 0.2 in/min (0.127 - 51 mm/min)
Platen:	6.25 in (159 mm) diameter
Piston:	2 in (51 mm) diameter
Piston Travel:	3 in (76 mm) maximum
Speed Control:	Microprocessor based electronic controller
Column Distance:	11.75 in (298 mm)
Daylight:	35 in (889 mm) without load measurement device
Strain Rods:	1.25 in (32 mm) diameter, Acme threaded for adjustment
Cross Beam:	2.5 x 3.5 x 16-in steel (63 x 89 x 406 mm), adjustable, with center hole drilled 0.75 in (19 mm)

*Other voltages available.



S-600 shown with S-type Load Cell and EZ-Daq data acquisition system (sold separately).

Note: For reading transducers, two alternatives are offered:

- EZ-Daq (E-8000E or E-8000M)
- Smart Digital Indicator (E-405) with optional WinSAS collection software (E-40521).

Accessories

E-124	Pore Pressure Transducer, 0-150 psi (1034 kPa)
E-212	S-Type Load Cell, 2500 lbf (11 kN) capacity
E-312	Linear Displacement Transducer, 2-in (50 mm) range
E-344	Adaptor, LDT-to-S-510 Triaxial Cell
E-281	Adaptor, 3/4-in 16 female-to-1/2-in 20 male
E-282	Triaxial Loading Piston-to-Small Load Cell
E-8000E	EZ-Daq 8-Channel Data Acquisition System, English units
E-8000M	EZ-Daq 8-Channel Data Acquisition System, SI units

Related Products

E-405	Smart Digital Indicator, 5 digits
E-40521	WinSAS™ Software

See full listing of transducers and readouts on p. 44-48.
See data acquisition options on p. 42.



For caps and pedestals, porous stones, membranes and more, visit www.DGSI.info/3090

Step 5. For Triaxial, Choose Transducers and Readout Options

Skempton's Value or "B" Value is an important value used in permeability and triaxial testing. DGSi's sensors and readouts are used to monitor pore water pressure within the sample being tested. The end result is used to calculate and determine sample saturation values ("B" Value).

Each DGSi transducer requires a subordinate readout device to display the output signal.

The EZ-Daq is recommended when...

- Three or more sensors / readouts are needed.
- When multiple tests (sensors) are being run simultaneously. (WinSAS software does not support simultaneous testing.)



EZ-Daq, (E-8000E or E-8000M), shown with an S-type load cell, two (2) linear displacement transducers and a pressure transducer. Transducers sold separately.

Transducer, load cell and indicator options.

Measurement	Typical Option
Pore Pressure	■ E-124 Pore Pressure Transducer, 0-150 psi
	■ E-405 Smart Digital Indicator or
	■ E-8000E or E-8000M EZ-Daq 8-Channel Data Acquisition System
Axial Load	■ E-210 S-Type Load Cell, 500 lbf or
	■ E-212 S-Type Load Cell, 2500 lbf
	■ E-405 Smart Digital Indicator or
Axial Deformation	■ E-8000E or E-8000M EZ-Daq 8-Channel Data Acquisition System
	■ E-311 Displacement Transducer, 1.0 in* or
	■ E-312 Displacement Transducer, 2.0 in*
	■ E-405 Smart Digital Indicator or
	■ E-8000E or E-8000M EZ-Daq 8-Channel Data Acquisition System

E-344, Adaptor for Linear Displacement Transducer (LDT) may be needed with permeability cell depending on your set up.

*See full listing of transducers
and readouts on p. 44-48.
See data acquisition
options on p. 42.*

Pore Pressure
Transducer



Smart Digital Indicator, E-405 and Pore Pressure Transducer, E-124. Transducers sold separately.

Pore Pressure Equipment

Item	Description
E-124	Pore Pressure Transducer, 0-150 psi range x 0.1 readability
E-8000E	EZ-Daq 8-Channel Data Acquisition System, English units
E-8000M	EZ-Daq 8-Channel Data Acquisition System, SI units
Optional Equipment	
E-405	Smart Digital Indicator

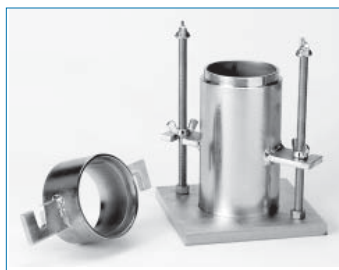
Step 6. Select Sample Preparation Tools

When choosing accessories for permeability / triaxial testing, be sure that consideration has been taken regarding which type of soil or materials are being tested. See the chart below for general recommendations.

Accessory Item:	Soil Type:		
	Cohesive • Clays • Silty Clays	Cohesionless • Sands • Silty Sands	Undisturbed Samples
Compaction Mold	✓		
Split Compaction Mold	✓		
Split Vacuum Mold		✓	
Split Miter Box	✓		✓
Soil Lathe	✓	✓	
Wire Saw	✓		✓
Sliding Weight Hammer	✓	✓	
Gauge Block	✓	✓	
Sample Extractor	✓		✓
Membrane Stretcher	✓	✓	✓

2.875 in x 6 in Compaction Mold

The 2.875-in diameter x 6-in Compaction Mold is used to remold cohesive soil samples for permeability and triaxial testing. Made of plated steel and includes the mold body, base and top collar. Cohesive soils are compacted into the mold with either the S-575 Kneading Compactor, S-577 Sliding Weight Hammer or the S-57728 Gauge Block and Rubber Mallet. Samples are extruded from the mold using the S-329 Sample Ejector with the S-32924 adapter.



S-57729

S-57729	2.875 x 6 in Compaction Mold, Base and Collar	10 lb
Accessories		
S-577	Sliding Weight Hammer	8 lb
S-57730	Aluminum Spacer Plug for S-57729, 2.85 dia. x 2 in	4 lb
S-57728	2.8 in Gauge Block with 1 in increments	4 lb
S-57728M	2.8 in Gauge Block with 25.4 mm increments	4 lb
S-575	Kneading Compactor	20 lb
S-329	Sample Ejector, 4 and 6 in	
S-32924	2.8 in adapter plate for sample ejector	

Split Compaction Mold

Machined aluminum molds for remolding test specimens from cohesive soils. Molds are designed to fit directly over the pedestals of our triaxial cells. These molds may be used either with or without collars.



S-57528

Triaxial Specimen Preparation - Split Molds*				
Diameter		Compaction**	Miter Box	Vacuum
(in)	(cm)			
1.4	3.5	S-57514	S-57414	S-57214
2.0	5	S-57520	S-57420	S-57220
2.5	6.3	S-57525	S-57425	S-57225
2.8	7.1	S-57528	S-57428	S-57228
3.0	7.6	S-57530	N/A	N/A
4.0	10.2	S-57540	S-57440	S-57240

*Other sizes available **Collar available as special order

Split Vacuum Mold

Machined aluminum molds for remolding sands and other cohesionless soils. Designed to fit directly onto the DGSI triaxial cell pedestal. A vacuum line is supplied to apply vacuum to the membrane while the test specimen is being molded. The base of mold has space for the membrane and "O" rings while being attached to the pedestal.



S-57228 & S-57214

Split Miter Box

Machined aluminum miter boxes for trimming ends square on undisturbed samples of clays and other cohesive soils.



S-57428

Step 7. Select Parts and Accessories for Triaxial and Permeability Testing



Permeability and
Triaxial Accessories

Diameter (in) (mm)	Latex Membrane		Membrane Stretcher	"O" Ring (set of 4)	Porous Stone	Cap and Pedestal			Glass Filter	Plastic Disc
	.012 in	.025 in				Acrylic	Stainless Steel	Wt.		
1.4 36	S-54014	S-54114	S-57014	S-53014	S-55014	S-52014	S-52114	1.0 lb	S-56114	S-56014
1.5 38	S-54015	S-54115	S-57015	S-53015	S-55015	S-52015	S-52115	2.0 lb	Cut to size	S-56015
1.875 48	S-54018	S-54118	S-57018	S-53018	S-55018	S-52018	S-52118	2.0 lb	Cut to size	S-56018
2.0 51	S-54020	S-54120	S-57020	S-53020	S-55020	S-52020	S-52120	2.5 lb	Cut to size	S-56020
2.5 63	S-54025	S-54125	S-57025	S-53025	S-55025	S-52025	S-52125	3.5 lb	Cut to size	S-56025
2.8 71	S-54028	S-54128	S-57028	S-53028	S-55028	S-52028	S-52128	4.5 lb	S-56128	S-56028
3.0 76	S-54030	S-54130	S-57030	S-53030	S-55030	S-52030	S-52130	5.0 lb	S-56130	S-56030
4.0 102	S-54040	S-54140	S-57040	S-53040	S-55040	S-52040	S-52140	6.0 lb	S-56140	S-56040

Soil Lathe (Sample Trimmer)

Specifically designed for trimming samples to precise diameters using a fine wire trimming knife. Adjustable in ranges from 1 to 4-in in diameter by simply changing the top platens.

Model S-57628 includes a 1.4-in and a 2.8-in platen with a 3.0 inch pedestal. Models S-57629 and S-57630 require selection of top platens from the table below. We can also handle special requests for sizes not shown.



S-57628

Permeant Interface Device (Bladder Accumulator)

Used in permeability or triaxial testing when a corrosive fluid is the permeant. It is installed between the permeability cell and the panel. Consists of a flexible bladder to prevent the permeant from entering the panel or escaping into the atmosphere. It also eliminates the possibility of compressed air dissolving into the permeant. All liquid contacting parts are made of 316 stainless steel, Teflon® or Viton®. The Permeant Interface Device is supplied with both Buna-N and Viton® Membranes.

The cylinder has an inside diameter of 2 in (51 mm). 185 ml.



S-470

S-57628	Soil Lathe w/ 1.4 and 2.8 in platens	15 lb
S-57629	Soil Lathe w/ 3.0 in bottom platen (specify top platen size)	15 lb
S-57630	Soil Lathe w/ 4.0 in bottom platen (specify top platen size)	15 lb

Top Platens

S-57601	1.0 in	S-57605	2.5 in
S-57602	1.4 in	S-57606	2.8 in
S-57603	1.875 in	S-57607	3.0 in
S-57604	2.0 in	S-57608	4.0 in

Other sizes available upon on request.

Accessories

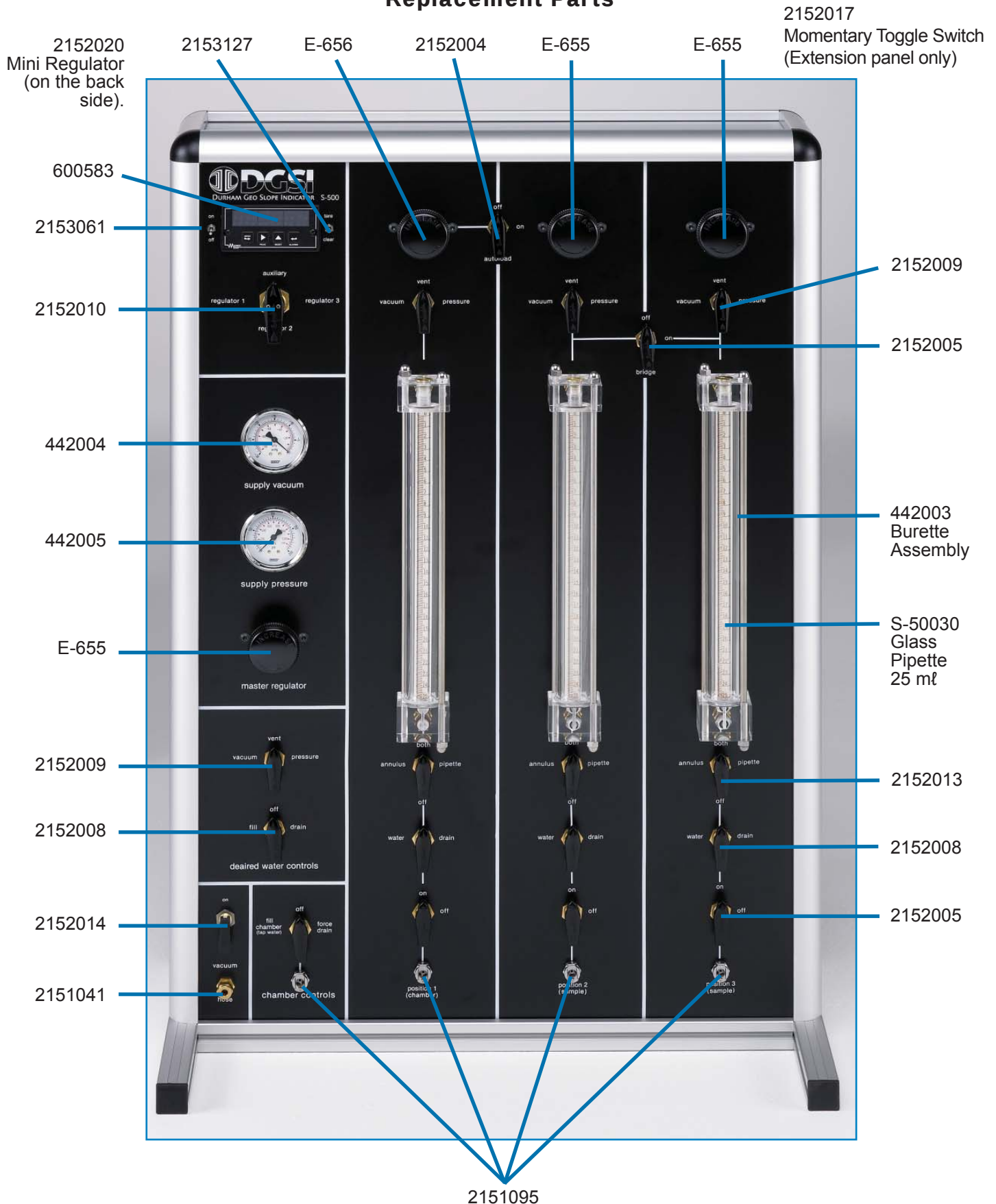
G-295	Open-end wire saw w/ replacement wires, pack of 6
G-29501	Replacement wire, pack of 6

S-470	Permeant Interface Device (with 2 membranes)
-------	--

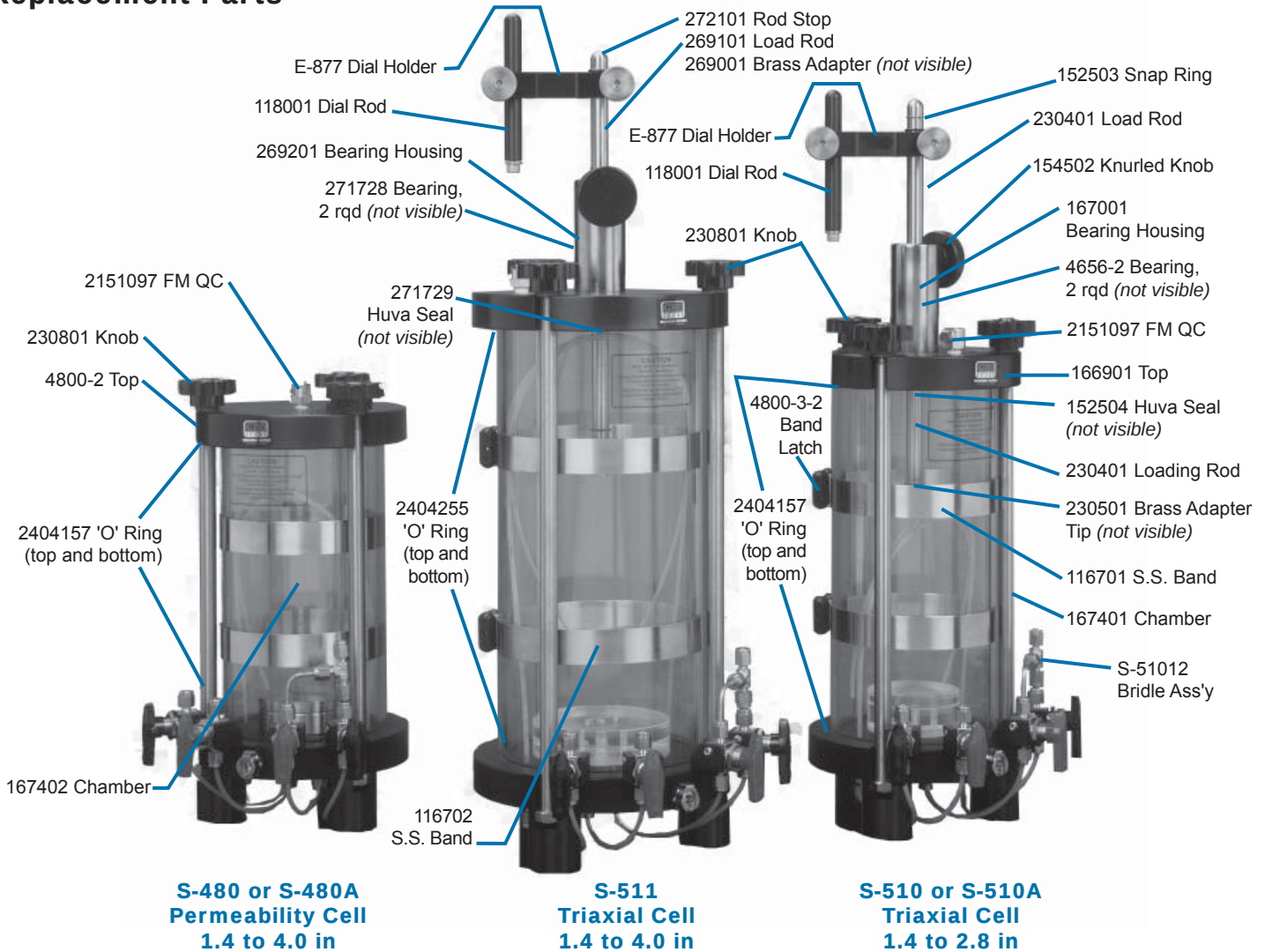
Related Items

S-47010	Viton Flexible Bladder
S-47020	Buna-N Flexible Bladder
G-52608	Teflon® Tubing, 1/8-in dia. 10 ft. long

Replacement Parts



Replacement Parts



Replacement Pressure Regulators

Bleed-Type Pressure Regulators are recommended for maximum sensitivity and stability against upstream supply pressure changes. All regulators are designed to accept supply pressures up to 250 psi. The supply pressure should always be at least 20 psi above the maximum regulated pressure and the regulator capacity should match the gauge or pressure transducer capacity. These regulators have a sensitivity of less than 1/4 in. of water. Differential pressure regulators are used to maintain a preset pressure difference between two pressures even if the pressure is raised or lowered.

