

## Standards Buyers Guide

## ASTM C 29

GW-135	Portable Bench Beam Balance, 131 lb
Or GW-34413	Electronic Bench Scale, 200 lb
C-353	Tamping Rod, 5/8" dia
G-29202	Scoop
G-170	Thermometer, General Purpose

Choose unit weight bucket based on aggregate size

C-601	Unit Weight Bucket, 1/10 cu ft
C-603	Unit Weight Bucket, 1/3 cu ft
C-605	Unit Weight Bucket, 1/2 cu ft
C-609	Unit Weight Bucket, 1 cu ft

Choose Strike Off Plate

C-61130	Strike Off Plate, 10 x 10 in
C-61150	Strike Off Plate, 12 x 12 in
C-61190	Strike Off Plate, 16 x 16 in, 1/2 in thick, acrylic

## ASTM C 31

*Making & Curing Concrete Test Specimens in the Field*

*Choose appropriate size molds*

C-209	Lipped Concrete Mold, 6 x 12
C-20910	Plastic Lids for Lipped Molds, 6 x 12
C-210	Plastic Cylinder Molds for 6 x 12
C-212	Domed Lids for C-210
C-215	Plastic Cylinder Mold, 3 x 6
C-21510	Flat Lid for 3 x 6 Molds
C-218	Plastic Cylinder Mold, 2 x 4
C-21810	Flat Lids for 2 x 4 Molds
C-220	Plastic Cylinder Mold, 4 x 8
C-221	Domed Lids for 4 x 8 mold

(see ASTM C 470 for devices needed to verify molds)

Choose Beam Mold

C-231	Steel Beam Mold, 6x6x24
Or C-234	Plastic Beam Mold, 6x6x21, plastic
C-233	Beam Mold Field Cover
C-345	Concrete Vibrator
C-540	Pocket Tachometer

Choose Accessories

G-510	Rubber Mallet
C-352	Graduated Tamping Rod 5/8"
C-353	Tamping Rod, 5/8"
C-357	Tamping Rod (Puddling), 3/8" x 12"
G-161	Pocket Dial Thermometer
G-15910	Armored Case Concrete Thermometer
C-252	Field Curing Box
	Economy Curing Box
	Transport Rack
	Thermostatically Controlled Heater
G-180	Max-Min thermometer
Or G-180E	Electronic Max Min Thermometer, two channel

Also needed: wheel barrow, concrete trowel, and items to perform slump, and air content.

*Compressive Strength of Cylindrical Concrete Specimens*  
*Select load frame of appropriate load capacity*

CM-200	300,000 lb capacity w/ single readout
CM-216	300,000 lb capacity w/ advanced readout
CM-400	500,000 lb capacity w/ single readout
CM-416	500,000 lb capacity w/ advanced readout

The above come with platens for 6 x 12 cylinders.  
Select appropriate Platen sets if other size cylinders

are to be tested.

C-18040	Cube Platen Set, 2" specimens
C-18060	Platen set for 3x6 cylinders
C-18070	Platen Set for 4 x 8 cylinders
C-170	Flexural Beam Test Attachment
301110	Splitting Tensile Strength Bar

(Note: On site calibration of load frames required upon delivery and anytime load frame is moved.)

## ASTM C 40 AASHTO T 21

*Organic Impurities in Fine Aggregates for Concrete*

C-404	Organic Impurities Test Set
Consist of:	
C-405	16 oz Graduated Glass Test Bottle (6)
C-410	Color Standards Chart
C-415	Sodium Hydroxide Beads, 1 lb container

## ASTM C 42

*Obtaining and Testing Drilled Cores and Sawed Beams of Concrete Coring Drills*

C-822	Trailer Mounted Coring Drill
C-752	Portable Electrical Core Drill
C-820	Portable Gasoline Core Drill

Concrete Core Bits

C-71042	4 1/4 OD x 4 ID Diamond Core bit, Closed Back
C-71062	6 1/4 OD x 4 ID Diamond Core bit, Closed Back

(note other sizes and open back bits available)

## ASTM C 70

C-424	Chapman Specific Gravity Flask
GW-115	Triple Beam Balance, 2610 gram
Or GW-342	Dual Range Electronic Balance

## ASTM C 78

*Flexural Strength of Concrete*

C-16001	Flexural Load Frame
Or CM-216	300,000 lb load Frame
And C-170	Flexural Beam Attachment
G-193	Dial Caliper, 0-12"

**ASTM C 87***Effects of Organic Impurities in Fine Aggregate on Strength of Mortar*

C-248	Flow Table, Manual, with mold
Or C-24810	Flow Table, Motorized, with mold
C-24805	Flow Calipers
C-235	Cube Mold, 2" square, 3 gang
C-238	Rubber Tamper
G-296	Trowel
Compression Machine	with cube platens (see ASTM C 39)
G-250	Mortar Mixer

