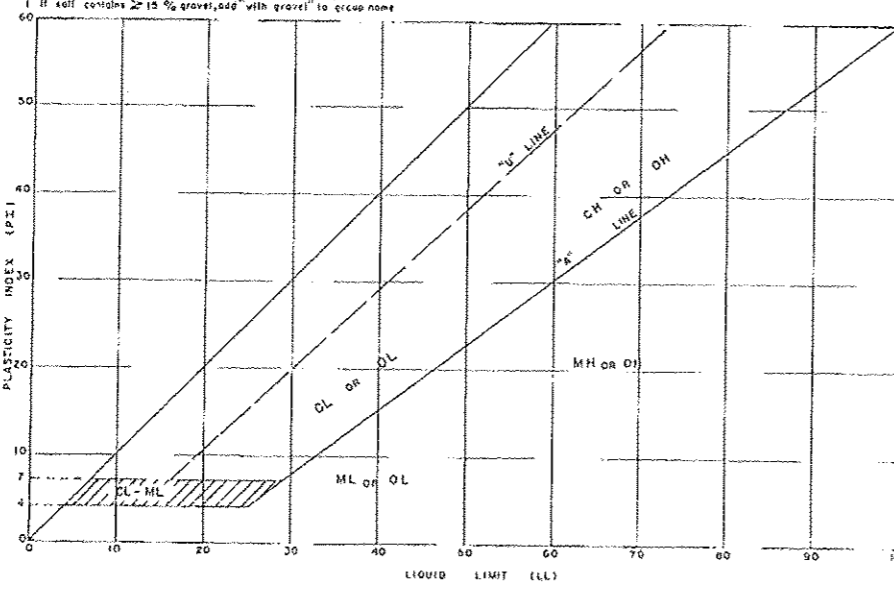


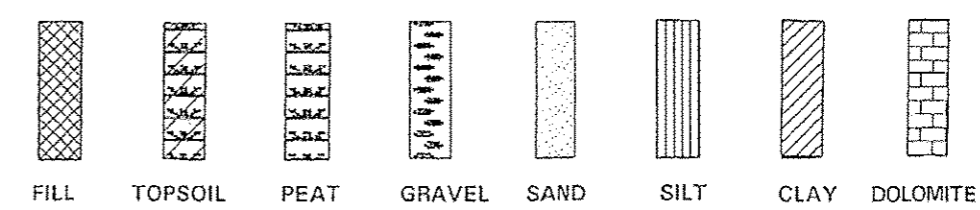
**TESTING SERVICE CORPORATION
UNIFIED CLASSIFICATION CHART**

CRITERIA FOR ASSIGNING GROUP SYMBOLS AND GROUP NAMES USING LABORATORY TESTS ^a			SOIL CLASSIFICATION
			GROUP SYMBOL GROUP NAME ^b
COARSE-GRAINED SOILS More than 50% of coarse fraction retained on No. 200 sieve	GRAVELS More than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS Less than 5% fines ^c	$C_u \geq 4$ and $1 \leq C_c \leq 3$ ^e GW Well-graded gravel ^f
		GRAVELS WITH FINES More than 12% fines ^c	$C_u < 4$ and/or $1 > C_c > 3$ ^e GP Poorly-graded gravel ^f
		CLEAN SANDS Less than 5% fines ^d	Fines classify as ML or MH GM Silty gravel ^{g,h}
		SANDS WITH FINES More than 12% fines ^d	Fines classify as CL or CH GC Clayey gravel ^{g,h}
	SANDS 50% or more of coarse fraction passes No. 4 sieve	CLEAN SANDS Less than 5% fines ^d	$C_u \geq 6$ and $1 \leq C_c \leq 3$ ^e SW Well-graded sand ^f
		SANDS WITH FINES More than 12% fines ^d	$C_u < 6$ and/or $1 > C_c > 3$ ^e SP Poorly-graded sand ^f
FINE-GRAINED SOILS 50% or more passed the No. 200 sieve	SILTS & CLAYS Liquid limit less than 50%	Inorganic	PI ≥ 7 and plots on or above "A" line ⁱ CL Lean clay ^{k,l,m}
		Organic	PI < 4 or plots below "A" line ⁱ ML Silt ^{k,l,m}
	SILTS & CLAYS Liquid limit 50% or more	Inorganic	PI plots on or above "A" line ⁱ CH Fat clay ^{k,l,m}
		Organic	PI plots below "A" line ⁱ MH Elastic silt ^{k,l,m}
		Organic	Liquid limit - oven dried Liquid limit - not dried < 0.75 OH Organic clay ^{k,l,m,n} Organic silt ^{k,l,m,n}
		Organic	Liquid limit - oven dried Liquid limit - not dried < 0.75 OH Organic clay ^{k,l,m,n} Organic silt ^{k,l,m,n}
		Primarily organic matter, dark in color, and organic odor PT Peat	