Bleed-Type Pressure Regulators		
E-651	0-10 psi output for S-450	2 lb
E-655	2-150 psi output for S-500, S-502 and S-450	2 lb
E-656	2-150 psi differential output for S-500 and S-502	2 lb
E-658	3-200 psi output for S-500	2 lb
2152020	Deairing Regulator for S-500, 0-15 psi	2 lb

Tubing for Permeability Panels

G-52508	Tubing, 1/8 in (sold per foot)
G-52504	Tubing, 1/4 in (sold per foot)

Related Item

S-50045	Male quick-connect to 1/8 in tubing
---------	-------------------------------------

Burette Assembly (as replacement)

442001	Burette Assembly, 10 ml	1 lb
442003	Burette Assembly, 25 ml	1 lb

Resilient Modulus Triaxial Cell

AASHTO T 307

The S-517 Resilient Modulus Triaxial Cell has been designed to facilitate Resilient Modulus Testing of aggregate and soil materials. The innovative design allows the acrylic chamber to be removed over the top of the cell, providing access to the sample for set-up and piston alignment. It allows access to the sides of the sample, for example to mount strain indicators directly to the specimen's membrane.



- Comes ready to test 6 x 12 in test specimen
- Loading Piston 1½ in stainless steel piston
- Platens of 316 stainless steel
- Acrylic chamber with SS bands
- Pressure rating of 40 psi
- Optional provisions for higher pressure
- Base equipped for dual ports to each platen S-517
- Mounting bracket for two displacement transducers

S-517	Resilient Modulus Triaxial Cell for 6 x 12 in specimen (15.2 x 30.5 cm)	56 lb
-------	---	-------

Accessories

S-51710	Split Vacuum Mold for re-molding 6 in samples	65 lb
S-51720	Steel Compaction Base	25 lb
S-54160	6 x 18 in latex membrane, 0.025 in	1 lb

Replacement Parts

S-55060	Porous stone, 6 in diameter x 0.5 in	2 lb
S-53060	Replacement O-rings for S-517	1 lb

Related Items

S-51150	Kit to convert S-511 4 in Triaxial Cell to Resilient Modulus
---------	--

Split Vacuum Mold

The S-51710 Split Vacuum mold is built to be mounted directly to the pedestal of the S-517 Triaxial Cell to form 6-in diam. x 12-in long test specimens. Made of machined aluminum with vacuum connection supplies for standard ¼-in plastic tubing. Recommend use with S-51720 compaction base.



S-51710

S-51710	Split Vacuum Mold - 6 in diam	65.0 lb
---------	-------------------------------	---------

Steel Compaction Base

S-51720 Steel Compaction Base absorbs the energy when compacting a test specimen directly on the pedestal of the S-517 Triaxial Cell, thus safeguarding the cell's aluminum base from damage. Made of machined mild steel and painted.

S-51720	Steel Compaction Base	25.0 lb
---------	-----------------------	---------

Specifications for Resilient Modulus Testing

Sample Size	6 in diameter x 12 in long (152 x 305 mm)
Working Pressure	40 psi air (275.8 kPa)
Chamber	Acrylic plastic, 12.5 in OD, 11 in ID x 19.5 in long (318 mm OD, 279 MM ID x 495 mm long)
Piston Housing	Hard-coated aluminum, 4 in OD, 1.5 in ID x 7.3 in long (102 mm OD, 38 mm ID x 185 mm long)
Piston	Case-hardened, ground and polished stainless steel 1.5 in dia. x 17.5 in long (38 x 445 mm)
Tie Rods	316 SS, 0.75 in dia. x 22 in long (19 x 559 mm). Three provided with up to six for high-pressure chamber
Tie Rod Sleeves	316 SS, 1 in OD, 0.75 in x 18 in long (25, 19 x 457 mm) Three provided, up to six possible.
Pedestal and Upper Cap	316 SS, 6 in dia. x 1.5 in high (152 x 38 mm), fitted w/ dual ports.
Overall Assembly	14 in dia. x 40.5 in high (356 x 1029 mm), piston extended
Net Weight	135 lb (61.2 kg)

Static Compactor and Extruder

AASHTO T 307



The S-242 Static Compactor and Extruder is designed to compact 2.8-in diam. x 5.6-in long test specimens in accordance with AASHTO Method T-307. (A 4-in model is available upon request). The device allows the operator to compact the sample in five equal lifts by both monitoring the length of the sample and the load applied to the sample. The supplied spacers prevent over compaction of the sample. Once the sample is compacted, the hydraulic piston is used to extrude the sample.

Key features include:

- Hydraulic piston that develops 30,000 lbf of thrust and up to 14 in piston travel
- Tripod stand positions sample at proper working height
- Built-in work surface provides ease of mold removal and insertion

Equipped with 1 mold, 4 spacers, 2 compaction pistons, 1 extruding piston and 1 straight edge.



S-242 with E-405 digital readout (sold separately).

ORDERING INFORMATION

S-242	Compactor / Extruder, 110 V (ac), 60 Hz, 1 ph	621 lb
S-24210	Compactor / Extruder, 220 V (ac), 50 Hz, 1 ph	625 lb

Accessories

E-405	Smart Digital Readout, 5 digit, univ. voltage, with peak load capture
E-119	Pressure Transducer, 3,000 psi, G FML TRD
600793	Transducer Adaptor, 1/4 in NPT to 10-32 female adaptor

Related Items

S-517	Resilient Modulus Triaxial Cell for 6 x 12 in specimens
S-510	Triaxial Cell, 1.4 in and 2.8 in
S-511	Triaxial Cell for 4 in (102 mm) samples
S-51150	Resilient Modulus Conversion Kit for S-511 4 in cell

Replacement Parts

S-57735	2.8 in Mold
S-24230	Spacer Set
S-24240	Extruding Piston

Also Available: Sample Extruder, Model S-240 to extrude samples up to 3 in x 36 in from Shelby Tubes.

Dimensions and Weights:

Footprint:		
	Extruder:	29 x 29 in (737 x 737 mm)
	Power Pack:	15 x 15 in (381 x 381 mm)
Height:		
	Extruder:	63 in (1.60 m)
	Power Pack:	38 in (0.97 m)
Ship. Weight:		621 lb (282 kg)
Ship. Volume:		110 ft ³ (3.1 m ³)

Constant/Falling Head Permeameter

The chamber is one piece acrylic to permit viewing of the sample during the test. Sample lengths are easily changed for constant or falling head tests by the use of a spacer that attaches to the top cap spring. This spring is positioned to apply 5-10 lbf against the top stone or screen to prevent soil density changes during the test.

End caps and clamping ring are anodized aluminum. Each chamber is equipped with valves; either porous stones or perforated screens, depending on the diameter; and tubing for connection to a water source, vacuum and manometer tubes.

The manometer tube, scale and permeameter base are attached to a platform creating a compact and portable unit.

An adjustable constant head reservoir (not shown) mounts to the upright scale and can be easily removed. All tubing connections are included.



S-446XX

ORDERING INFORMATION

S-44610	Constant/Falling Head Permeameter, for 2½ in samples	11.0 lb
S-44620	Constant/Falling Head Permeameter, for 3 in samples	13.0 lb
S-44630	Constant/Falling Head Permeameter, for 4½ in samples	15.0 lb
S-44640	Constant/Falling Head Permeameter, for 6 in samples	18.0 lb
S-44650	Constant/Falling Head Permeameter, for 9 in samples	20.0 lb

Sand / Gravel Permeameter

ASTM D 2434 AASHTO T 215

Same as the above Constant / Falling Head Permeameter except the The Sand / Gravel Permeameter features two manometer ports that are grooved and screened on the inside. All tubing connections included. Manometer tube not included (sold separately).



S-486XX

S-48625	Sand / Gravel Permeameter w/ ports, for 2.5 in samples	11 lb
S-486	Sand / Gravel Permeameter w/ ports, for 3 in samples	13 lb
S-48645	Sand / Gravel Permeameter w/ ports, for 4.5 in samples	15 lb
S-48660	Sand / Gravel Permeameter w/ ports, for 6 in samples	18 lb
S-48090	Sand / Gravel Permeameter w/ ports, for 9 in samples	20 lb

Related Items

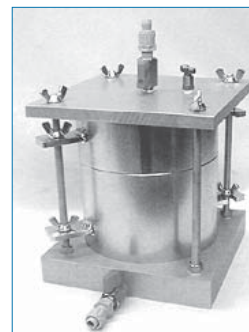
S-488	Manometer, wall mount w/ constant head tank, tubing and valves
S-577	Sliding weight hammer



For caps and pedestals, porous stones, membranes and more, visit www.DGSI.info/3090

Compaction Permeameter

The Compaction Permeameter uses standard 4-in and 6-in compaction molds for falling or constant head permeability tests. The top and base are made from anodized aluminum and have shut off valves. The top also has an air bleed valve. The steel mold and collar are plated. They are supplied with a porous stone and sealing rings. Manometer tube not included (sold separately).



S-48504

S-48504	Compaction Permeameter, 4 in	15.0 lb
S-48506	Compaction Permeameter, 6 in	19.0 lb

Shelby Tube Permeameter

Designed to use a 6-in section of a standard 3-in diameter Shelby tube. Ideal for testing loose sands and other materials that may be difficult to transfer to a standard permeability cell. It comes with anodized aluminium end caps, each fitted with a valve and porous stones with "O" rings to provide a leak free seal. Manometer tube not included (sold separately).



S-487

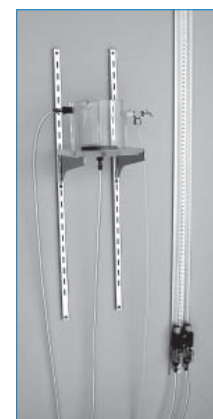
S-487	Shelby Tube Permeameter for 3 x 6 in tube	11 lb
-------	---	-------

Related Item

S-488	Manometer, wall mount w/ constant head tank, tubing and valves
-------	--

Wall Mount Manometer with Constant Head Tank

Acrylic tank with a regulating valve for flow control of water and a porous media on the bottom to filter out air bubbles. The unit maintains a constant water head by utilizing an overflow port. It also allows connection to a tap water line or deaired water source. Equipped with a saddle valve and necessary tubing for connection to a water source and the test chamber. The manometer panel features two acrylic tubes with valving on an aluminum rail and a 100 cm scale. Each tube has its own valve making it possible to run two independent permeability tests.



(L) Constant Head Tank
(R) Manometer, S-488

S-488	Wall Mount Manometer w/ constant head tank, tubing and valves
-------	---

Related Item

S-577	Sliding weight hammer
-------	-----------------------

Double Ring Infiltrometer Set

ASTM* D 3385

* See Standards Buyer's Guide at www.DGSI.info/3000.

The unit consists of two stainless steel rings measuring 12- and 24-in diameter x 20 in high. The rings incorporate a double thickness, welded top edge for increased stability when driving into the soil.

Also included is a 1/2-in thick aluminum driving cap (that serves as the cover when testing) with centering pins that ensure a simplified setup, two 6 in square neoprene splash guards and two Mariotte tubes with 3,000 ml and 10,000 ml capacities.



S-475, Double Ring Infiltrometer Set

S-475 Double Ring Infiltrometer Set 90.0 lb

Set Includes:

Rings, driving caps, mariotte tubes, depth gauges, metal tamper, splash guards and complete instructions.

Specifications for Double Ring Infiltrometer Set

Rings:	Stainless steel; two included, 12 in I.D. x 20 in high and 24 in I.D. x 20 in high
Driving Caps:	Aluminum; two included, 1/2 in thick; with centering pins
Splash Guards:	Neoprene; four included; 6 in square
Mariotte Tubes:	Graduated; two included; 3,000 ml and 10,000 ml capacities. Tubing included

Pin Hole Dispersion Device

ASTM D 4647

This test is used for evaluating clay soils for erodibility by flowing water through a small hole that is drilled through the compacted specimen.

The test chamber has a unique clamping ring for holding the stainless steel mold to the base while compacting the sample. Included with the chamber are screens, base stand, constant head reservoir, tubing, connections, pipette and a tool for drilling the pinhole. The end cap has a pilot hole for drilling the 1.0 mm (.040") hole through the sample.

All aluminum parts are anodized for corrosion resistance.



S-482

S-482 Pin Hole Dispersion Device



Download data sheets, manuals, and technical notes from www.durhamgeo.com

Consolidation Loading Devices

ASTM* D 2435 D 4546

AASHTO* T 216

* See Standards Buyer's Guide at www.DGSI.info/3000.

We offer both the pneumatic consolidometer S-450 Terraload and the S-449 lever-type dead weight loading device. The following may help in choosing between a pneumatic or lever-type consolidation frame:

The S-450 Terraload Pneumatic Loading Device:

- requires less space in the lab than a dead weight device.
- has a lesser chance of being bumped compared to the lever-type.
- is easier to operate when it comes to adding loads to the sample. Operators tend to prefer turning a valve rather than carefully adding a weight by hand. The weight on the dead weight device can be added too fast or too slow and affect results. Therefore loading weight may require some operator experience.
- requires a source of compressed air. This is an additional expense. There is also a chance that the power will fail, thus a chance of "losing the sample." The lever-type requires no external source of air, and is independent of electrical power or air compressor failures.

The S-449 Dead Weight Loading Device:

- may be more appropriate for soils that swell at low stresses.
- slightly less costly to set up, but the pneumatic frame costs less when multiple units are purchased, because one S-45040 Digital Readout and pressure transducer can be used with multiple S-450 units.

S-450 Options

Consolidation Set (part #)	Consolidometer Type		Deflection Measurement		Load Display
	Fixed	Floating	Dial	LDT	
S-45001	X		X		S-45040
S-45002		X	X		S-45040
S-45003	X			X	S-45040
S-45004		X		X	S-45040

Specifications for Terraload Consolidation Device

Load (Max.):	32 tons/ft ² (3064 kPa) on a 2.5 in (6.4 cm) dia. sample
Air Pressure:	100 psi (689 kPa) maximum
Air Regulators:	Low range: 0 - 10 psi (0 - 69 kPa) High range: 2 - 150 psi (14 - 1034 kPa)
Platen:	Aluminum, 7 in (17.8 cm) diameter
Piston Travel:	1 in (2.54 cm)

Terraload Consolidation Load Frame



Terraload consolidation device, Model S-45002. Shown with accessories (S-45040, S-453 Floating Ring and E-805 Dial Indicator). The dial indicator can be replaced by a transducer. The fixed ring consolidometer, S-455, (left) is additional.

Load is applied by compressed air via a piston coupled to a rolling diaphragm. This unique design virtually eliminates friction over the maximum 1 in (2.5 cm) of piston travel. Precision air regulators provide the needed accuracy and stability at low and high loads. Ball valves are used to allow for instant application of loads.

Model S-450 is housed in a high impact case with an anodized cross beam, supports and platen. The Terraload is supplied as a basic machine without the dial gauge, digital readout with transducer and the consolidometer shown in the picture.