**ASTM C 109***Compressive Strength of Hydraulic Cement Mortars using 2" Cube Specimens*

C-235	Cube Mold, 2" Square, 3 Gang, Bronze
GW-115	Triple Beam Balance, 2610 gram x 0.1 gram
Or GW-342	Dual Range Electronic Balance
G-37125	Graduated Cylinder, Plastic, 250 ml
G-37150	Graduated Cylinder, Plastic, 500 ml
G-250	Mortar Mixer
C-238	Hard Rubber Tamper
G-296	Trowel, 2 3/4" x 5 1/2", Triangular
C-248	Flow Table, Manual, w/ Mold
Or C-24810	Flow Table, Motorized, with Mold
G-29201	Scoop, Small
C-401	Cube Test Sand, 50 lb bag

**ASTM C 117***Materials Finer than # 200 Sieve in Mineral Aggregates by Washing*

GW-115	Triple Beam Balance, 2610 gram x 0.1
Or GW -342	Dual Range Electronic Balance
PCF-80016	Brass Sieve, 8" dia, # 16 ss mesh
P-404	Wet Wash Sieve, 8" dia, by 4" deep
Or P-40410	Wet Wash Sieve, 8' dia x 4", with backup
G-30014	Pan, Stainless Steel, 13.5" dia x 5" deep
GO-220	Oven, Forced Draft, 7.0 cu ft
Or GO-216	Oven, Gravity Convection, 2.0 cu ft
P-620	Aggregate Wash Drum

**ASTM C 127***Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate*

GW-30315	Electronic Balance, 12,000 x 0.1 gram
	With weigh below capability
C-625	Density Wire Basket
A-532	Water Tank, 45 gallon
PCF-80004	Brass Sieve, 8" dia, # 4 ss mesh

**ASTM C 128***Density, Relative Density (Specific Gravity) and Absorption of Fine Aggregates*

GW-115	Triple Beam Balance, 2610 gram
Or GW-342	Electronic Dual Range Balance
G-29151	Volumetric Flask, 500 ml
S-292	Specific Gravity and Absorption Set
	Consists of:
	S-29220 Pycnometer, 1 qt capacity
	S-29250 Sand Absorption Cone
	S-29290 Tamper
C-425	Le Chatelier Density Flask
G-170	General Purpose thermometer

**ASTM C 131***Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine*

C-658	LA Abrasion Machine
Or C-660	Enclosed LA Abrasion Machine
C-66020	Abrasion Charges, set of 12
	Ovens, Scales, sieves and handling pans also required.

**ASTM C 136***Sieve Analysis of Fine and Coarse Aggregates*

P-260/261/262	Screen Shaker
	With appropriate size screen trays
P-220	Portable Sieve Shaker, 8"
Or P-231/240	Ro-Tap Sieve Shaker, 8" / 12"
Or P-200/210	Laboratory Sieve Shaker, 8"/12"
	With appropriate size sieves
P-410/411/412/413	Sieve Brushes
	Ovens, Scales, sample splitters and handling pans also required

**ASTM C 138***Density (Unit Weight), Yield and Air Content (Gravimetric) of Concrete*

GW-135	Platform Balance, 131 lbs x 0.01 lb
Or GW-40513	Electronic Bench Scale, 220 x .01 lb
C-352	Tamping Rod, Graduate, 5/8"
Or C-353	Tamping Rod, 5/8"

Choose unit weight bucket based on aggregate size

C-601	Unit Weight Bucket, 1/10 cu ft
C-603	Unit Weight Bucket, 1/3 cu ft
C-605	Unit Weight Bucket, 1/2 cu ft
C-609	Unit Weight Bucket, 1 cu ft

Choose Strike Off Plate

C-61130	Strike Off Plate, 10 x 10 inches
C-61150	Strike Off Plate, 12 x 12 inches
C-61190	Strike Off Plate, 16 x 16 in, 1/2 in thick, acrylic
G-510	Rubber Mallet

(Note: C-345 Vibrator required if slump is 1" or less)

*Slump of Hydraulic-Cement Concrete*

C-350	Slump Cone Test Set
	Includes:
C-335	Slump Cone
C-351	Aluminum Base Plate
C-352	Graduated Tamping Rod
G-29202	Scoop
C-354	Funnel, Slump Cone

(Note: Tape Measure or stiff ruler, wheel barrow or G-30009 Material Handling Pan also needed)

**ASTM C 151***Autoclave Expansion of Portland Cement*

C-254	Cement Mortar Autoclave
C-24520	Test Specimen Holder (holds 8)
C-24550	Length Comparator
C-24557	Contact Points
C-24541	Single Bar Mold, 1x1x10 in
C-24542	Dual Bar Mold, 1x1x10in
G-296	Triangular Trowel