a. Based on the material passing the 3-in. (75-mm) sieve.
b. If field sample contains cobbles and/or boulders, add "with cobbles and/or boulders" to group name.
c. Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GP-GC poorly-graded gravel with clay
SP-SC poorly-graded sand with silt
d. Sands with 5% to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SP-SC well-graded sand with clay
e. $C_u = \frac{D_{60}}{D_{10}}$ $C_c = \frac{(D_{30})^2}{D_{10} \cdot D_{60}}$
f. If soil contains $\geq 15\%$ sand, add "with sand" to group name.
g. If fines classify as CL-ML, use dual symbol GC-GM, SC-SM.
h. If fines are organic, add "with organic fines" to group name.
i. If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.
j. If Atterberg Limits plot in hatched area, soil is a CL-ML, silty clay.
k. If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel" whichever is predominant.
l. If soil contains $\geq 30\%$ plus No. 200, predominantly sand, add "sand" to group name.
m. If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravel" to group name.
n. PI ≥ 4 and plots on or above "A" line.
o. PI ≥ 4 or plots below "A" line.
p. PI plots on or above "A" line.
q. PI plots below "A" line.



**TESTING SERVICE CORPORATION
LEGEND FOR BORING LOGS**



- SAMPLE TYPE:**
SS = Split Spoon
ST = Thin-Walled Tube
A = Auger
- FIELD AND LABORATORY TEST DATA:**
N = Standard Penetration Resistance in Blows per Foot
Wc = In-Situ Water Content
Qu = Unconfined Compressive Strength in Tons per Square Foot
* Pocket Penetrometer Measurement; Maximum Reading = 4.5 tsf
 γ_D = Dry Unit Weight in Pounds per Cubic Foot

- WATER LEVELS:**
▽ White Drilling
▽ End of Boring
▽ 24 Hours

SOIL DESCRIPTION:

MATERIAL	PARTICLE SIZE RANGE
BOULDER	Over 12 inches
COBBLE	12 inches to 3 inches
Coarse GRAVEL	3 inches to 3/4 inch
Small GRAVEL	3/4 inch to No. 4 Sieve
Coarse SAND	No. 4 Sieve to No. 10 Sieve
Medium SAND	No. 10 Sieve to No. 40 Sieve
Fine SAND	No. 40 Sieve to No. 200 Sieve
SILT and CLAY	Passing No. 200 Sieve

COHESIVE SOILS		COHESIONLESS SOILS	
CONSISTENCY	Qu	RELATIVE DENSITY	N
Very Soft	Less than 0.3	Very Loose	0 - 4
Soft	0.3 to 0.6	Loose	4 - 10
Stiff	0.6 to 1.0	Firm	10 - 30
Tough	1.0 to 2.0	Dense	30 - 50
Very Tough	2.0 to 4.0	Very Dense	50 and over
Hard	4.0 and over		

MODIFYING TERM	PERCENT BY WEIGHT
Trace	1 - 10
Little	10 - 20
Some	20 - 35