S-450	Terraload Consolidation Device	35 lb
Accessories		
E-805	Dial Indicator, 0.40 in range, 0.0001 in divisions	
S-453	Floating Ring Consolidometer	
S-455	Fixed Ring Consolidometer	
S-45040	Smart Digital Indicator (E-405) matched with 150 psi Pressure Transducer (E-114) with quick-connect	
E-332	Digital Dial Indicator, 1 in x 0.0001 resol. Battery or 110-220 V (ac) Operation, (SI / Eng).	
E-333	A/C Adaptor for E-332 Digital Dial Indicator	
E-310	Linear Displacement Transducer, 0.5 in (1.3 cm) range, 0.001 in readability	
S-454	Calibration Disc, 2.46 in dia. x 1 in	
E-405	Smart Digital Indicator for E-130	
E-40504	RS-485 Output Board	
E-40508	RS-485 to RS-232 Converter	
E-40521	WinSAS Collection Software	
S-45070	2.5 in Tapered Stone with Screw, top	
S-45075	2.5 in Porous Stone, bottom	
Related Items		
S-240	Sample Extruder	
E-8000E	EZ-Daq 8-Channel Data Acquisition System (US units)	
E-8000M	EZ-Daq 8-Channel Data Acquisition System (SI units)	

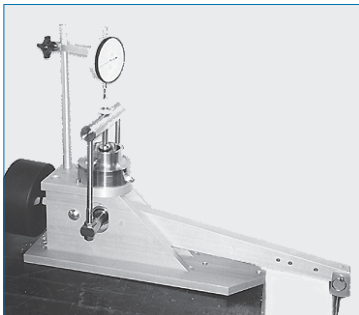
Dead Weight Loading Device

ASTM* D 2435, D 4546 AASHTO* T 216

 * See Standards Buyer's Guide at www.DGSI.info/3000.

Load is applied by adding weights to a beam. Adjustable ratios of 9:1, 10:1 and 11:1.

Designed for mounting on a table top. Constructed of anodized aluminum to ensure minimum frame distortion in use and provide corrosion resistance. Vertical rods, cross arms and the beam support rods are made from stainless steel. The beam is fitted with a counter weight and an adjustable beam position screw.



S-449, shown with E-805 Dial Indicator (optional) and S-455 Fixed Ring Consolidometer.

The loading platform will accept any of the DGSI consolidometer cells. Settlement may be measured with a dial indicator as shown, or by using a displacement transducer and digital readout.

S-449	Dead Weight Consolidation Frame							62 lb
Weights used to make up weight sets:								
kg Set	1 kg		4 kg		8 kg		Total Cap.	
S-44902	4		3		2		32 kg	
S-44903	4		5		5		64 kg	
S-44905	4		5		8		88 kg	
TSF Set	1/8	1/4	1/2	1	2	3	4	
S-44901	2	1	1	1	1	1	3	16 TSF*
S-44904	2	1	1	1	1	1	7	32 TSF*

*16 and 32 TSF for 10:1 ratio and 2.5 in diameter test specimen

Related Items

S-453	Floating Ring Consolidometer, 2.5 in
S-454	Calibration Disc, 2.46 in dia. x 1 in
S-455	Fixed Ring Consolidometer, 2.5 in
E-332	Digital Dial Indicator
E-805	Mechanical Dial Indicator
E-310	Linear Displacement Transducer
E-405	Digital Readout
E-8000E	EZ-Daq 8-Channel Data Acquisition System (English units)
E-8000M	EZ-Daq 8-Channel Data Acquisition System (Metric units)

Specifications for Dead Weight Consolidation Frame

Load Capacity:	48 TSF
Height:	19.5 in (49.5 cm)
Width:	7.75 in (19.7 cm)
Depth:	32 in (81.2 cm)
Vertical Clearance:	5.25 in (13.3 cm)
Horizontal Clearance:	6.375 in (16.1 cm)

Floating Ring Consolidometer

The Floating Ring Consolidometer allows the sample to be loaded from both ends. The Consolidometer Cutting Ring is 1 in (2.54 cm) high with a 2.5-in (6.4 cm) ID, made from stainless steel, the S-453 has an acrylic outer cylinder for water containment. It comes with upper and lower porous stones.

S-453



S-453	Floating Ring Consolidometer, 2.5 in	5.0 lb
S-4531	Floating Ring Consolidometer, 50 mm	5.0 lb
S-4532	Floating Ring Consolidometer, 70 mm	5.0 lb

Fixed Ring Consolidometer

The Fixed Ring Consolidometer is normally used with the S-450 Consolidometer and is supplied with a burette that allows for simultaneous permeability testing. The Consolidometer Cutting Ring is 1-in (2.54 cm) high, with a 2.5-in (6.4 cm) ID and is made from stainless steel. Supplied with upper and lower porous stones and stainless steel 1/8-in NPT connections.

S-455



S-455	Fixed Ring Consolidometer, 2.5 in diameter	6.5 lb
S-4551	Fixed Ring Consolidometer, 50 mm diameter	6.5 lb
S-4552	Fixed Ring Consolidometer, 70 mm diameter	6.5 lb

Related Items

S-45510	Back pressure saturation adaptor kit to allow saturation of the consolidation test specimen prior to one-dimensional consolidation
S-45070	2.5 in Tapered Stone with Screw, top
S-45075	2.5 in Porous Stone, bottom

Calibration Disc

ASTM D 2435

Stainless steel calibration disc, 2.46-in dia. by 1-in high as described in ASTM D 2435. It is used to determine the load frame deformation at various applied loads.

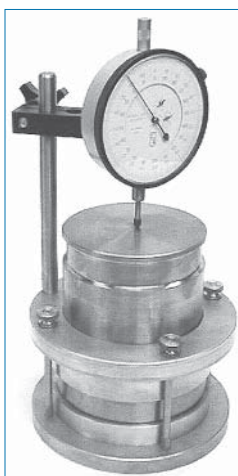
S-454	Calibration Disc, 2.46 in dia. x 1 in	3.5 lb
-------	---------------------------------------	--------

Expansion Index Consolidometer

ASTM D 4829
California UBC 29-2

This consolidometer is used to test remolded specimens for expansion. The sample is first compacted in a 4 x 1 in (10.1 x 2.54 cm) ring and then placed in the consolidometer with dried porous stones. The supplied 12.6 lb (5.7 kg) weight is placed on the assembled specimen which is allowed to consolidate for 10 minutes. It is then immersed in distilled water for up to 24 hours. During this time, the sample height is monitored with the dial gauge for determining the maximum swell.

The Expansion Index Consolidometer is made from anodized aluminum with stainless steel hold down rods, specimen ring and weight. It is supplied with ring, porous stones and weight. Dial indicator not included.



S-441 with S-44150
(sold separately)

S-441	Expansion Index Consolidometer	22.0 lb
-------	--------------------------------	---------

Related Items

S-44150	Dial Indicator, 0.5 in x 0.0001 in, CW
S-44101	Porous Stones, 4 in dia., 1/2 in thick, set of 2

Data Collecting Software for Consolidation Testing

The hardware and software required to add data collection to your existing consolidometer, new S-450 or new S-449 are listed below.

E-405	Smart Digital Indicator
E-40504	RS-485 Output Board
E-40508	RS-485 to RS-232 Converter
E-310	Linear Displacement Transducer
E-40521	WinSAS Data Collection Software
E-344	LDT Mounting Bracket for S-449 Dead Weight Consolidation Frame
301142	Indicator Support Bar for older S-450 Terraload

The readings are collected in a .txt file which can then be imported into spreadsheet programs (such as Excel).

E-40521	WinSAS™ Data Collection Software
---------	----------------------------------

Related Items

E-8000E	EZ-Daq 8-Channel Data Acquisition System (US units)
E-8000M	EZ-Daq 8-Channel Data Acquisition System (SI units)

Constant Rate of Strain Consolidometer

This DGSI Consolidometer uses the S-510 Triaxial Cell to apply vertical load and allow pore pressure measurement. Saturation back-pressure may be applied when the cell is attached to the S-500 Triaxial/Permeability Control Panel. Designed for a 2½-in dia. by 1-in thick sample. The sample ring is sealed at both ends. Porous stones permit saturation.

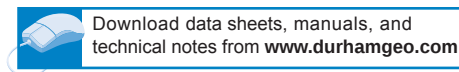


S-457

S-457	Constant Rate of Strain Consolidometer w/ S-510 Triaxial Cell	26 lb
-------	---	-------

Related Items

S-500	Triaxial Permeability Panel
S-510	Triaxial Cell for samples up to 3 in (76 mm) dia.
E-124	Pore Pressure Transducer, 0 - 150 psi
E-405	Digital Transducer Readout
S-600	Triaxial Load Frame
E-8000E	EZ-Daq 8-Channel Data Acquisition System (US units)
E-8000M	EZ-Daq 8-Channel Data Acquisition System (SI units)



S-610 Load Frame for CBR, LBR, UCC Testing

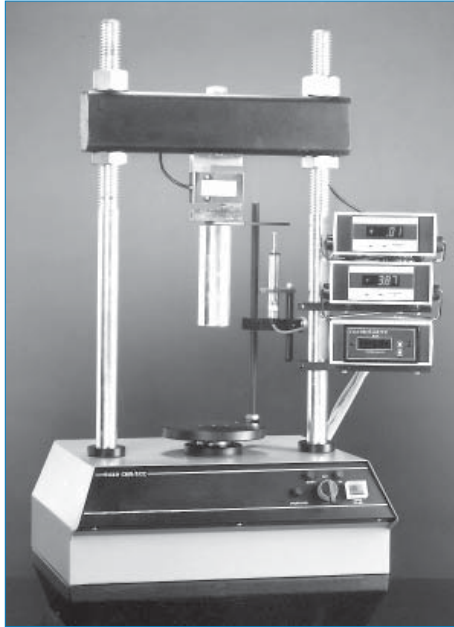
ASTM* D 1883, D 2166

AASHTO* T 193, T 208

* See Standards Buyer's Guide at www.DGSI.info/3000.

Time-proven, reliable mechanical load frame. Operator convenience includes the capability to control the speed by simply pushing touch pads and viewing direct readings in in/min on a digital device.

Dimensions, (WxDxH): 9 x 16 x 36 in (229 x 406 x 914 mm).



S-610, with optional accessories. CBR Set Up.

An automated version of this load frame is available (see Model S-611).

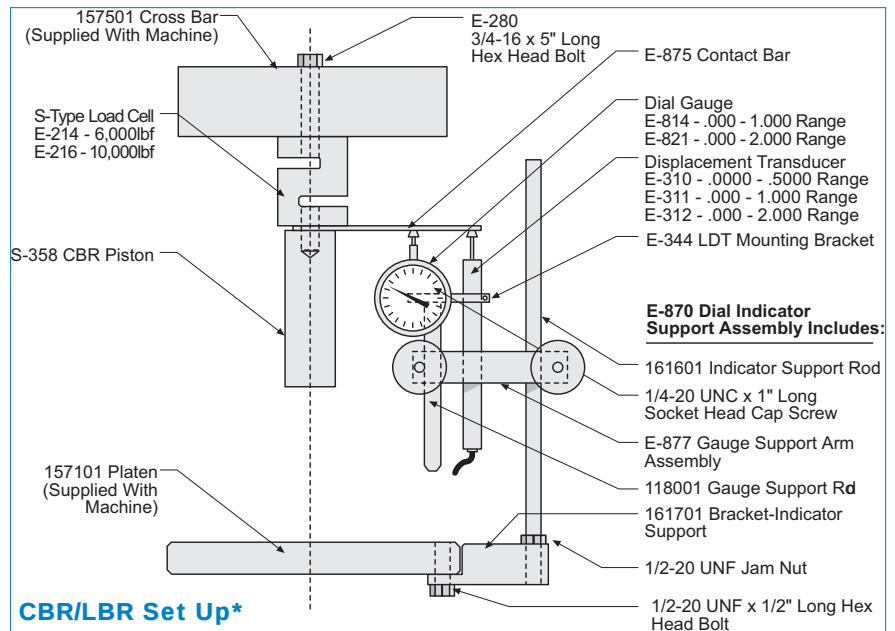
Grout Test Accessories

The S-610 Load Frame may be used to test grout or concrete specimens (3 x 6 in cylinders, 4 x 8 in cylinders, 3 x 3 x 6 in prisms) to a **maximum load of 10,000 lbf**. For this, in addition to the S-610 Load Frame, you will need the accessory kit (S-61060) which consists of a spherical seat and lower platen (C-290). An S-Type load cell with a capacity of either 6,000 lbf (E-214) or 10,000 lbf (E-216) will be needed (sold separately). See S-Type load cells on page 48.

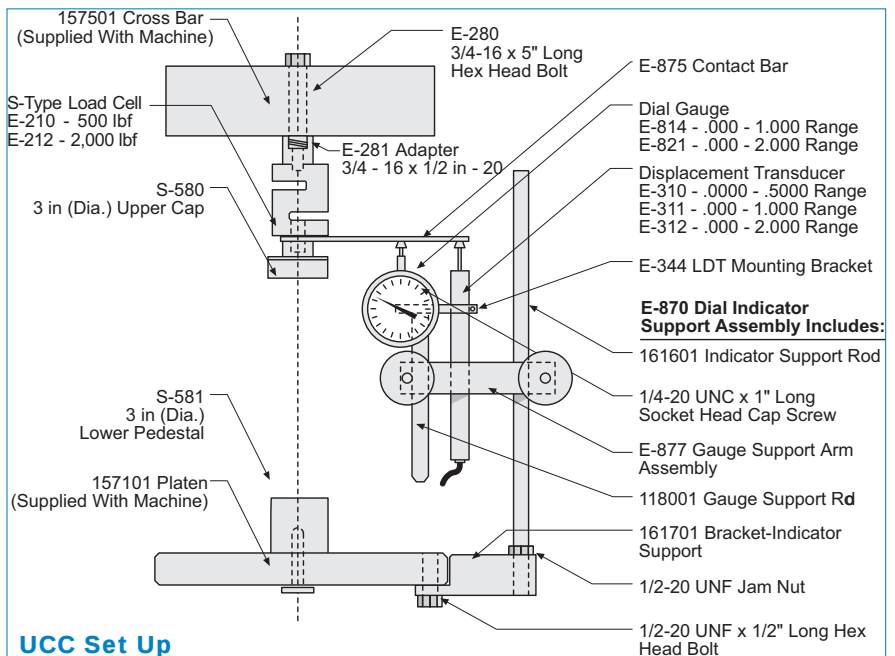
S-61060	Soil Cement Spherical Seat, 4 in
Accessories:	
C-290	Platen
E-214	S-Type Load Cell, 6000 lbf
or	
E-216	S-Type Load Cell, 10,000 lbf

Specifications for S-610 Load Frame

Load Capacity	10,000 lbf (44.5 kN)
Speed Range for Platen Movement	From 0.005 to 0.2 in/min. (0.127 to 5.08 mm/min) in 0.001 in/min (0.0284 mm/min) steps.
Platen	6.25 in (159 mm) diameter
Piston	2 in (50 mm) diameter
Piston Travel	3 in (76 mm) maximum
Speed Control	Microprocessor based electronic controller
Column Distance	11.75 in (298 mm)
Max. Daylight	19 in (483 mm) without load measuring device
Strain Rods	1.5 in (38 mm) dia., Acme thread for adjustment
Cross Beam	Adjustable, w/ center hole 0.75 in (19 mm)



* For LBR, use E-217 cylindrical load cell instead of E-214, or E-216 S-type load cell.