**ASTM C 173***Air Content of Freshly Mixed Concrete by the Volumetric Method*

Select the Volume Meter:

C-440	Roll-A-Meter, Bonze
C-440A	Light weight, Air Volume Meter, Aluminum
C-445	Air Volume Meter, Plastic

(accessories required for all three models of Volume Meters)

G-29202	Scoop
G-510	Rubber Mallet

**ASTM C 231***Air Content of Freshly Mixed Concrete by the Pressure Method*

Select the Air Meter

C-435	Press-UR-Meter w/ wood case
C-435A	Air Meter with Plastic case
G-510	Rubber Mallet
G-29202	Scoop

*Optional Equipment*

C-44201	Calibration Vessel (canister), 5%
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**ASTM C 403***Time of Setting of Concrete Mixtures by Penetration Resistance*

C-241	Mortar Penetrometer
G-170	General Purpose Thermometer
C-353	Tamping Rod, 5/8"

Sample containers, pipettes, and handling pans also required

**ASTM C 490***Use of Apparatus for the Determination of Length Change of Hardened Cement Paste, Mortar and Concrete*

C-24550	Length Comparator
C-24557	Contact Points
C-24541	Single Bar Mold, 1x1x10 in
C-24542	Dual Bar Mold, 1x1x10in

**ASTM C 496***Splitting Tensile Strength of Cylindrical Concrete Specimens*

301110	Splitting Bar, 12 x 12 x 3 in
G-191	Concrete Micrometer, 5.5 to 6.5 in.

Compression machine to meet ASTM C 39 required  
Bearing strips of 1/8" plywood, 1" wide required

**ASTM C 511***Moist Cabinets, Moist Rooms and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes*

C-250	Humidifier
C-254	Curing Tank
C-255	Heater, Curing Tank
C-256	Submersible Circulating Pump
G-184/185	Temperature Recorder
C-252	Concrete Curing Box

**ASTM C 535 AASHTO T 96**

C-658	LA Abrasion Machine
Or C-660	Enclosed LA Abrasion Machine
C-66020	Abrasion Charges, set of 12

Ovens, Scales, sieves and handling pans also required.

**ASTM C 597***Pulse Velocity Through Concrete*

C-561	Ultrasonic Concrete Testing System
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Related Items:

C-561220	Handheld Terminal
C-56130	Coupling Grease

**ASTM C 617**

*Capping Cylindrical Concrete Specimens*

- G-29105 Stainless Steel Capping Ladle
- G-153 Thermometer
- Select capping fixture of appropriate size
- C-275 Vertical Cylinder Capping Fixture, 6"
- C-27510 Vertical Cylinder Capping Fixture, 4"
- C-27520 Vertical Cylinder Capping Fixture, 3"

Select Warming Pot of suitable capacity

- GO-230 Warming Pot, 4 qt
- GO-231 Warming Pot, 8 qt
- GO-232 Warming Pot, 12 qt
- GO-23220 Warming Pot, 20 qt

Select type of capping compound

- C-280 Capping Compound, powder
- C-281 Capping Compound, ingot
- C-282 Capping Compound, Hi Strength flakes

Cube molds to verify strength of capping compound

- C-235 Cube mold, 2", 3 gang
- C-23510 Cover Plate, 3 hole, Cube Mold

**ASTM C 803**

*Penetration Resistance of Hardened Concrete*

- C-510 Windsor Probe Test System
- C-520 Silver Probe Kit, 3 probes / set
- C-530 Gold Probe Kit, 3 probes / set

**ASTM C 805**

*Rebound Number of Hardened Concrete*

- C-500 Concrete Test Hammer  
Includes: rubbing stone and carrying case
- Or C-505 Digital Concrete Test Hammer
- Accessories and replacement parts
- C-50010 Rubbing Stone
- C-50020 Calibration Test Anvil

**ASTM C 1231 AASHTO T 22**

*Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders*

- C-289 6" Capping Pad Set
- C-28904 4" Capping Pad Set
- C-28903 3" Capping Pad Sets  
(sets include 2 steel receivers and 2 pads, Durometer 60)

Replacement Items:

- C-288 6" Steel Receivers, set of 2
- C-293 6" Capping Pads, pair, soft
- C-294 6" Capping Pads, pair, medium
- C-295 6" Capping Pads, pair, hard
- C-28804 4" Steel Receivers, set of 2
- C-28705 4" Capping Pads, pair, medium
- C-28706 4" Capping Pads, pair, hard
- C-28803 3" Steel Receivers, set of 2
- C-28701 4" Capping Pads, pair, soft
- C-28702 4" Capping Pads, pair, medium
- C-28703 4" Capping Pads, pair, hard

**ASTM D 421 AASHTO T 87, T 146**

*Dry preparation of soil samples for particle size analysis and determination of soil constants.*