S-610	Load Frame, 110 V, 60 Hz	160 lb			
S-61010	Load Frame, 220/240 V, 50/60 Hz (Can be used for triaxial testing if speed meets ASTM specifications)	160 lb			
S-6100E	Load Frame w/ Extended Strain Rods for Triaxial Shear Testing, 110 V, 60 Hz (Can be used for triaxial testing if speed meets ASTM specifications)	180 lb			
S-611CONV	S-610 to S-611 Load Frame Conversion Kit				
S-61050	Extended Strain Rod Set, 35 in clearance				
Grout and Cement Test Accessories					
S-61060	Soil and Cement Spherical Seat, 4 in				
C-290	1 in Lower Platen				
E-214	S-Type Load Cell, 6,000 lbf				
E-216	S-Type Load Cell, 10,000 lbf				
Unconfined Compression Accessories					
S-61030	UCC Mechanical Accessory Set	16 lb			
S-61031	UCC Dial Indicator / Load Cell Accessory Set	18 lb			
S-61035	UCC Electronic Accessory Set	25 lb			
S-61036	UCC Electronic Accessory Set, includes Plotter Playback Software	42 lb			
CBR Accessories		ASTM D 1883			
S-61020	CBR Mechanical Accessory Set	22 lb			
S-61021	CBR Dial Indicator / Load Cell Accessory Set	26 lb			
S-61025	CBR Electronic Accessory Set	31 lb			
S-61026	CBR Electronic Accessory Set w/ Plotter Playback Software	52 lb			
Contents of UCC Accessory Sets		S-61030	S-61031	S-61035	S-61036
S-580	Upper Platen, 3-in diameter	1	1	1	1
S-581	Lower Platen, 3-in diameter	1	1	1	1
E-875	Content Bar, fits above upper platen	1	1	1	1
E-281	Threaded adapter for PR/LC	1	1	1	1
E-870	Displacement Support Assembly	1	1	1	1
E-710	Proving Ring, 500 lb	1	-	-	-
E-814	Dial Indicator, 1 in x 0.001 in	1	1	-	-
E-210	S-Type Load Cell, 500 lb	-	1	1	1
E-311	Linear Displacement Transducer, 1-in x 0.001 in	-		1	1
E-344	LDT Mounting Adapter	-		1	1
E-405	Digital Transducer Readout	-	1	2	2
E-45010	Mounting Bracket for E-405	-	1	1	2
E-40501	Analog Board	-	-	-	2
603169	Plotter Playback Software	-	-	-	1
Contents of CBR Accessory Sets		S-61020	S-61021	S-61025	S-61026
S-358	CBR Piston	1	1	1	1
E-875	Contact Bar, fits above CBR Piston	1	1	1	1
E-870	Displacement Support Assembly	1	1	1	1
E-714	Proving Ring, 5,000 lb	1	-	-	-
E-814	Dial Indicator, 1 in x 0.001 in	1	1	-	-
E-214	S-Type Load Cell, 5,000 lb	-	1	1	1
E-311	Linear Displacement Transducer, 1-in x 0.001 in	-	-	1	1
E-344	LDT Mounting Adapter	-	-	1	1
E-405	Digital Transducer Readout	-	1	2	2
E-40501	Analog Board	-	-	-	2
E-45010	Mounting Bracket for E-405	-	1	1	2
603169	Plotter Playback Software	-	-	-	1

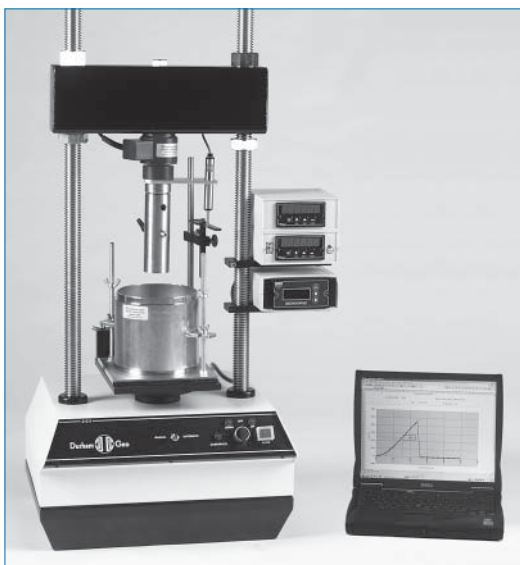
S-611 Auto Load Frame

**For CBR,
LBR,
UCC and
Triaxial
Testing**

**ASTM
D 1883, D 2166**

**AASHTO
T 193, T 208**

S-611, shown
with optional
accessories



The S-611 Auto Load Frame is based on our time proven S-610 Load Frame (see p.30). When connected to a PC, the S-611 Auto Load Frame offers the ability to perform LBR, CBR and UCC tests with a minimum of operator involvement. Once the test is started, the operator may leave the test area. The computer controls the S-611, records load and deflection readings, shows the test in progress on an on-screen graph, automatically stops the test and returns the platen to the start position for the next test. Separate reporting software calculates results and provides final reports that can be printed.

The front-panel mounted selector switch allows the user to choose the mode of operation between "manual" and "auto". In manual mode, the S-611 load frame operates the same as the S-610.

Compared to the S-610, the S-611 offers three major additions:

- The platen will automatically retract to the lower home position when a preset load and/or displacement condition is satisfied. The platen will retract when a pre-set maximum displacement, load, or load drop-off (indicating the test is completed) has been reached or if sample failure has been detected.
- New Smart Digital Indicators permit continuous transmission of data. Programmable features include setting end of test conditions and transmitting information to a computer using Windows®-based serial acquisition software called WinSAS™.
- CBR and LBR software retrieves the data file to produce data report sheet, complete with load-deformation plots.

S-611	Auto Load Frame, 10,000 lbf, 110 V, 60 Hz	160 lb
S-61110	Auto Load Frame, 10,000 lbf, 220 V, 60 Hz	160 lb
S-61115	Auto Load Frame, 10,000 lbf, 220-240 V, 50 Hz	180 lb

Accessories

S-61120	Accessory Package for LBR Testing (details on next page)
S-61130	Accessory Package for UCC Testing (details in next column)
S-61140	Accessory Package for CBR Testing (details in next column)
E-217	Cylindrical-Type Load Cell, 10,000 lbf (45 kN) (LBR Testing)

Software options on page 42.

Specifications for S-611 Load Frame

Load Capacity	10,000 lbf (44.5 kN)
Speed Range for Platen Movement	From 0.005 to 0.2 in/min. (0.127 to 5.08 mm/min) in 0.001 in/min (0.0254 mm/min) steps.
Platen	6.25 in (159 mm) diameter
Piston	2 in (50 mm) diameter
Piston Travel	3 in (76 mm) maximum
Speed Control	Microprocessor based electronic controller
Column Distance	11.75 in (298 mm)
Max. Daylight	32 in (812mm) without load measuring device
Strain Rods	1.5 in (38 mm) dia. Acme thread for adjustment
Cross Beam	Adjustable, w/ center hole 0.75 in (19 mm)
Dimensions (WxDxH)	9 x 16 x 53 in (229 x 406 x 132 mm)
Ship. Wt. (w/o acc.)	200 lb (91 kg)
Ship. Vol.	4.75 ft³ (0.13 m³)

Accessory Package for CBR Testing (S-61140)

Model	Qty.	Description
E-216	1	S-Type load Cell, 10,000 lbf (44.5 kN)
Or E-217	1	Or Cylindrical Type Load Cell, 10,000 lbf (44.5 kN)
E-311	1	Linear Displacement Transducer, 1 x 0.001 in
E-870	1	Dial Indicator Support Assembly
E-875	1	LDT Contact Bar
E-40508	1	RS-485 to RS-232 Converter
E-40520	1	Dual Smart Digital Indicators (5-Digit)
E-40521	1	WinSAS Collecting Software
E-41525	1	CBR Reporting Software
E-45010	1	Mounting Bracket for E-40520
S-61056	1	2-in Quick Adjust CBR / LBR Piston
600336	1	Centralizing Mold Fixture, S-611
600787	1	LDT Bracket, S-611

Accessory Package for UCC Testing (S-61130)

Model	Qty.	Description
E-875	1	LDT Contact Bar
E-212	1	S-Type Load Cell, 2,000 lbf capacity
E-281	1	Adapter for Load Cell to Cross Bar
E-311	1	Linear Displacement Transducer, 1 x 0.001 in
E-344	1	LDT Mounting Adapter
S-580	1	Upper Platen, 3 in diameter
S-581	1	Lower Platen, 3 in diameter
E-870	1	Dial Indicator Support Assembly
E-40508	1	RS-485 to RS-232 Converter
E-40520	1	Dual Smart Digital Indicators (5-Digit)
E-40521	1	WinSAS Collecting Software
E-41524	1	UCC Reporting Software
E-45010	1	Mounting Bracket for E-40520

* See Standards Buyer's Guide at www.DGSI.info/3000.

Accessory Package for LBR Testing (S-61120)

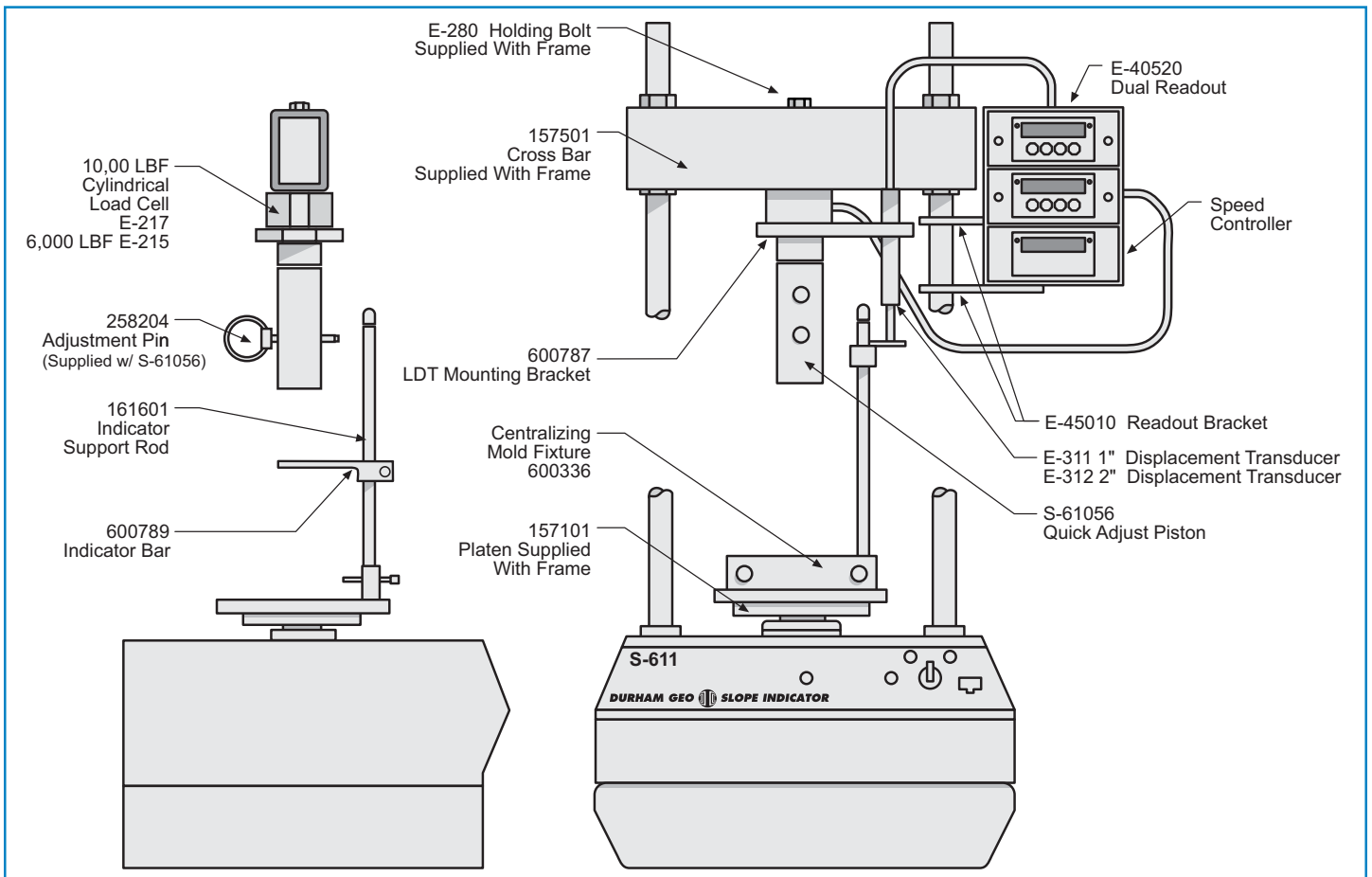
Model	Qty.	Description
E-217	1	Cylindrical Load Cell, 10,000 lbf capacity
E-311	1	Linear Displacement Transducer, 1-in range
E-40508	1	RS-485 to RS-232 Converter
E-40520	1	Dual Smart Digital Indicator (5-Digits)
E-40521	1	WinSAS Collecting Software
E-41525A	1	LBR Reporting Software
E-45010	1	Mounting Bracket for E-40520
S-61056	1	2-in Quick Adjust CBR / LBR Piston
161601	1	Indicator Assembly Support Rod
600336	1	CBR Mold Centering Jig (Factory Installed)
600787	1	LDT Bracket S-611
600789	1	Indicator Bracket

Related Items

S-327	CBR Mold with perforated base
S-328	LBR Mold



Detail of S-611 Auto Load Frame with accessories for CBR testing. Same accessories as on the illustration below plus the compaction mold, S-327.



S-611 Auto Load Frame with optional accessories for CBR testing. Cylindrical load cell shown here as an alternative to the S-type load cell.

Software options on page 42.

S-600 Triaxial Load Frame

ASTM* D 2850, D 4767 AASHTO: T 296, T 297

* See Standards Buyer's Guide at www.DGSI.info/3000.

The electronically controlled Triaxial Load Frame has a compression capacity of 10,000 lbf (45 kN). The user friendly Interface/Controller allows the user to set speed and distance of travel and observe actual platen position during the test. The display may be configured in the engineering units of choice and is used to simplify set-up by using screen prompts. Modular construction enhances the reliability of the system and keeps service and maintenance to a minimum. Belt driven for smoother load rates.

S-600	Triaxial Load Frame, 110 V, 60 Hz*	200 lb
	Min. Speed: 0.0001 in/min	
S-60010	Triaxial Load Frame, 220 V, 60 Hz*	
S-6100E	S-610 Load Frame, 110 V, 60 Hz* with extended strain rods for triaxial shear testing.	200 lb
	Min. Speed: 0.005 in/min.	

S-600 Specifications

Load Capacity:	10,000 lbf (45 kN)
Speed Range:	0.0001 to 0.2 in/min (0.0127 - 5 mm/min)
Platen:	6.25 in (159 mm) diameter
Piston:	2 in (50 mm) diameter
Piston Travel:	3 in (76 mm) maximum
Speed Control:	Microprocessor based electronic controller
Column Distance:	11.75 in (298 mm)
Daylight:	35 in (889 mm) - without load measurement device
Strain Rods:	1.25 in (32 mm) diameter, Acme threaded for adjustment
Cross Beam:	2.5 x 3.5 x 16-in steel (63 x 89 x 406 mm), adjustable, with center hole drilled 0.75 in (19 mm)

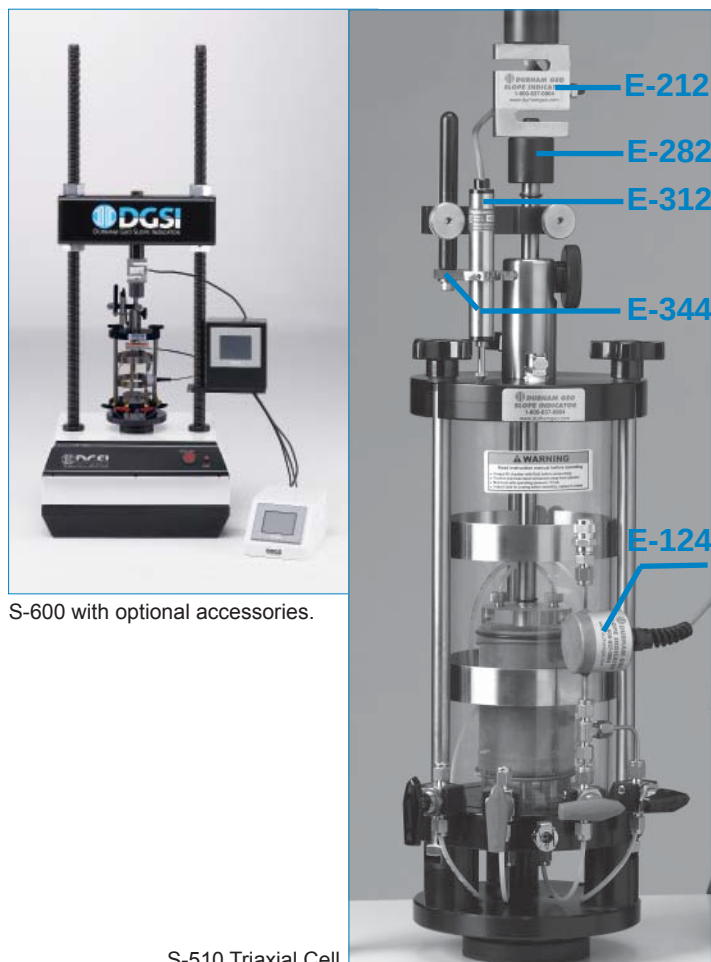
Accessories:

S-510	Triaxial Cell for samples up to 3 in (76 mm) diameter
S-511	Triaxial Cell for 4 in (102 mm) samples
E-124	Pore Pressure Transducer, 0-150 psi (1034 kPa)
E-405	Smart Digital Indicator, 5 digits
E-212	S-Type Load Cell, 2500 lbf (11 kN) capacity
E-312	Linear Displacement Transducer, 2-in (50 mm) range
E-344	Adaptor, LDT-to-S-510 Triaxial Cell
E-281	Adaptor, 3/4-in 16 female-to-1/2-in 20 male
E-282	Load Rod Adaptor for E-212
E-8000E	EZ-Daq 8-Channel Data Acquisition System (US units)
E-8000M	EZ-Daq 8-Channel Data Acquisition System (SI units)

Related Products

E-40521	WinSAS™ Software
S-500	Triaxial / Permeability Panel, 110 V, 60 Hz
Dimensions: (WxDxH)	16 x 22 x 52 in (229 x 406 x 132 mm)
Ship. Wt. (w/o Acc.)	200 lb (91 kg)
Ship. Vol.	4.75 ft³ (0.13 m³)

*Other voltages available



S-600 with optional accessories.

S-510 Triaxial Cell

Standard features for the S-600 Triaxial Load Frame:

- Precision DC motor for vibration-free operation
- Motor and reduction box grease packed for long life
- Micro-switch protection to prevent overtravel
- Microprocessor based Controller provides:
 - Visual LCD display for data and screen prompts
 - Set speed from 0.0001 to 0.2 in/min
 - Set travel distance before automatically stopping
 - Visual display in engineering units of platen position during test
 - Visual overtravel alarms
- All exposed parts plated. Cover, base and cross beam are texture painted
- Two auxiliary power sockets provided for accessories

Note: Model S-600, S-60010 and S-6100E Triaxial Load Frames comprise of the frame and controller only. Test cells, transducers and readouts must be purchased separately.

For triaxial and permeability panels, see p.16.

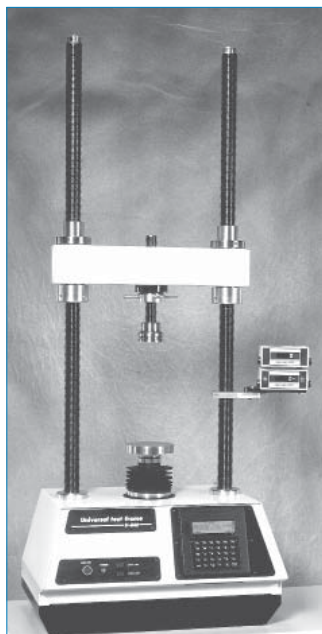
Universal Test Frame for Compression or Tension

Designed for a wide range of needs in the soils, asphalt and concrete laboratory, the Model S-640 will apply up to 40,000 lbf of compression or tension. The high-efficiency direct motor drive system and reduction unit provides high torque with low power input.

The LCD display allows the user to:

- Select Speed (0.2 in/min to 0.001 in/min)*
- Select Platen Travel (3 in maximum)
- Return Home
- Rapid Up or Down
- Start / Stop

*Other speed ranges available.



S-640 shown with optional E-405's, (sold separately).

S-640	Universal Test Frame, 110 V, 60 Hz	270 lb
S-64010	Universal Test Frame, 240 V, 50 Hz	270 lb

Related Items

E-405	Smart Digital Indicator
E-8000E	EZ-Daq 8-Channel Data Acquisition System (US units)
E-8000M	EZ-Daq 8-Channel Data Acquisition System (SI units)
E-240	"S" Type Load Cell, 40,000 lbf (178 kN)
E-311	Linear Displacement Transducer, 1 in x 0.001 in
E-344	LDT Mounting Adapter
E-870	Displacement Support System
E-40521	WinSAS™ Collecting Software for E-405

Specifications for Universal Test Frame

Display Type:	LCD
Load Range:	0 to 40,000 lbf (0 to 178 kN) Rated
Vertical Daylight:	40 in (102 cm)
H Daylight:	18 in (45.7 cm)
Bottom Platen:	6 1/4 in (16 cm) - diameter
Max. Platen Travel:	3 in (7.6 cm)
Platen Speed:	0.2 in/min to 0.001 in/min
Strain Rods:	2 in (5.1 cm) - diameter
Cross Beam:	Adjustable to Bottom Platen
Accessory Power:	Aux. sockets, fuses, surge protection
Overall Height:	72 in (183 cm)
Overall Width:	30.5 in (77.5 cm)
Overall Depth:	20 in (51 cm)
Ship Volume:	27 ft³ (0.76 m³)
Net Weight:	610 lb (277 kg)

Hand Operated CBR/LBR Load Frame

ASTM: D 1883

AASHTO: T 193

* See Standards Buyer's Guide at www.DGSI.info/3000.

Designed for both field and soil laboratory CBR/LBR studies, the Hand Operated CBR/ LBR Load Frame will apply up to 10,000 lbf (44.5 kN) of force at a steady rate. It uses a hand operated mechanical screw-type jack with a two-speed transmission.

The load frame includes the penetration piston but not the "S" type load cell or digital readout shown in the photo.

Dimensions: 12 x 18 x 42 in (31 x 46 x 107 cm)



S-360 with optional accessories

S-360	Hand Operated CBR/LBR Load Frame	45 lb
-------	----------------------------------	-------

Related Items

E-214	S-Type Load Cell, 6,000 lbf	4 lb
or E-216	S-Type Load Cell, 10,000 lbf	4 lb
S-350	CBR Laboratory Set	300 lb
E-405	Smart Digital Indicator	5 lb
E-714	Proving Ring, 5,000 lbf, w/ dial indicator	5 lb
E-814	Dial Indicator, 1.0 x .001 in travel	1 lb
E-880	Magnetic Dial Indicator Holder w/ swivel post	1 lb

For Unconfined Compression:

S-360	Hand Operated CBR/LBR Load Frame	45 lb
-------	----------------------------------	-------

Related Items

E-212	S-Type Load Cell, 2500 lbf (11 kN) capacity
E-311	Linear Displacement Transducer, 1 in x 0.001 in
E-344	LDT Mounting Adapter
E-405	Smart Digital Indicator
S-580	Upper Cap, 3 in dia.
S-581	Lower Pedestal Set, 3 in
E-712	Proving Ring, 2,000 lbf
E-814	Dial Indicator, 1.0 x .001 in travel
E-880	Magnetic Dial Indicator Holder w/ swivel post

Direct Shear Machine

ASTM D 3080 AASHTO T 236

Two similar systems are available:

- The S-490 applies dead weight loading with optional weights. Generally considered to be more sensitive at low loads.
- The S-492 uses a pneumatic air cell to apply the vertical load. Smaller footprint. Easier to apply normal loads but requires a compressed air source. An optional kit for residual shear testing is available.

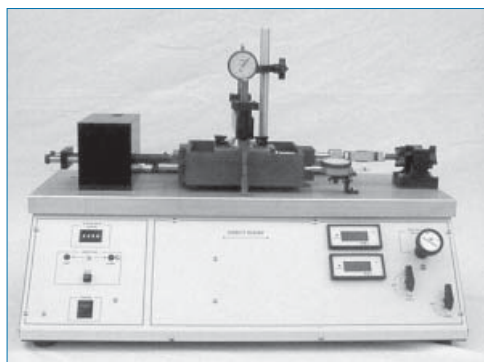
The operator sets horizontal travel with limit switches. Strain rates are set with digital thumb wheels. Horizontal loads are displayed on a panel-mounted E-405 Smart Digital Readout with RS-485 output. The units are compact and self contained.

The S-490 has casters. The S-492 is cabinet mounted.

Note: To perform residual shear testing, a conversion kit (part number S-49220) is required.

Pneumatic Direct Shear Machine, S-492,

features two pneumatic pistons to provide the vertical load to the specimen with accuracy. A small diameter rolling diaphragm piston provides small loads from 4 lbf to 100 lbf (18 to 4.5 kN). A large diameter piston provides loads up to 1500 lbf (6.7 kN).



S-492

Specifications for Dead Weight Direct Shear

Specifications	(Dead Weight) S-490	(Pneumatic) S-492
Horizontal Movement:	2 in (5.1 cm) maximum	2 in (5.1cm) maximum
Strain Rate:	0.00005 in to 0.2 in/min	0.00005 in to 0.2 in/min
Vertical Load:	1500 lb (680 kg)	4 - 1500 lb (1.8 - 680 kg)
Max. Horizontal Shear:	1500 lb (680 kg)	1500 lb (680 kg)
Overall Height:	54 in (137 cm)	22 in (56 cm)
Cabinet Height:	9 in (23 cm)	9 in (23 cm)
Length:	36 in (91 cm)	30 in (76 cm)
Depth:	14.5 in (37 cm)	14.5 in (76 cm)

The basic unit includes a set of 2.5 in (6.35cm) diameter stainless steel shear rings, porous stones, drainage plates and an anodized aluminum water chamber. Shear force is measured with an E-405 Smart Digital Readout (RS-485 output included) and a 2,000 lbf (8.9 kN) S-type load cell. One E-814 dial indicator for measuring horizontal displacement and one E-805 dial indicator for vertical displacement are included with the S-490.

The Dead Weight Direct Shear Machine, S-490, with optional kit for residual shear testing uses a dead weight system for applying the vertical load to the specimen. A 10:1 ratio beam allows the application of vertical loads up to 1411 lb (6.3 kN) depending on the weight set selected.



S-490

S-490	Dead Weight Direct Shear, 110 V	250 lb
S-49010	Dead Weight Direct Shear, 220 V	250 lb
S-492	Pneumatic Direct Shear, 110 V	190 lb
S-49210	Pneumatic Direct Shear, 220 V	190 lb

Accessories:

S-44901	16-Ton Weight Set for S-490
S-44902	32-kg Weight Set for S-490
S-44903	64-kg Weight Set for S-490
S-44904	32-Ton Weight Set for S-490
S-44905	88-kg Weight Set for S-490
S-49051	2-in Dia. Shear Rings
S-49052	2.42-in Dia. Shear Rings
S-49053	2.5-in Dia. Shear Rings
S-49054	4-in Dia. Shear Rings
S-49055	4-in Square Shear Rings
S-49220	Residual Shear Testing kit

Related Items:

E-310	Vertical Displacement Transducer, 0.5 in x 0.0001 in
E-312	Horizontal Displacement Transducer, 2 in x 0.001 in
E-405	Smart Digital Indicator
E-40504	RS-485 Output Board
E-40508	RS-485 to RS-232 Converter
E-40521	WinSAS™ Data Collecting Software
E-8000E	EZ-Daq System (US units)
E-8000M	EZ-Daq System (SI units)

Data Acquisition and Reporting Software

We offer data acquisition systems for the soil testing laboratory:

- WinSAS, a Windows®-based serial acquisition system used in conjunction with E-405 Smart Digital Indicators which are modified for serial port communication.
- A suite of reporting software to present the information in a way that conforms with the relevant ASTM standard.
- EZ-Daq 8-channel data acquisition system (see p.46).

WinSAS™ — Windows®-based collecting software

- Increased production. Sensor readings are automatically saved and available 24 / 7 if necessary.
- Data accuracy: Automated data collection eliminates operator errors.
- Ease of use: Having digital readouts at the work station makes it easy for the user to set up samples and visually monitor test progress.
- Flexibility to use the readouts without the PC if desired.
- Easy to retrofit on older load frames.

WinSAS™ is a Windows®-based serial acquisition software used in conjunction with E-405 Smart Digital Indicators which have been modified for serial port communication. The software is pre-configured for common laboratory tests such as shear strength, consolidation and penetration. However, the user can use the software to collect data from a wide range of tests limited only by the communication speed of the E-405 Smart Digital Indicators.

WinSAS™ gives the user the convenience of having digital indicators at the test stand with the ability of transferring the test data to a standard ASCII text file. Multiple E-405 Smart Digital Indicators may be linked together via a standard phone (RJ-45) cable to a multiple plug connector. An RS-485/RS-232 converter is connected to the user's computer via a standard DB-9 COMM port connection.

WinSAS™ software permits the user to create a "test machine" by grouping sensors from a user defined library to perform a specific task, such as a CBR test. The sensor library contains the sensor type, maximum range, calibration, date and serial number. WinSAS™ software includes a library of common soil tests from which the user selects the type of test to be performed. The user has the ability to change the suggested intervals on the fly. The user can create custom logging profiles and intervals containing up to 9999 data points.

Output of each channel assigned to the "test machine" is displayed with the elapsed time and reading. Also, any channel can be graphically displayed with the sensor value plotted on the ordinate and the elapsed time on the abscissa or user-defined graphs such as load versus deformation.

E-40521 WinSAS™ Collecting Software w/ Printer Port Dongle

Related Items

602430	WinSAS™ USB Software Key
E-405	Smart Digital Indicator (5 Digits)
E-40504	RS-485 card for E-405 (one for each E-405)
E-40508	RS-485-to-RS-232 Converter (only one E-40508 is necessary per computer)
E-45010	E-405 Support Brackets

Data Reduction and Reporting Software for Laboratory Soil Testing

Our suite of Windows®-compatible software programs read data, perform calculations and generate graphical and tabular output as well as test reports conforming to the respective ASTM standard. The various programs have a common rationale that makes it easy to move from one program to another.

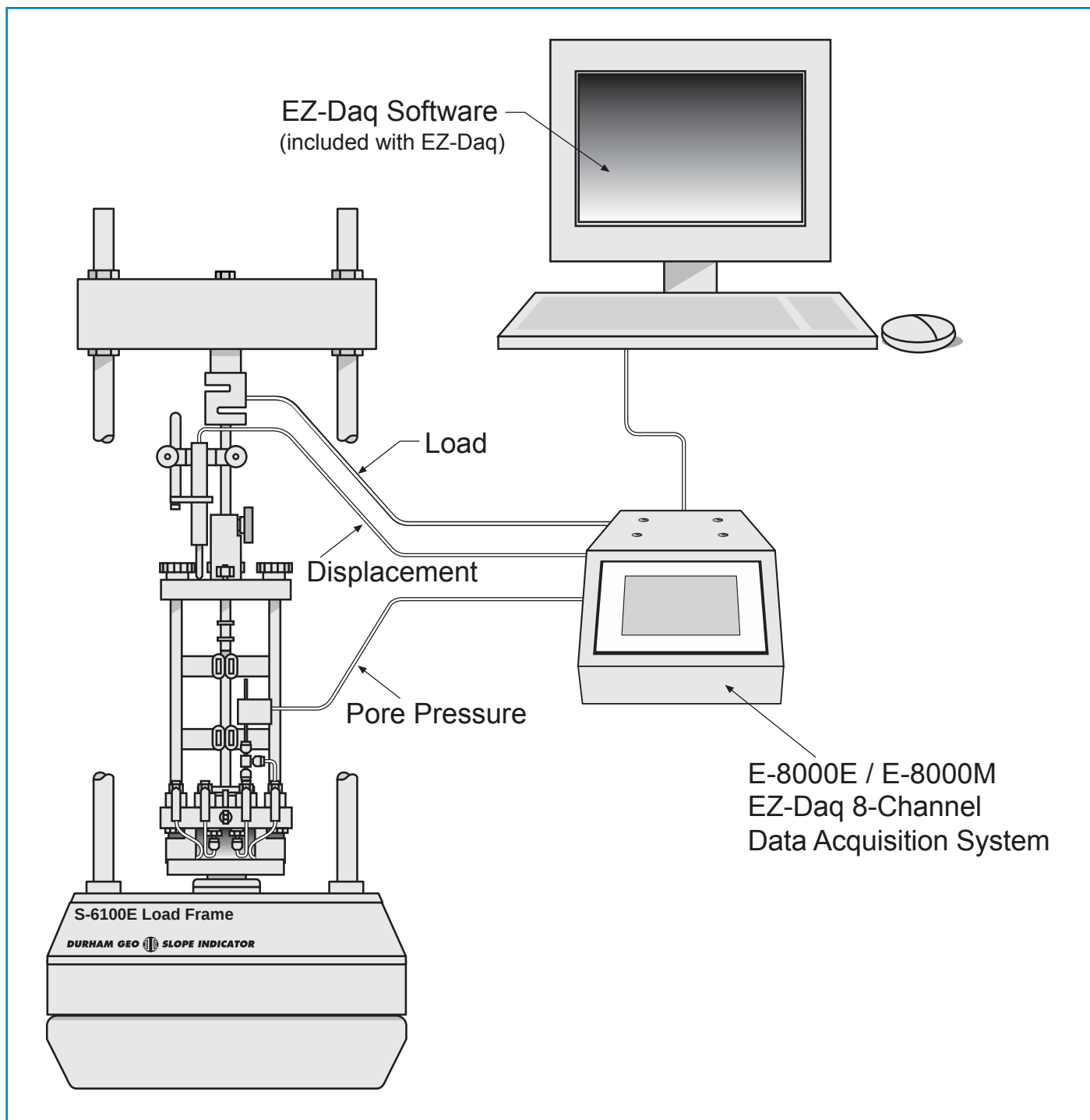
Principal features are:

- Windows® 98 through XP compatible.
- Powerful data base manager automatically saves input files by project ID.
- Uses data from WinSAS™ output file.
- User-selectable engineering units for input and output.
- Software pre-configured to show company or agency name in the output report.

E-41524	Reporting Software, Unconfined Compression (UCC)
E-41525	Reporting Software, California Bearing Ratio (CBR)
E-41525A	Reporting Software, Florida's Limerock Bearing Ratio (LBR)



Download data sheets, manuals, and technical notes from www.durhamgeo.com



Typical Data Acquisition Set Up for Triaxial Compression with Pore Pressure.