- P-421 Soil Mortar
- P-420 Soil Pestle, rubber tipped
- PCF-80004 #4 Sieve, 8 in diameter
- PCF-80010 #10 Sieve, 8 in diameter
- PCF-80040 #40 Sieve, 8 in diameter
- PB-180 Brass Pan
- PB-185 Cover
- GW-117 Dial O Gram Triple Beam Scale, 2610 g x 0.1 g
- GW-11520 Stainless steel scoop and counterweight
- Or GW-342 Electronic Balance, Dual Range
- P-512 Sample Splitter, 1 in
- G-30012 Mixing Pan, Stainless Steel

**ASTM D 422 AASHTO T 88**

*Particle Size Analysis (hydrometer analysis).*

- GW-110 Dial-O-Gram Balance, 310 g x 0.01 g
- Or GW-342 Electronic Balance, Dual Range
- GW-117 Dial-O-Gram Triple Beam Scale, 2610 g x 0.1 g
- GW-11520 Stainless steel scoop and counterweight
- S-30020 Stirring apparatus with paddle and cup
- S-300 Hydrometer, 151 H
- S-301 Hydrometer, 152 H
- S 30010 Hydrometer Jar
- G-18731 Thermometer, 2 to 80°C x 0.2
- PCF-83000 3 in Sieve, 8 in diameter
- PCF-82000 2 in Sieve, 8 in diameter
- PCF-81500 1 1/2 in Sieve, 8 in diameter
- PCF-81000 1 in Sieve, 8 in diameter
- PCF-80750 3/4 in Sieve, 8 in diameter
- PCF-80380 3/8 in Sieve, 8 in diameter
- PCF-80004 #4 Sieve, 8 in diameter
- PCF-80008 #8 Sieve, 8 in diameter
- PCF-80010 #10 Sieve, 8 in diameter
- PCF-80016 #16 Sieve, 8 in diameter
- PCF-80020 #20 Sieve, 8 in diameter
- PCF-80030 #30 Sieve, 8 in diameter
- PCF-80040 #40 Sieve, 8 in diameter
- PCF-80050 #50 Sieve, 8 in diameter
- PCF-80060 #60 Sieve, 8 in diameter
- PCF-80100 #100 Sieve, 8 in diameter
- PCF-80140 #140 Sieve, 8 in diameter
- PCF-80200 #200 Sieve, 9 in diameter
- PB-180 Brass Pan

**ASTM D 427 AASHTO T 92**

Shrinkage factor of soils.

G-387	Evaporating Dish
S-29510	Monel Shrinkage Dish
G-29520	Crystallizing Dish
G-29530	Prong Plate
G-36025	Graduated Cylinder
S-29540	Mercury, 1 lb
GW -117	Dial O Gram Triple Beam Scale, 2610 g x 0.1 g
Or GW-342	Electronic Balance, Dual Range
S-35710	Beveled Straight Edge
S-56028	Acrylic Plate
S-35710	Straight Edge

Need: 6" straight edge and glass plate

**ASTM D 558 AASHTO T 134***Standard Method for Moisture-Density Relations of Soil-Cement Mixtures*

S-320	4" Compaction Mold
Or S-322	4" Split Compaction Mold
S-310	Standard Proctor Hammer, 5.5 lbs
Or S-335	Mechanical Compaction Hammer
GW-342	Electronic Dual Range Balance
Or GW-115	Triple Beam Balance, 2610 x 0.1 gram
GW-135	Platform Balance, 131 lbs x 0.01 lb
Or GW-40511	Bench Scale 50 lb x 0.002 lb/25 kg x 0.001kg
S-35710	Straight Edge, beveled
P-47030	Screen Tray, 3" mesh
P-47008	Screen Tray, 3/8" mesh
P-47000	Screen Tray, #4 mesh
G-30014	Round Bowl, SS, 13" x 5"
G-29101	Sampling Spoon
G-296	Triangular Trowel
G-29402	Preparation Knife, large
G-30004	Pan, S/S 12-5/8x10-1/2x2-1/2 22GA SS
GO-220	Oven, Forced Draft
G-316	Moisture Cans, Aluminum

**ASTM D 559 AASHTO T 135***Test Methods for Wetting & Drying Compacted Soil Cement Mixtures*

S-320	4" Compaction Mold
Or S-322	4" Split Compaction Mold
S-310	Standard Proctor Hammer, 5.5 lbs
Or S-335	Mechanical Compaction Hammer
GW-342	Electronic Dual Range Balance
Or GW-115	Triple Beam Balance, 2610 x 0.1 gram
GW-135	Platform Balance, 131 lbs x 0.01 lb
Or GW-40511	Bench Scale 50 lb X 0.002 lb/25 kg X 0.001kg
S-35710	Straight Edge, beveled
P-47030	Screen Tray, 3" mesh
P-47008	Screen Tray, 3/8" mesh
P-47000	Screen Tray, #4 mesh
G-30014	Round Bowl, SS, 13" x 5"
G-29101	Sampling Spoon
G-296	Triangular Trowel
G-29402	Preparation Knife, large
G-30004	Pan, S/S 12-5/8x10-1/2x2-1/2 22GA SS
GO-220	Oven, Forced Draft
G-316	Moisture Cans, Aluminum
G-29003	Scratch Brush
G-192	Dial Caliper, 0-6"
G-37125	Glass Graduated Cylinder, 250 ml

Also need sample carriers, trays, moisture room and 6 prong ice pick.