 Download data sheets, manuals, and technical notes from www.durhamgeo.com



Digital Transducer Readouts

The E-405 programmable Smart Digital Indicator is a single-channel digital readout with a "99999" display. It sends a direct voltage of 5 or 10 V to a load cell, pressure or displacement transducer or temperature transducer. The transducer then sends a millivolt signal back to the readout, based on the amount of stress or strain applied to the transducer. The E-405 then takes the millivolt signal and converts it into engineering units based on the calibration factors stored in memory. The direct display of readings in engineering units is very convenient for the operator, increases productivity and minimizes the potential for recording errors in the lab.

The E-405 has fast control responses (60 readings/sec), true peak reading capability and an analog output that accurately tracks the signal input. It has an adaptive digital filter that automatically selects the best time constant for minimum noise, and yet responds rapidly to an actual change in signal level.

When purchased with a DGSI transducer, the E-405 is supplied with a NIST Traceable Certificate of Calibration. The front panel allows user set-up and re-calibration by using push buttons.

Optional accessories include RS-232, Relay Board and Analog "plug in" boards which allow the E-405 to output data to plotters or computers. An RS-485 board is also available to connect up to 31 indicators using 4-wire phone cable (also known as daisy chaining). This feature allows the laboratory manager to customize the data acquisition from 1 to 31 channels and use the RS-485 to RS-232 converter to bring the data into the "Com Port" on his computer.

The E-405 can be customized for a wide variety of industry testing tasks. If you have a special application, please call us to discuss your requirements.



Smart Digital Indicator (E-405) shown with optional transducers

Standard Features

- Plug-in Option Boards
- Five Full Digits
- 50-60 Readings Per Second
- True-Peak Hold, Auto Tare and Automatic Adaptive Digital Filter
- Isolated 5, 10, or 24 V (dc) Excitation
- Worldwide AC/DC Power with auto-select
- NEMA 4 Lens Cover
- 0.56" High Digits
- User Selectable Scaling, Front Panel Programming

Optional Features

- Dual Relay Alarm Board, 10 A
- Open Collector Outputs
- Isolated RS-232 or RS-485 or Parallel BCD Computer Interface
- Analog Outputs; 0-20 mA, or 5 to 10 V (dc)

E-405	Smart Digital Indicator	5 lb
Accessories		
E-40501	Dual Range Analog Output Board, 5 or 10 V (dc)	
E-40502	Relay Output Board, 10 A	
E-40503	RS-232 Output Board	
E-40504	RS-485 Output Board w/ 20 ft phone cable	
E-40505	Precision Strain Gauge Board, ranges 25, 50, 150, 250 mV	
E-40506	BCD Output Board (for printers)	
E-40507	DC Power Board, 9-37 V (dc)	
E-40508	RS-485 to RS-232 Converter	
600504	5 Port, RJ11-4, Phone Outlet	
Related Items		
E-1xx	Pressure Transducers	
E-2xx	Load Cells	
E-3xx	Displacement Transducers	
E-40521	WinSAS™ Data Collecting Software, includes software security key (fits parallel printer port). USB software key, 602430 available upon request.	

Specifications for Digital Transducer Readouts, E-405

Display:	5 digits, 0.56 in (14 mm), 3 LED indicators
A-to-D Conversion:	60/s for 60 Hz NMR, 50/s for 50 Hz NMR
RMS Accuracy at 25° C:	0.1% FS
Operating Temperature:	0°C to 55°C
Operating Power (standard):	95 to 240 V ac, 90 to 300 V dc
Operating Power (optional):	10 to 34 V ac, 10 to 48 V dc
Excitation Output:	5 V dc, 100 mA maximum 10 V dc, 120 mA maximum 24 V dc, 40 mA maximum

Have your proving rings, load cells, pressure gauges and other measuring devices in the laboratory been calibrated recently? If not, give our calibration department a call. They will be glad to provide a quotation for your calibration needs.

EZ-DAQ™

Basic 8-Channel Data Acquisition for the Laboratory

Benefits:

- ❖ Eight 16-bit analog inputs for eight channels of real-time data acquisition
- ❖ 10 V dc instrumentation excitation supply
- ❖ mV, V, mA instrumentation output types
- ❖ Multiple instrumentation output ranges
- ❖ Instrument calibration in English or SI units
- ❖ Sample rate of 10 per second
- ❖ Simple USB connection to the computer.
- ❖ Program storage and instrument calibrations stored in nonvolatile memory
- ❖ Bright touch screen for improved visibility and easy data entry. 3.8-inch, 256 color TFT display.
- ❖ View live test data on color screen
- ❖ Windows-based software available for data viewing and exporting
- ❖ Easy data “dump” to Excel for performing custom data reduction/manipulation
- ❖ Real-time graphing capabilities for each test
- ❖ Quick sample interval changing

Description:

Now you can collect data easily from your current laboratory equipment with the EZ-DAQ System. EZ-DAQ is an 8-channel, 16-bit data acquisition unit* that is easy to use and configure. The EZ-DAQ can perform locally all data acquisition functions (sampling, signal conditioning, A/D conversions), and when connected to a PC, can capture data and display real-time graphs. Designed specifically for the needs of today's soils labs, the unit is flexible, reliable, and robust.

The bright, color screen is easy to read and has a high performance CPU for ultra-fast screen refresh. The screen is rugged for use in dirty, dusty conditions and incorporates a touch-panel for easy data entry. No openings to get clogged or jammed.

In addition, connections for up to eight industry-standard sensors are conveniently located on the rear of the unit.

* EZ-DAQ is not a data logger because it does not store data.



EZ-DAQ device showing, in this photograph, live data for three tests and six sensors. Data from up to eight sensors may be acquired and displayed simultaneously using the EZ-DAQ.

These connections supply the common 10 V dc excitation required by most of today's sensors. Along with the excitation, the connections also handle the sensor return signals. The flexibility designed into the EZ-DAQ System allows for the return signals to be configured in mV, V, or mA, and a multitude of ranges.

The EZ-DAQ-Soft software, which is included with the unit, is highly configurable and simple to use. It gives the ability to display up to eight active channels of data simultaneously on a PC. The system can support as many as six individual tests with each test capable of having its own sampling rate. The test files are saved as delimited text which may be imported easily in a spreadsheet program or simply opened as an ASCII text file.

Communication from the EZ-DAQ to the user's PC is done with standard Ethernet protocol. Set up is uncomplicated because it uses a static IP address.

SPECIFICATIONS

FUNCTIONAL SPECIFICATIONS:

Display:

Size	3.8 inch
Type	Touch screen LCD, color, TFT (thin film transistor) technology.
Colors	256 Colors (No blink) 64 Colors (3 speed blink)
Backlight	Maintenance free LED back lit
Resolution	320×240 pixels
Brightness	Control 16 levels of adjust available via touch panel
Touch Panel	Resistive Film (analog) 1024 x 1024 resolution
Memory - Application	Flash EPROM 6 MB
Memory - Data Backup	Lithium battery backup
Ethernet Interface	IEEE 802.3u, 10BASE-T/100BASE-TX, RJ-45 jack

Analog Input:

Resolution	16-bit
Channels	8 differential
Input Type	mV, V, mA
Input Range	±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V, ±20 mA, 4~20 mA

Rear Connections:

Supply Power (1)	AC Power inlet IEC320 110/220 V ac, 50/60 Hz
Ethernet Interface (1)	IEEE 802.3u, 10BASE-T/100BASE-TX, RJ-45 jack
Sensors (8)	Bulkhead connections (Amphenol type) Number of contacts – 5 Contact arrangement – IEC130-9 Rated voltage – 150 V Current rating – 5 A / +400°C
Instrumentation Supply:	10 V dc

SPECIFICATIONS (continued)

FUNCTIONAL SPECIFICATIONS (continued):

Environmental:

Ambient Operating Temp.	0 to +50°C
Storage Temperature	-20 to +60°C

Computer requirements:

Windows® 2000/XP compatible, Pentium® III or better, 512 MB RAM, 30 MB available hard drive space. Software not compatible with Windows® 95, Windows® ME. Not recommended for Windows® XP-Home Edition. Installation requires administrator access.
--

GENERAL SPECIFICATIONS:

Mechanical:

Dimensions (l x w x h)	9.5 in x 6.37 in x 4.75 in
Weight	10 lb

Electrical:

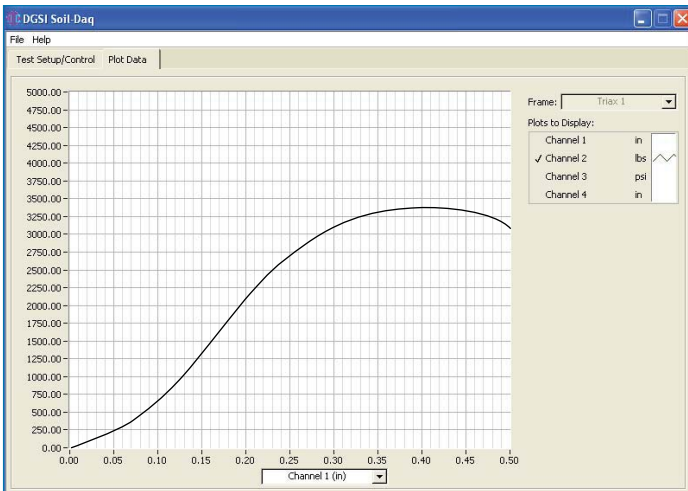
Supply Power	110/220 V ac, 50/60 Hz
--------------	------------------------

LIMITATIONS:

1. EZ-DAQ is not capable of performing data reduction.
2. EZ-DAQ is not compatible with WinSAS software.

ORDERING INFORMATION

	EZ-DAQ System, 110/220 V ac, 50/60 Hz. Includes EZ-DAQ device, Ethernet/USB adaptor, 5-ft Ethernet cable and EZ-DAQ-Soft software for PC.	
E-8000E	As above, with US Customary units	11 lb
E-8000M	As above, with SI units	11 lb



Example of EZ-DAQ-Soft real-time graphing capabilities.

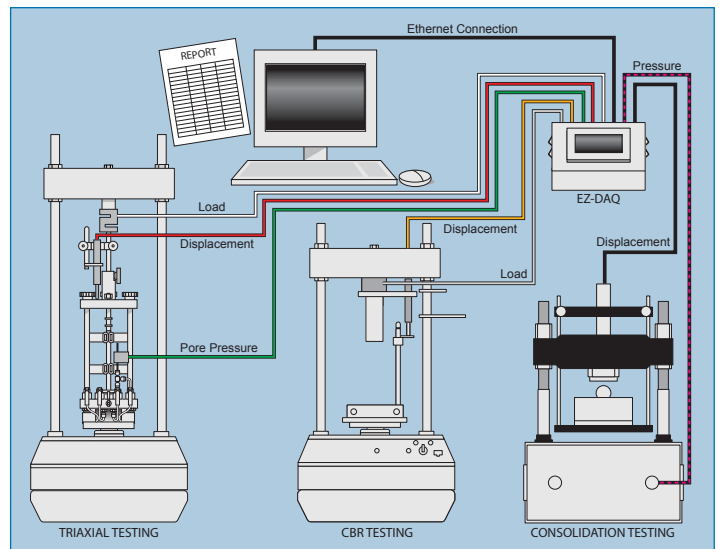


Illustration shows EZ-DAQ acquiring data from three tests while utilizing seven channels. Up to eight channels may be used and data from up to six tests may be acquired simultaneously.

Pressure Transducers

General Purpose Pressure Transducers

May be used to measure pressure of gases. These general purpose models may be used for sensing pressure levels in many kinds of test equipment. The design incorporates a ceramic pressure element in a stainless steel enclosure.



Pressure Transducers

General Purpose Transducers

E-110	General Purpose Pressure Transducer, 0 - 15 psig, male thread
E-111	General Purpose Pressure Transducer, 0 - 30 psig, male thread
E-112	General Purpose Pressure Transducer, 0 - 75 psig, male thread
E-114	General Purpose Pressure Transducer, 0 - 150 psig, male thread
E-116	General Purpose Pressure Transducer, 0 - 300 psig, male thread

Related Items

E-405	Smart Digital indicator
E-8000E	EZ-Daq 8-Channel Data Acquisition System (US units)
E-8000M	EZ-Daq 8-Channel Data Acquisition System (SI units)

Pore Pressure Transducers

Used to measure pore fluid pressure of soil test specimens.

Select the E-120 Series Pore Pressure Transducers for reliability and ease of use. The design incorporates a ceramic pressure element in a stainless steel enclosure and bleed valve to eliminate air traps.



Pore Pressure Transducer

Pore Pressure Transducers

Model	Range		Readability		Shipping Weight
	(psi)	(kPa)	(psi)	(kPa)	
E-120	0 - 30	0 - 207	0.1	0.690	2 lb
E-122	0 - 75	0 - 517	0.1	0.690	2 lb
E-124	0 - 150	0 - 1034	0.1	0.690	2 lb
E-126	0 - 300	0 - 2068	0.1	0.690	2 lb

Replacement Part

2152027	Replacement Teflon Ball for Pore Pressure Transducer
---------	--

Related Items

E-405	Smart Digital indicator
E-8000E	EZ-Daq 8-Channel Data Acquisition System (US units)
E-8000M	EZ-Daq 8-Channel Data Acquisition System (SI units)

Specifications for General and Pore Pressure Transducers

Excitation:	10 V (dc)
Rated Output:	70 mV at full scale
Non-Linearity:	0.2% at full scale
Hysteresis:	0.2% at full scale
Bridge Resistance:	13 k Ohms nominal
Volume Change:	10 - 6 cc full-scale

Displacement Transducers, Strain Gauge Type



Displacement Transducers

These transducers measure deformation or travel:

- Linear deformation in triaxial, CBR & direct shear tests
- Travel of components in testing equipment
- LDT, not LVDT

The E-310 Series of displacement transducers are available in four models with operating ranges between 0.5 - 4.0 in (13 - 102 mm).

Specifications for Displacement Transducers (LDT)

Excitation:	10 V (dc)
Rated Output:	35-65 mV at full scale
Non-linearity:	0.1% at full scale
Hysteresis:	0.1% at full scale
Bridge Resistance:	350 Ohms nominal
Operating Temp:	-10 to 60°C
Excitation Outputs:	5 V (dc), 100 mA maximum, 10 V (dc), 120 mA maximum, 24 V (dc), 50 mA maximum

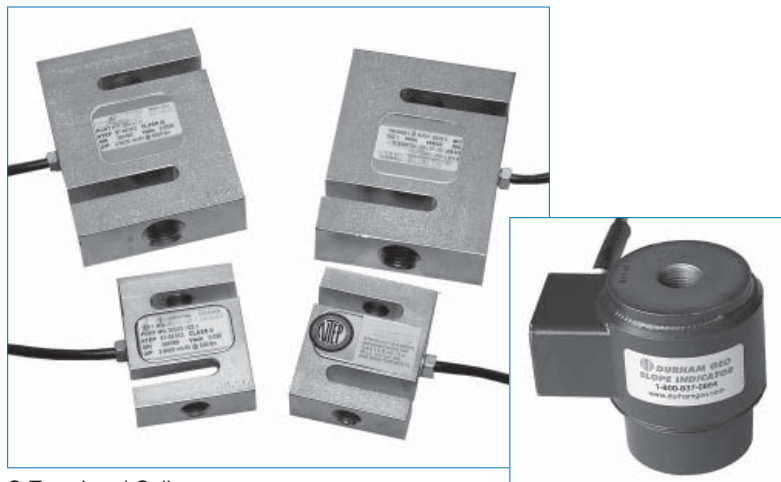
Displacement Transducers (LDT)

Model	Range		Readability		Shipping Weight
	(inches)	(mm)	(inches)	(mm)	
E-310	0.5	13	0.0001	0.0025	2 lb
E-311	1.0	25	0.001	0.025	2 lb
E-312	2.0	50	0.001	0.025	2 lb
E-314	4.0	102	0.001	0.025	2 lb

Related Items

E-405	Smart Digital indicator
E-8000E	EZ-Daq 8-Channel Data Acquisition System (US units)
E-8000M	EZ-Daq 8-Channel Data Acquisition System (SI units)

Load Cells



S-Type Load Cells

Cylindrical Type Load Cell

Load Cells measure the total load applied to a sample. DGS I S-Type load cells display excellent long term stability and have significant overload characteristics to protect against accidental damage. They are made in a variety of ranges and are easily adapted to any type of load frame. Select from the range or contact us for information on other ranges available and calibration in other engineering units.

Load cells have tapped female ends with 1/2 x 20 tpi for E-210 and E-212, and 3/4 x 16 tpi for E-214, E-215, E-216 and E-217.