**ASTM D 698 AASHTO T 99***Moisture Density relations of soils and soil aggregate mixtures (5.5 lb hammer, 12 in drop)*

S-310	Compaction Hammer, 5.5 lb
Or S-335	Mechanical Compaction Hammer
S-320	Compaction Mold, 4 in (Methods A & B)
S-326	Compaction Mold, 6 in (Method C)
S-35710	Beveled Straight Edge
S-329	Sample Ejector
GW-120	Solution Balance, 20 kg x 1 g
Or GW-40511	Bench Scale 50 lb X 0.002 lb/25 kg X 0.001kg
GW-115	2610 gram Triple Beam Balance
Or GW-342	Electronic Balance Dual Range
GO-220	Forced Draft Lab Oven
S-35710	Straight Edge
P-47000	Screen Tray #4
P-47008	Screen Tray, 3/4"
P-47004	Screen Tray, 3/8"
G-30010	Sample Prep Pan, 24 x 24
G-30015	Stainless Steel Mixing Pan
G-316	Aluminum Moisture Box
G-535	Laboratory Tongs
G-37220	Plastic Graduated Cylinder
G-296	Mixing Trowel
G-29101	Mixing Spoon
G-29202	Scoop
G-341	Water Bottle, 16 oz
G-510	Rubber Mallet
G-29303	Spatula

**ASTM D 854 AASHTO T-100**

Specific Gravity of Soils

Select Volumetric Flask of appropriate size

- S-29111 100 ml Volumetric Flask, Unstoppered
- S-29121 250 ml Volumetric Flask, Unstoppered
- S-29151 500 ml Volumetric Flask, Unstoppered
- S-29120 250 ml Volumetric Flask, Plain Stopper
- S-29150 500 ml Volumetric Flask, Plain Stopper
- S-29151 One hole rubber stopper for 250 & 500 ml flask

Other Items

- GW-30312 Electronic Balance, 2100 gram x 0.01 gram
- GO-220 Oven, Forced Draft
- G-169 Thermometer, -1 to 51 C x 0.1
- S-293 Desiccator
- G-430 Dessicant, color reactive
- GO-235 Hot Plate, 6.26 x 6.25 inches
- G-400 Vacuum Pump
- G-299 Vacuum Aspirator
- S-274 Buckner Funnel Assembly w/ Flask
- PCF-80004 #4 Sieve, 8" diameter, Brass w/ss mesh
- G-530 High Temperature Cotton Gloves, pair  
Cooler, Stryrofoam (purchase locally)

**ASTM D 1140**

*Amount of Material in Soils Finer than the # 200 Sieve*

- GW-342 Electronic Balance, Dual Range
  - P-40410 Wet Wash Sieve # 200 with B/U, 8" x 4" deep
  - P-40610 Wet Wash Sieve #200, 8" dia x 8" deep
  - PCF-80040 Brass Sieve, # 40 ss mesh, 8" diam
- Other sieve sizes may be necessary based on soil particle size
- S-30060 Sodium Hexametaphosphate, 1 lb

**ASTM D 1556 ASSHTO T 191**

*Density of soil in place by the sand cone method.*

- S-120 Sand Cone Apparatus
- S-121 Density Base Plate
- S-125 Density Sand, 100 lb, w/ plastic bag  
Or 2190-A Density Sand, 100 lb, paper bag
- GW-130 Field Scale, 36 lb x 0.01 lb
- GW-115 Triple Beam Scale, 2610 g x 0.1 g  
Or GW-50030 Electronic Balance, 15 Kg x 2 Grams  
GW-50099 Carrying Case for GW-30030
- G-500 Pick Hammer
- G-515 Chisel
- G-29101 Spoon
- G-29001 Brush
- G-510 Rubber Mallet
- G-310 Field Can
- GO-220 Portable Bench Oven 250°F
- G-316 Aluminum Moisture Cans
- G-535 Laboratory Tongs

Note: Field Moisture Contents can be performed by Model S-141 Speedy Moisture Tester, hot plate or camp stove