S-Type and Cylindrical Load Cells

Model	Description	Range (lbf) (kN)	Readability (lbf) (kN)	Weight
E-210	S-Type 0.5k	500 2.2	0.1 .0004	2 lb
E-212	S-Type 2.5k	2,000 8.9	1.0 .004	2 lb
E-214	S-Type 6.0k	6,000 26.7	1.0 .004	4 lb
E-216	S-Type 10.0k	10,000 44.5	10.0 .04	4 lb
E-215	Cylindrical Type 6.0k	6,000 26.7	1.0 .004	5 lb
E-217	Cylindrical Type 10.0k	10,000 44.5	10.0 .04	5 lb

Related Items

E-405	Smart Digital Indicator	5 lb
E-40404	RS-485 Output	
E-8000E	EZ-Daq System (US units)	11 lb
E-8000M	EZ-Daq System (SI units)	11 lb
E-40508	RS-485 to RS-232 Converter	
E-40521	WinSAS™ Collecting Software	

Specifications for	S-Type	Cylindrical Load Cells
Excitation:	10 V (dc)	10 V (dc)
Rated Output:	3 mV/V maximum	3 mV/V maximum
Non-linearity:	0.03% full scale output	± 0.1% full scale output
Hysteresis:	0.03% full scale output	± 0.1% full scale output
Bridge Resistance:	350 ohms nominal	350 ohms nominal
Overload:	100% of rated capacity	15% of rated capacity
Operating Temp:		-65°F to + 250°F



Smart Digital Indicator (E-405) shown with optional transducers



Proving Rings

Proving Rings have a repeatability of 0.2% and an accuracy of 1% or better. They are supplied with a dial indicator, 0.2 in range and 0.0001 in divisions. The rings have tapped female ends, 1/2 in - 20 threads. Each ring is supplied with a calibration chart.

Proving Rings

Model	Description	Accuracy	Sensitivity (lbf/Div)	Weight
E-708	250 lbf (1.1 kN)	0.5%	0.25	4 lb
E-710	500 lbf (2.2 kN)	0.5%	0.5	4 lb
E-711	1,000 lbf (4.45 kN)	1%	1.0	6 lb
E-712	2,000 lbf (8.9 kN)	1%	2.0	6 lb
E-713	2,500 lbf (11.1 kN)	1%	2.5	8 lb
E-714	5,000 lbf (22.2 kN)	1%	5	8 lb
E-716	10,000 lbf (44.5 kN)	1%	10	20 lb

Dial Indicators



(L-R) E-805, E-821 and E-812



E-880



E-332

Dial Indicators

Model	Description	Range	Divisions	Reading	Rotation	Jewel Bearing	Applications	Ship. Weight
E-802	Mechanical, 2 3/4 in Dial	0.2 in	0.0001 in	0-10	CW	No	Proving Rings	1 lb
E-802B	Mechanical with brake	0.2 in	0.0001 in	0-10	CW	No	Proving Rings	1 lb
E-805	Mechanical, 3 5/8 in Dial	0.4 in	0.0001 in	0-20	CCW	Yes	Consolidation	1 lb
E-812	Mechanical, 2 3/4 in Dial	1.0 in	0.001 in	0-100	CCW	No	Triaxial, UCC, CBR	1 lb
E-814	Mechanical, 2 3/4 in Dial	1.0 in	0.001 in	0-100	CW	No	Triaxial, UCC, CBR	1 lb
E-821	Mechanical, 2 1/4 in Dial	2.0 in	0.001 in	0-100	CW	Yes	Triaxial, UCC	1 lb
E-815	Mechanical, 2 3/4 in Dial	25 mm	0.01 mm	0-100	CW	No	Triaxial, UCC, CBR	1 lb
E-825	Mechanical, 2 3/4 in Dial	50 mm	0.01 mm	0-100	CW	Yes	Triaxial, UCC	1 lb
E-332	Digital Display, batt. op.	1.0 in	0.0001 in	0-1	---	---	Triaxial, UCC, CBR	5 lb

Related Items

E-333	AC Power Supply for E-332 (Recommended)	E-860	Extended Contact Point, 1/2 in long (1.3 cm)
E-344	Adaptor for mounting LDT to Magnetic Holder	E-861	Extended Contact Point, 1 in long (2.5 cm)
E-868	Dial Stem Extension Flat Tip, 1/2 in dia., male	E-862	Extended Contact Point, 1.5 in long (3.8 cm)
E-875	Dial Stem Contact Bar for S-610 Load Frame, AM-100, S-600, and S-360	E-863	Extended Contact Point, 2 in long (5.1 cm)
E-877	Dial Holder Assembly for Triaxial Cells	E-864	Extended Contact Point, 3 in long (7.6 cm)
E-880	Magnetic Holder with Swivel Adaptor Post	E-867	Dial Stem Flat Contact Point, 1/4 in dia. (.64 cm)
E-870	Dial Indicator Support Assy for use with S-610 Load Frame, AM-100, S-600, and S-360	E-868	Dial Stem Flat Contact Point, 1/2 in dia. (1.3 cm)
E-885	Dial Holder with Granite Base		

Standard Compaction Kit

ASTM* D 698, D 1557

* See Standards Buyer's Guide at www.DGSI.info/3000.



S-31000 Standard Compaction Kit 100 lb

Set Includes

S-310	5.5 lb Compaction Hammer, 12 in (30.5 cm) drop
S-320	4 in Compaction Mold
S-329	Sample Ejector
S-35710	Straight Edge, beveled
G-30010	Pan, sheet metal, 24 x 24 x 3 in
P-47000	Screen Tray, #4
G-29101	Spoon, stainless steel
G-29202	Scoop
G-510	Rubber Mallet
G-341	Water Bottle
G-30015	Mixing Bowl, stainless steel
G-312	Sample Container, 4 qt HDPE pail w/ lid (4 ea.) (not shown)

For Coarse Grain Soils, Add

S-326	6 in Compaction Mold
P-47008	Screen Tray, 3/4 in
P-47004	Screen Tray, 3/8 in

For Modified Proctor (ASTM D 1557), Add

S-311	10 lb Compaction Hammer, 18 in (45.7 cm) drop
S-326	6 in ID Compaction Mold

Scales

GW-130	Avoirdupois Multipurpose Scale
OR GW-131	Metric Multipurpose Scale
OR GW-152	General Purpose Scale, 15000 g / 33 lb cap. 0.5 g / 0.001 lb readability

Ovens

GO-220	Bench Oven, 7.0 cu ft (see p.111 for details)
OR GO-216	Double-Wall Utility Oven, 115 V (for Atterberg limits) (see p.111 for details)

Compaction Molds and Rammers

Model S-310 ASTM*: D 558, D 559, D 560, D 698

Model S-310 AASHTO*: T 99, T 134, T 135, T 136

Model S-311 ASTM*: D 1557

Model S-311 AASHTO*: T 180

* See Standards Buyer's Guide at www.DGSI.info/3000.

GUIDE FOR SELECTING MOLDS AND RAMMERS

Compactive Application	ASTM Std.	Mold Model	Hammer Model
Standard Proctor	D 558, D 559, D 560, D 698, Method A or B	S-320, S-321 S-322	S-310
Standard Proctor or CBR*	D 698, Method C or D	S-326, S-327	S-310
1 7/8 in (48 mm)	D 1557 Method A	S-320, S-321 S-322	S-311
Modified Proctor	D 1557 Method B	S-326, S-327	S-311
Modified Proctor or CBR*	D 1557 Method C or D	S-326, S-327	S-311

* CBR mold requires the use of spacer disc.

Soil Compaction Molds

The DGSI compaction molds for soil conform to ASTM and AASHTO Standards. They are used with the Auto-mated Soil Compactor or manual soil compaction rammers. Made from zinc plated steel, they have a 2-in. (10.2 cm) collar, base plate and studs with wing nuts for easy dismantling.



Soil Compaction Molds, S-300 series

Soil Compaction Molds

S-320	4 in ID Compaction Mold, 1/30 ft³ (.95 cm³) capacity, 4.584 in high	13 lb
S-321	4 in Tapered Compaction Mold, 1/30 ft³ (.95 cm³) capacity, 4.584 in high	13 lb
S-322	4 in ID Split Compaction Mold, 1/30 ft³ (.95 cm³) capacity, 4.584 in high	15 lb
S-325	6 in Split Compaction Mold, .075 ft³ (2.2 cm³) capacity, 4.584 in high	18 lb
S-326	6 in ID Compaction Mold, .075 ft³ (2.2 cm³) capacity, 4.584 in high	18 lb
S-327	6 in ID CBR Compaction Mold, 7 in high	20 lb
S-328	6 in ID LBR Compaction Mold, 6 in high	19 lb
S-319	6 in ID Split Compaction Mold, 6 in high, Soil Cement	19 lb

Related Items

S-32710	Spacer Disc for S-327 Mold, 5 7/8 in dia. x 2.416 in high
S-32810	Spacer Disc for S-328 Mold, 5 7/8 in dia. x 1.416 in high
S-329	Sample Ejector for Compaction Molds
S-35710	Straight Edge, ground with beveled edge

Sleeve Compaction Rammer

Model S-310 ASTM*: D 558, D 559, D 560, D 698

Model S-310 AASHTO*: T 99, T 134, T 135, T 136

All rammers have a 2-in dia. face. They are provided with a loosely fitting guide sleeve to control drop height without restricting the free fall of the weight. The weight is mounted on the end of a rod. Guide sleeves have four vent holes at each end to allow free air flow during use.



S-311, top, and S-310, bottom

S-310	Sleeve Compaction Rammer, 5.5 lb (2.5 kg), 12 in (30.5 cm) drop	10 lb
S-311	Sleeve Compaction Rammer, 10 lb (4.5 kg), 18 in (45.7 cm) drop	20 lb

Sample Ejector

The DGSI Sample Ejector provides fast extrusion of soil samples from compaction molds. This Ejector may also be used to remove samples from CBR/LBR molds, Marshall molds and Thin-wall Sampler tubes 6-in long.

Standard Features:

- Rugged all steel construction.
- Hydraulic Jack with 6,000 lbf (27 kN) force.
- Adaptor Plates and Pistons available in alternate sizes for other applications.
- Quick-change height adjustment.
- Hydraulic piston, manual.



S-329

S-329	Sample Ejector with upper plate and piston for 4- and 6-in molds	50 lb
Related Items		
S-32924	2.8 in adapter plate and piston (for 3-in Shelby tube extraction)	

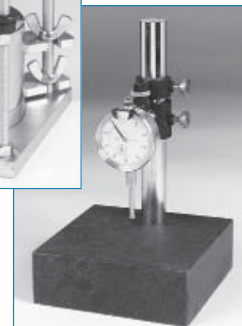
Georgia Swell Mold Device

Georgia Test Method GDT-6

The S-324 Mold and related accessories are designed to meet the specifications of Georgia test method GDT-6, "Method of Test For Determining Volume Change of Soil". The S-324 Mold meets the specifications for both the "Swell" and "Shrinkage" molds.



S-324



E-885 with E-814

The S-32402 Gauge Block is used to "zero" the dial indicator (part # E-814) when the indicator is placed either in the Dial Indicator Holder with Granite Base (part # E-885), or the Cross Head Reference Bar (part # S-32401). The specification also calls for a Nr. 1 qualitative, 4-in dia. paper (S-32405).

S-324	GA DOT Volume Change Mold, 4 in Mold Assembly with Perforated Base Plate	10 lb
Accessories		
S-32401	Cross-Head Assembly	
S-32402	Gauge Block	
S-32405	Filter Paper, 4 in diameter, # 601	
E-885	Dial Indicator Holder with Granite Base	
E-814	Dial Indicator, 1 in travel with 0.001 in readability	
Related Items		
S-310	Compaction Hammer, 5.5 lb (standard)	
S-35710	Straight Edge	
GO-220	Portable Bench oven, 300 °F, 115 V	
Replacement Items		
S-32412	Shrinkage Mold for GA DOT vol. change mold	
S-32413	Base plate for GA DOT vol. change mold	
S-32414	Adjusting nut for GA DOT vol. change mold	

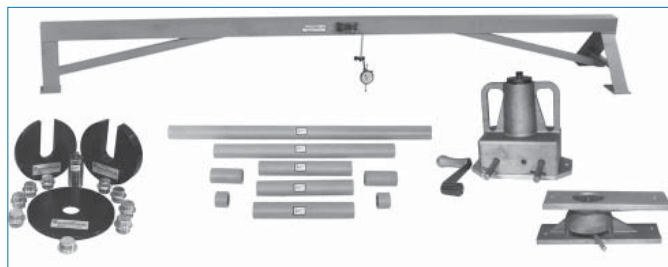
Proctor Penetrometer Test Set

ASTM D 1558 See Standards Buyer's Guide at www.DGSI.info/3000.

The S-172 serves as a rapid field test to determine the approximate amount of moisture in the soil. It is used with Methods A and B of Test Method D 698 to develop relationships between moisture content, density and penetration resistance.

The set includes a spring dynamometer with a scale on the stem of the handle graduated from 10 lb to 130 lb and nine interchangeable needles in a wooden box with carrying handle.

S-172	Proctor Penetrometer Set	32.0 lb
-------	--------------------------	---------



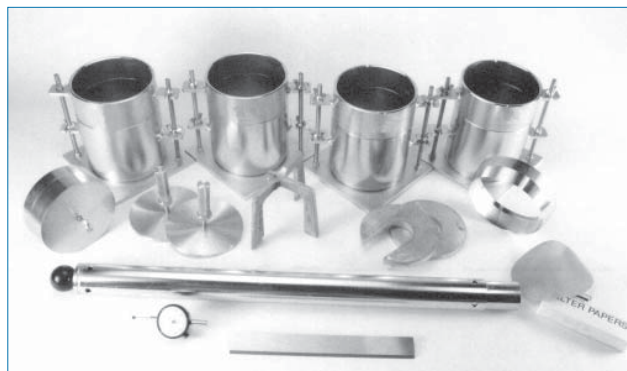
S-180

Field CBR Test Set

ASTM D 4429

The DGSI Field CBR Test Set follows the U.S. Army COE (with optional 3-speed jack) and ASTM recommendations. The set includes a two-speed 10,000 lbf (45 kN) Mechanical Jack, swivel head, an 8 ft long Dial Support Bridge, Piston, Piston Extension and Connector sets. The Penetration Dial Gauge is provided with a magnetic holder. Three Surcharge Masses, a Surcharge Plate and Proving Ring with Dial Indicator completes the Set.

S-180	Field CBR Test Set	310 lb
Set Includes		
E-281	Adapter (2) for Proving Ring	
S-18020	2 x 4 in Penetration Piston	
S-18030	CBR Extension Rod Set, includes one (1) 4, 12, 24 and 36 in rod (one of each, 4 total)	
S-18031	Field CBR Connector Set	
S-18040	CBR Bridge Support	
E-880	Magnetic Gauge Holder	
E-812	Penetration Dial Indicator, 1 in travel, 0.001 in, CCW	
S-18050	Circular 10 lb Surcharge Mass	
S-18060	Slotted 10 lb Surcharge Mass	
S-18070	Slotted 20 lb Surcharge Mass	
S-18005	10,000 lbf 2-Speed Jack (ASTM), 2 in travel	
S-18006	Swivel Base for 2-Speed Jack S-18005	
E-716	10,000 lbf Proving Ring w/ Dial Indicator	
Related Items:		
S-18010	3-Speed Jack (COE), 2 in travel, 10,000 lbf	
S-18011	Swivel Base for 3-Speed Jack S-18010	
E-712	Proving Ring, 2,000 lbf	
E-715	Proving Ring, 6,000 lbf	



S-350

Laboratory CBR Test Set

ASTM* D 1883 * See Standards Buyer's Guide at www.DGSI.info/3000.

A convenient package of the apparatus needed for CBR/LBR Testing. It may be used with either the motor driven S-610 Unconfined Compression Load Frame, S-611 Automated Load Frame or the S-360 Hand Operated CBR/LBR Load Frame.

S-350	Laboratory CBR Test Set	175 lb
S-35099	Laboratory LBR Test Set	175 lb
Set Includes		
<u>For CBR Test Set</u>		
S-327	(4) CBR Molds, 6 in (15.2 cm) ID	
S-32710	CBR Spacer Disc, steel 5-15/16 in (13.1 cm) x 2.416 in (61 mm)	
S-359	CBR Filter Papers, #613, box of 100	
S-352, S-353, S-354, E-814, S-355A, S-356A, S-311, S-35710 as described below		
<u>For LBR Test Set</u>		
S-328	(4) LBR Molds, 6 in (15.2 cm) ID	
S-32810	LBR Spacer Disc, steel 5-7/8 in (14.9 cm x 1.416 in (36 mm)	
S-35910	LBR Filter Papers, #631, box of 100	
S-352, S-353, S-354, E-814, S-355A, S-356A, S-311, S-35710 as described below		
S-352	(4) Filter Screens, #100 brass, 5-15/16 in (15.1 cm) dia.	
S-353	(4) Swell Plates, 5-7/8 in (14.9 cm) dia.	
S-354	Aluminum Tripod Attachment for use with the Swell Plate	
E-814	Mechanical 2-3/4 in Dial Indicator, 1 in x 0.001 in divisions	
S-355A	(4) Surcharge Weights 5-7/8 in (14.9 cm) OD	
S-356A	(4) Slotted Surcharge Weights, 5-7/8 in (14.9 cm) dia.	
S-311	10 lb Compaction Hammer	
S-35710	Straight Edge, ground with beveled edge	
Accessories not included in set		
S-357	Steel Cutting Edge, tubular, 6 in (15.2 cm) ID, hardened	
C-253	Metal Curing Tank, 137 gal (519 L) capacity, 24 x 24 x 60 in (0.6 x 0.6 x 1.5 m)	
C-254	Metal Curing Tank, 300 gal (1136 L) capacity, 36 x 96 x 24 in (0.9 x 0.6 x 2.8 m)	

See p.52 for the Sample Ejector which may be used to remove samples from CBR/LBR molds, Marshall molds and thin-wall sampler tubes 6-in long.

Automated Soil Compactor

Uniform, consistent and safe compaction for quality test results — layer after layer.

ASTM* D 558, D 559, D560, D 698, D 1557

AASHTO* T-99*, T-134, T-135, T-136, T-180

* See Standards Buyer's Guide at www.DGSI.info/3000.



S-333 Automated Soil Compactor shown with hammer and mold. (hammers and molds sold separately).

The S-333 Automated Soil Compactor provides uniform, consistent and safe mechanical compaction of Proctor and CBR samples for quality test results in the laboratory. Mechanized compaction minimizes inconsistencies and operator errors associated with hand compaction and frees the operator for other tasks.

Benefits:

- Soil layers are uniformly compacted, every time.
- Conformity to ASTM and AASHTO standards for hammer drop height is assured because the hammer lift compensates for changing sample height.
- Display shows number of layers and blow counts per layer to prevent common causes of operator errors. Blows can be pre-set in memory and automatically stop the machine.
- Changing hammer drop height (to accommodate alternate test requirements) is simple and very quick — just insert a couple of spacers and you're ready. 12 or 18 in drop.
- Safety operation — fully enclosed drive mechanism, locking mechanism to prevent the hammer from falling when the machine is OFF, and emergency shut-off button.
- Rotating base accepts molds from a variety of manufacturers.
- Works with standard, CBR and LBR molds.



For more information please visit www.DGSI.info/3093

SPECIFICATIONS

Lift Mechanism	Self-tensioning chain drive
Drop Height	Adjustable, 12 in (305 mm) or 18 in (457 mm)
Hammer Clearance	11 in (279 mm) between hammer face and rotating mold base
Control Panel	Machine: Emergency "Off" button; jog switch, reset switch; Start and Stop buttons.
Display	LED displays number of layers and blow counts.
Compaction Rate	26 blows per minute
Power Supply	1/3 hp (0.25 kW) motor 7 A at 115 V or 3.5 V at 220 V
Oper. Temp.	32 to 150 °F (0 to 65 °C)
Dimensions and Volume:	
Footprint	25 x 23 in (635 x 584 mm) W x D
Max. Height	48 in (1.22 m) without hammer shaft extended. 84 in (2.13 m) with 7" soil and shaft extended.
Total Ship. Vol.	57.4 ft ³ (1.62 m ³)
Weight:	
Total Ship. Wt	384 lb (175 kg)

ORDERING INFORMATION

S-333	Automated Soil Compactor, 110 V, 60 Hz. Order hammer(s) separately.	385 lb
S-33310	Automated Soil Compactor, 220 V, 60 Hz. Order hammer(s) separately.	385 lb

Accessories:

S-33360	Cam Mold Clamp Assembly (2 required)	3 lb
S-320	4 in (102 mm) Compaction Mold	13 lb
S-32013	Mold Base 4 in	5 lb
S-326	6 in (152 mm) Compaction Mold	18 lb
S-32613	Mold Base 6 in	8 lb
330302	Mold Base Tie Rod	1 lb

Hammers: At least one hammer must be selected.

S-33380	5.5 lb (2.5 kg) Hammer with Round Face	7 lb
S-33385	5.5 lb (2.5 kg) Hammer with Pie-shaped Face	7 lb
S-33390	10 lb (4.5 kg) Hammer with Round Face	14 lb
S-33395	10 lb (4.5 kg) Hammer with Pie-shaped Face	14 lb
S-33020	Calibration Kit. Meets ASTM D 2168	
S-33050	Lead Calibration Cylinders, 100/pack	

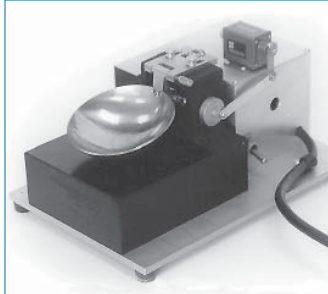
Related Items:

S-329	Sample Ejector	
S-35710	Straight Edge, Beveled	
G-30010	Pan, sheet metal, 24" x 24" x 3"	
P-47000	Screen Tray, #4, 14 3/4" x 22 3/4"	
G-29202	Scoop	
G-510	Rubber Mallet	
G-341	Water Bottle	
G-30015	Stainless Steel Mixing Bowl	
GW-120	Heavy Duty Solution Balance. Other balances available — see Section 6, Laboratory Equipment.	
GO-215	Double Wall Utility Oven, 115 V. Other ovens available — see Section 6, Laboratory Equipment.	
GO-220	Bench Oven, 7.0 ft ³	
For Coarse Grain Soil Add:		
P-47008	Screen Tray, 3/4", 13 3/4" x 22 3/4"	
P-47004	Screen Tray, 3/8", 13 3/4" x 22 3/4"	

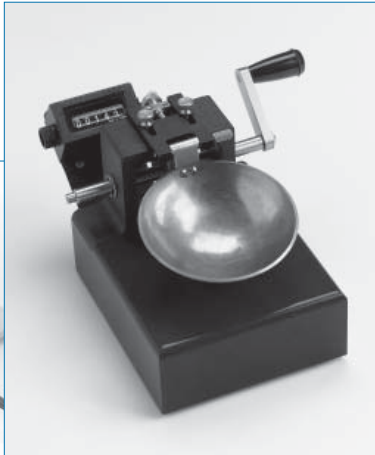
Liquid Limit Device

ASTM* D 4318
AASHTO* T 89

* See Standards Buyer's Guide at
www.DGSI.info/3000.



Motorized Liquid Limit Device,
S-272



Manual Liquid Limit Device, S-271

The Liquid Limit Device aids in determining the amount of water needed to liquefy a soil sample. DGSI offers two models of this device, a manual and motor driven model.

- Manual with hand crank for right or left hand use **without** drop counter, S-27100.
- Manual with hand crank for right or left hand use **with** drop counter, S-271.
- Motor driven with gear for proper operating speed, with automatic drop counter and switch, S-272.

Both models are made in accordance with the specifications of ASTM D 4318 and come with grooving tools as specified in the adjacent table.

Liquid Limit Set



Liquid Limit Set, Model S-270

Liquid Limit Devices and Set

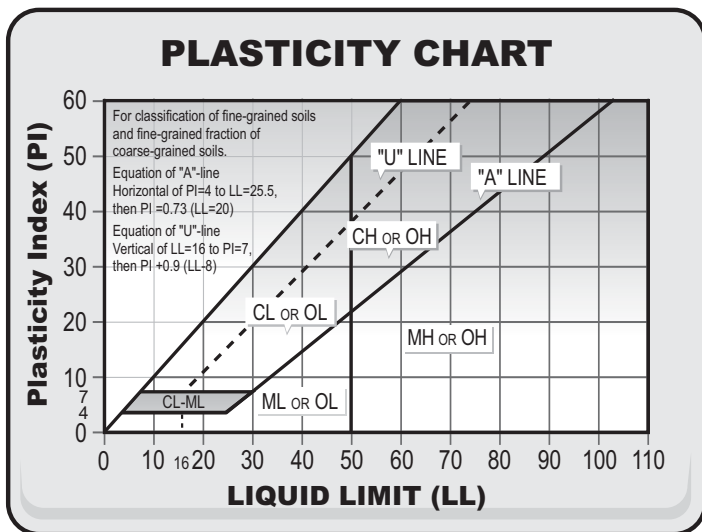
S-271	Liquid Limit Device with counter w/ plastic flat grooving tool, pkg. of 10	9 lb
S-27100	Liquid Limit Device without counter w/ plastic flat grooving tool, pkg. of 10	9 lb
S-272	Liquid Limit Device, motor driven w/ flat grooving tool, 110 V, 60 Hz	14 lb
S-27210	Liquid Limit Device, motor driven w/ flat grooving tool, 220 V, 50 Hz	14 lb
S-270	Liquid Limit Set Includes:	14 lb
	S-271 Liquid Limit Device w/ counter	
	G-340 Plastic Dispensing Bottle	
	G-386 Evaporating Dish	
	G-29301 Flexible Spatula	
	G-36110 Graduated Cylinder, 100 ml	
	G-31510 Alum. Sample Boxes (12)	

Related Items

S-274	Buchner Decant Assembly
S-276	Wedge Grooving Tool, steel, (AASHTO T-89)
S-275	Flat Grooving Tool, steel, w/ Measuring Block
S-27510	Flat Grooving Tool, Plastic, pack of 10
S-293	Dessicator
C-285	Durometer, Type-D, for testing hardness of the base of the Liquid Limit Devices for compliance with ASTM D 4318
C-286	Durometer, Type-A, for testing feet on LL Device
S-27150	Resiliency (Rebound) Tester
PCF-80040	Brass Sieve, 8-in, SS mesh #40

Repair Parts

S-27140	Counter Assembly
S-273	Brass Cup with Holder and Follower
S-27101	Rubber feet for liquid Limit Device



Vacuum Desiccator

ASTM D 4318

The S-274 consists of a 178 mm Buckner funnel and a plastic flask. Filter paper is included.

A source of vacuum — such as a vacuum pump or aspirator — is required.

S-274



S-274	Vacuum Desiccator
600246	Filter paper, coarse
S-27405	6-position Manifold for multiple S-274 (not shown)
Accessories:	
G-400	Vacuum pump
G-40911	Vacuum tubing, 1/4" ID x 1/2" OD

Plastic Limit Set

ASTM* D 4318 AASHTO* T 90

* See Standards Buyer's Guide at www.DGSI.info/3000.

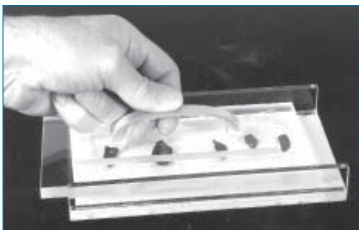
The DGSI Plastic Limit Set includes all the items needed, including the ground glass plate, 12 x 12 x 3/8 in (30.5 x 30.5 x 0.95 cm), and one side sand blasted, as described in the applicable standards.

S-277	Plastic Liquid Limit Set	13 lb
Set Includes:		
S-27710	Ground Glass Plate for Plastic Limit, 12 x 12 x 3/8 in	
G-340	Plastic Dispensing Bottle	
G-386	Evaporating Dish	
G-29301	Flexible Spatula	
G-36025	Graduated Cylinder, 25 ml	
G-315	Aluminum Sample Boxes (12)	
Related Items:		
S-293	Dessicator	
S-278	Plastic Limit Roller	

Plastic Limit Roller

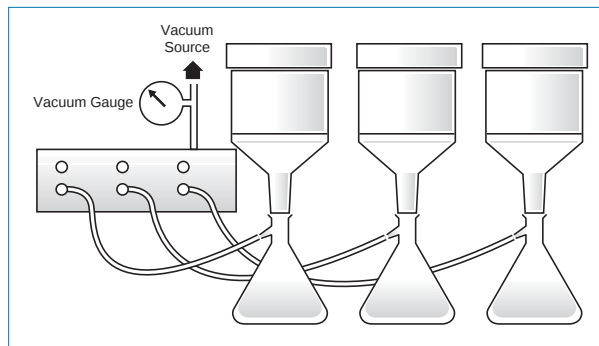
ASTM D 4318 AASHTO T 90

Top and bottom roller plates are separated by 1/8 in (3.2 mm) side rails. Contact surfaces of the plates are covered by sheets of a special adhesive-backed absorbent paper that will not add fiber to the soil samples. Up to five soil samples can be rolled simultaneously. Made from rigid 3/16 in (4.8 mm) acrylic. It measures 8 x 4.5 x 1 1/4 in (20.3 x 11.4 x 3.2 cm). and is supplied with 50 sheets of adhesive paper.



S-278

S-278	Plastic Limit Roller	4.0 lb
S-27801	Adhesive Paper, pad of 50 sheets	1.0 lb



The use of a manifold allows multiple S-274 to be connected to one vacuum source. Connect up to six flasks with manifold S-27405 and tubing G-40911.

Shrinkage Limit (Mercury Method)

ASTM* D 427 AASHTO* T 92

* See Standards Buyer's Guide at www.DGSI.info/3000.

The Shrinkage Limit apparatus is described in detail in the applicable ASTM and AASHTO standards. The Shrinkage Limit Set includes all the items needed.



S-295

Caution: Mercury is a hazardous substance which can cause serious health effects from prolonged inhalation of the vapor or contact with the skin. Take proper precautions when using, including gloves, containment and ventilation in the use area.

S-295	Shrinkage Limit Set (Mercury Method)	6 lb
Set Includes:		
G-387	Evaporating Dish, 5-7/8 in dia.	
S-29510	Monel Shrinkage Dish	
S-29520	Crystallizing Dish	
S-29530	Shrinkage Prong Plate	
G-36025	Graduated Cylinder, 25 ml	
Related Items:		
S-29540	Mercury, (3) 1 lb Poly Flasks w/ dispensing tip	
S-29599	Mercury Spill Cleanup Kit	

Mercury Spill Kit

Mercury Spill Kit provides a safe and easy way to clean up accidental spills in the laboratory. Includes instructions, dust pan, scraper, safety glasses, gloves, absorbent sponges, absorbent powder, and Ziploc bag.



S-29599

S-29599	Mercury Spill Clean Up Kit
---------	----------------------------

Specific Gravity and Absorption Set

ASTM* C 128

AASHTO* T 84

* See Standards Buyer's Guide at

www.DGSI.info/3000.

The Specific Gravity and Absorption Set includes a pycnometer with conical mold and tamper. The pycnometer is a 1 qt glass jar with a rubber gasket, brass tapered top and 3/8 in hole. The mold and tamper are used prior to specific gravity measurement to establish when a surface-dry condition is reached.



S-292

S-292	Specific Gravity and Absorption Set	1.0 lb
-------	-------------------------------------	--------

Includes:

S-29220 Pycnometer, 1 qt capacity

S-29250 Sand Absorption Cone

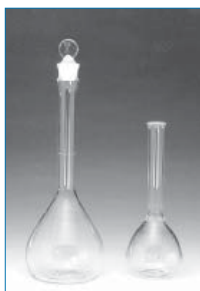
S-29290 Tamper

Volumetric Flasks

ASTM* D 854 AASHTO* T 100

* See Standards Buyer's Guide at www.DGSI.info/3000.

Volumetric Flasks are made from heat-resistant glass and are graduated to contain the specified volume at 20 °C (68 °F) within allowable tolerances. Available without stoppers or with standard ground stoppers.



Volumetric Flasks

Volumetric Flasks		
S-29105	Spec. Gravity Bottle, 50 ml w/ perf. stopper	1 lb
S-29111	100 ml Volumetric Flask, Unstoppered	2 lb
S-29121	250 ml Volumetric Flask, Unstoppered	2 lb
S-29151	500 ml Volumetric Flask, Unstoppered	2 lb
S-29120	250 ml Volumetric Flask, Ground Glass Stopper	2 lb
S-29150	500 ml Volumetric Flask, Ground Glass Stopper	2 lb
G-169	Thermometer 1 - 50° C x 0.1	
S-29151-1	Rubber Stopper w/ hole for 500 ml flask	

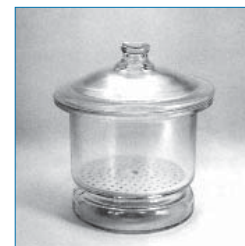
MISCELLANEOUS

Desiccator

The Desiccator is made of heavy glass with wide rims. The cover and rim are ground true to ensure a tight fit. The inside diameter is 8.0 in (203 mm).

S-293 includes the jar, lid and plate.

S-293



S-293	Dessicator - 8 in inside diameter	20.0 lb
-------	-----------------------------------	---------

Related Items

S-29312 Dessicator Plate

S-29310 Dessicator Cover, 20 cm diameter

G-400 Vacuum Pump

G-430 Dessicant, 5# Container (color reactive)

Calcium Carbonate Content Chamber

ASTM D 4373

The test provides a quantitative measurement of the calcium carbonate content of marine soils. A 1-gram dried soil sample is treated with hydrochloric acid in the sealed chamber. A pre-calibrated gauge indicates the pressure of carbon dioxide produced.

Clear acrylic with anodized end caps. 10 psi gauge, bleed valve and cap.



S-296

S-296	Calcium Carbonate Content Chamber	4.0 lb
-------	-----------------------------------	--------

Related Items

GW-342 Electronic Dual Balance, 1000 x 0.01 g and 4000 x 0.1 g

GW-111 Mech. Balance, 310 g x 0.01 g