**ASTM D 1557 AASHTO T 180**

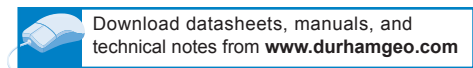
*Moisture Density relations of soils and soil-aggregate mixtures (10 lb hammer and 18 in drop).*

- S-311 Compaction Hammer, 10 lb  
Or S-335 Mechanical Compactor
- S-320 Compaction Mold, 4 in (Methods A & B)
- S-326 Compaction Mold, 6 in (Method C)
- S-35710 Beveled Straight Edge
- S-329 Sample Ejector
- GW-120 Solution Balance, 20 kg x 1 g  
Or GW-40511 Bench Scale 50 lb X 0.002 lb/25 kg X 0.001kg
- GW-115 2610 gram Triple Beam Balance  
Or GW-342 Electronic Balance Dual Range
- GO-220 Forced Draft Lab Oven
- S-35710 Straight Edge
- P-47000 Screen Tray #4
- P-47008 Screen Tray, 3/4"
- P-47004 Screen Tray, 3/8"
- G-30010 Sample Prep Pan, 24 x 24
- G-30015 Stainless Steel Mixing Pan
- G-316 Aluminum Moisture Box
- G-535 Laboratory Tongs
- G-37220 Plastic Graduated Cylinder
- G 296 Mixing Trowel
- G 29101 Mixing Spoon
- G-29202 Scoop
- G-341 Water Bottle, 16 oz
- G-510 Rubber Mallet
- G-29303 Spatula

**ASTM D 1558**

*Moisture Content Penetration Resistance Relationships of Fine-Grained Soils*

- S-172 Proctor Penetrometer Set
  - GW-347 Electronic Bench Scale, 110 lbs x 0.05 lbs
- Items to perform ASTM D 698 also needed.



**ASTM D 1883      AASHTO T 193***CBR (California Bearing Ratio of compacted soils)*

S-350      CBR Lab Set

Which Contains

S-327      (4) CBR Mold, 6" I.D.  
 S-32710    (1) CBR Spacer Disk, 2.416 thick  
 S-359      (1) CBR Filter Paper  
 S-352      (4) Filter Screens, #100 brass  
 S-353      (4) Swell Plates, 5 7/8" diameter  
 S-354      (1) Aluminum Tripod  
 E-814      (1) Dial Indicator  
 S-355A     (4) Surcharge Weight, Circular  
 S-356A     (4) Surcharge Weight, Slotted  
 S-311      (1) Compaction Hammer  
 S-35710    (1) Straight Edge with Beveled Edge

Sample Preparation Equipment which is the same as equipment needed for ASTM D698 and D1557 listed above

S-329      Sample Ejector  
 GW-120    Solution Balance, 20 kg x 1 g  
     Or GW-40511 Bench Scale 50 lb X 0.002 lb/25 kg X 0.001kg  
 GW-115    2610 gram Triple Beam Balance  
     Or GW-342 Electronic Balance Dual Range  
 GO-220    Forced Draft Lab Oven  
 S-35710    Straight Edge  
 P-47000    Screen Tray #4  
 P-47008    Screen Tray, 3/4"  
 P-47004    Screen Tray, 3/8"  
 G-30010    Sample Prep Pan, 24 x 24  
 G-30015    Stainless Steel Mixing Pan  
 G-316      Aluminum Moisture Box  
 G-535      Laboratory Tongs  
 G-37220    Plastic Graduated Cylinder  
 G-296      Mixing Trowel  
 G-29101    Mixing Spoon  
 G-29202    Scoop  
 G-341      Water Bottle, 16 oz  
 G-510      Rubber Mallet  
 G-29303    Spatula

Load Frame, Either Mechanical or Manual

S-360      Manual CBR load frame, w/ Penetration Piston

S-610      Mechanical Load Frame

And Either

S-61020    Mechanical CBR Accessory Set

Or S-61025 Electronic CBR Accessory Set

Note: The S-611 offers automated Load Frame, data collection and report preparation

**ASTM D 2166***Unconfined compressive strength of soil.*

S-611 &amp; S-61130 Automated UCC Load Frame, Electronic Accessories and software

Or S-610    Mechanical Load Frame

And either

S-61030    Mechanical Accessory Set  
 Or S-61035 Electronic Accessory Set  
 G-190      Stop Watch  
 GW-117    Dial-O-Gram Triple Beam Scale, 2610 g x 0.1 g  
 Or GW-342 Dual Range Electronic Balance  
 G-192      Dial Caliper, 0-6"  
 Or G-194    Digital Caliper, 0-12"  
 S-240      Sample Extruder for Shelby Tubes, full length  
 Or S-329 & Sample Ejector  
     S-32922 Accessory Set for 3 in Shelby tubes  
 S-57428    Miter Box  
 S-57628    Trimming Device  
 G-29402    Large Preparation Knife  
 G-295      Open Wire Saw

Note: If remolded samples are needed then add

S-57729    Compaction Mold, 2.875 x 6"

S-57728    2.8" Gauge Block

S-577      Sliding Weight Hammer

Equipment to perform D 2216 Moisture Content of Soils is also needed

**ASTM D 2167      AASHTO T 205***Density and unit weight of soil in place by the rubber balloon method.*

Balloon Density Apparatus Choose either S 130, S 132, or S 133.

S-130      1/20 ft<sup>3</sup>S-132      1/13 ft<sup>3</sup>S-133      1/10 ft<sup>3</sup>

GW-130    Field Scale, 36 lb x 0.01 lb

GW-115    Triple Beam Scale, 26 10 g x 0.1 g

G-310      Field Can

G-500      Pick Hammer

G-515      Chisel

G-29101    Mixing Spoon, stainless

G-29001    Dusting Brush

G-510      Rubber Mallet

GO-220    Portable Bench Oven 250°F

G-316      Aluminum Moisture Cans

G-535      Laboratory Tongs

Note: Field moisture contents can be determined by Model S-141 Speedy Moisture Tester, hot plate, or camp stove

**ASTM D 2168***Calibration of Laboratory Mechanical-Rammer Soil Compactor*

S-33020    Calibration Kit

S-33050    Lead Calibration Cylinders, 100/ pk

**ASTM D 2216**

*Water Moisture Content of Soil and Rock*

- GO-220 Forced Draft Oven, 7.0 ft<sup>3</sup>  
(recommended)
- Or GO-216 Gravity Convection Oven, 2.0 ft<sup>3</sup>
- GW-342 Electronic Balance, Dual Range
- Or GW-115 Triple Beam Balance, 2610 gram x 0.1
- And GW -110 Dial-O-Gram Balance, 310 gram x 0.01
- G-316 Aluminum Moisture containers, with lids
- S-293 Dessicator
- Or S-29350 Dessicator Cabinet
- G-340 Desiccant, 5 lb container, color reactive
- G-530 Gloves, High Temperature, Cotton
- G-535 Laboratory tongs
- G-29401 Knife, Sample Preparation
- G-29302 Spatula, medium
- LT-98 Quartering Canvas
- P-512 Sample Splitter, Riffle type, 1" chutes

**ASTM D 2434 ASHTOO T 215**

*Permeability of Granular Soils*

- S-488 Constant Head Tank and Wall Mounted Manometer

*Select Cell Based on sample particle size*

- S-48625 Sand Gravel Permeameter, 2.5"
- S-486 Sand Gravel Permeameter, 3.0" (most popular)
- S-48645 Sand Gravel Permeameter, 4.5"
- S-48660 Sand Gravel Permeameter, 6.0"
- S-48090 Sand Gravel Permeameter, 9.0"
- G-299 Vacuum Aspirator
- Or G-400 Vacuum Pump
- S-577 Sliding Weight Hammer
- G-29201 Scoop, Small
- G-170 Thermometer, General Purpose
- G-36125 Glass Graduated Cylinder, 250 ml
- Or G-37125 Plastic Graduated Cylinder, 250 ml
- G-30015 Stainless Steel Bowl, 17" x 6"
- G-190 Stop Watch
- GW-115 Triple Beam Balance, 2610 x 0.1 gram

**ASTM D 2435 AASHTO T 216**

*One dimensional consolidation properties of soil.*

- Select either a Pneumatic Load Frame
- S 450 Terraload Consolidation Device
- S 45040 Digital Transducer Readout matched with 150 psi Pressure Transducer
- G-410 Laboratory Air Compressor
- TR-738 Air Filter, Regulator Assembly
- Or a Dead Weight Load Frame
- S-449 Dead Weight Load Frame
- S-44901 Weight set, 16 TSF
- Other weight sets available, see catalog description
- And Select either a Floating ring
- S-453 Floating Ring Consolidometer
- Or a Fixed Ring Consolidometer
- S-455 Fixed Ring Consolidometer
- Select a Measuring device, dial gauge or electronic
- E-805 Dial Indicator, 0.4 in x 0.0001 in and flat tips
- Or E-405 Smart Digital Transducer Readout with a
- E-310 Linear displacement Transducer, 0.5 x 0.0001 in
- E-344 LDT Mount Bracket or E-342
- Displacement Transducer mounted to Dial Indicator
- Other Items
- S45599 Calibration Disk
- G-29402 Preparation Knife
- G-295 Wire Saw
- S-359 Filter Paper, cut to size
- GW-342 Electronic Dual Range Balance
- Equipment to perform ASTM D 2216 also needed

**ASTM D 2850 AASHTO T 296**

- Unconsolidated Undrained Triaxial Compression Test on Cohesive Soils
- S-600 Triaxial Load Frame
- Or S-6100E Load Frame, 0.005 to 0.200 speed range
- E-212 Load cell, 2,000 lb capacity
- E-405 Digital Readout calibrated to E-212
- S-500 Panel, 3 burettes for one cell
- S-502 Extension Panel, 6 burettes for 2 cells
- S-505 Deairing Tank
- Or S-530 Nold Deairing Apparatus
- S-510 Triaxial Cell with 1.4 and 2.8" accessories
- E-814 Dial Indicator, 1.0 inch x 0.001
- S-54028 Membranes, 2.8"
- S-57028 Membrane Stretcher, 2.8"
- S-56128 Glass Fiber Filter Disc, 2.8"
- G-5002G High Vacuum Grease

**ASTM D 2850 AASHTO T 296** (continued)

*Unconsolidated Undrained Triaxial Compression Test on Cohesive Soils*

- G-192 Dial Caliper, 0-6"
  - GW-342 Dual Range Electronic Balance
  - Or GW-115 Triple Beam Balance, 2610 x 0.1 gram
  - And GW-110 Dial-O-Gram, 310 x 0.01 gram
  - G-400 Vacuum Pump
  - G-410 Laboratory Air Compressor
  - TR-738 Filter Regulator Assembly
  - S-57428 Split Mitre Box, 2.8"
  - G-295 Wire Saw
  - G-29402 Large Sample Knife
  - S-35710 Straight Edge, Beveled
- Equipment to perform ASTM D 2216 Moisture Content of Soils also needed

Items to extrude sample from Shelby Tube

- S-240 Sample Extruder
- And S-24030 Sample Tray for S-240 extruder
- Or S-329 Sample Ejector
- And S-32924 Adaptor Plate and Piston, 2.8"

Items to remold sample (technique will decide actual items)

- S-57729 2.875 x 6" Compaction Mold
- S-57730 Spacer Plug, 2.85 x 2"
- S-57728 Gauge Block
- G-510 Rubber Mallet
- S-577 Sliding Weight Hammer
- S-575 Pneumatic Kneading Compactor
- S-57528 Split Compaction Mold
- S-57228 Vacuum Split Mold

Optional and Suggested Spare Items

- S-53028 O-rings, pack of 4, 2.8"
- S-55028 Porous Stones, 2.8",
- S-57629 Soil Sample Trimmers, Lathe
- And S-57606 2.8" cap for S-57629 Trimmer

**ASTM D 2937**

*Density of Soil in Place by the Drive Cylinder Method*

- S-104 Density Drive Sampler
- S-10230A Density Drive Tubes, 4" Swaged end
- Or Optional S-10230 Drive tubes, straight bevel end
- S-35710 Straight Edge
- GW-115 Triple Beam Balance, 2610 gram x 0.1
- GW-11905 Plastic Carry Case for GW-115
- GW-33040 Portable Balance 6000 x 1 gram
- GW-33090 Hard Carrying Case for GW-33040

Note: Field moisture determination equipment is also needed. (Such as the S-141 Speed Moisture Tester or Hot plate.)

**ASTM D-3385**

*Infiltration Rate of Soils in Field using Double Ring Infiltrometer*

- S-475 Double Ring Infiltrometer Set
  - G-189 Digital Stop Watch
  - G-18731 Thermometer, -2 to 81°C by 0.2°C
  - G-510 Rubber Mallet
  - S-110 Hand Auger Set
- Other items to be purchased locally including level, steel tape measure, steel ruler, 2x4 or 4x4 wood, water container.

**ASTM D 4318 AASHTO T 89**

*Liquid Limit, Plastic Limit and Plasticity index of soils.*

- S-271 Liquid Limit Device with counter
  - Or S-272 Motorized Liquid Limit Device with counter
  - S-27510 Plastic Grooving Tool, Set/12
  - S-275 Metal ASTM Tool with Measuring Block
  - S-275 AASHTO Wedge Grooving Tool
  - G-315 Small Aluminum Moisture Cans w/ lids
  - GW-110 Dial-O-Gram Balance, 310 g x 0.01 g
  - Or GW-342 Electronic Balance, dual range
  - Or GW-30312 Electronic Balance, 2100 gram x 0.01 gram
  - G-386 Evaporating Dish, 4 5/8" diameter
  - S 27710 Plastic Limit Plate
  - S-278 Plastic Limit Roller (optional)
  - S-27801 Adhesive paper for S-278
  - G 29301 Spatula
  - PCF-80040 #40 Brass Sieve, 8" dia, ss mesh
  - G 340 Plastic Dispensing Bottle
  - C 36110 Graduated Cylinder, 200 ml
  - G-36025 Graduated Cylinder, 25 ml
  - GO-220 Portable Bench Oven 250°F
  - G 3001 Stainless steel bowl, 9 in dia.
- Equipment necessary to perform ASTM D 2216 also needed

