







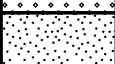
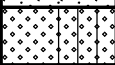










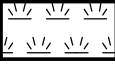

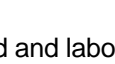


# UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2488

MAJOR DIVISION		GROUP SYMBOL	LETTER SYMBOL	GROUP NAME	
<b>COARSE GRAINED SOILS</b> CONTAINS MORE THAN 50% FINES	<b>GRAVEL AND GRAVELLY SOILS</b> MORE THAN 50% OF COARSE FRACTION <u>RETAINED</u> ON NO. 4 SIEVE	GRAVEL WITH <u>* 5% FINES</u>		GW	Well-graded GRAVEL
		GRAVEL WITH <u>* 5% FINES</u>		GP	Poorly graded GRAVEL
		GRAVEL WITH BETWEEN 5% AND 15% FINES		GW-GM	Well-graded GRAVEL with silt
				GW-GC	Well-graded GRAVEL with clay
				GP-GM	Poorly graded GRAVEL with silt
				GP-GC	Poorly graded GRAVEL with clay
	GRAVEL WITH $\geq 15\%$ FINES		GM	Silty GRAVEL	
			GC	Clayey GRAVEL	
	<b>SAND AND SANDY SOILS</b> MORE THAN 50% OF COARSE FRACTION <u>PASSING</u> ON NO. 4 SIEVE	SAND WITH <u>* 5% FINES</u>		SW	Well-graded SAND
		SAND WITH <u>* 5% FINES</u>		SP	Poorly graded SAND
		SAND WITH BETWEEN 5% AND 15% FINES		SW-SM	Well-graded SAND with silt
				SW-SC	Well-graded SAND with clay
				SP-SM	Poorly graded SAND with silt
				SP-SC	Poorly graded SAND with clay
SAND WITH $\geq 15\%$ FINES			SM	Silty SAND	
			SC	Clayey SAND	
<b>FINE GRAINED SOILS</b> CONTAINS MORE THAN 50% FINES	SILT AND CLAY	LIQUID LIMIT <u>LESS</u> THAN 50		ML	Inorganic SILT with low plasticity
				CL	Lean inorganic CLAY with low plasticity
				OL	Organic SILT with low plasticity
	LIQUID LIMIT <u>GREATER</u> THAN 50		MH	Elastic inorganic SILT with moderate to high plasticity	
			CH	Fat inorganic CLAY with moderate to high plasticity	
			OH	Organic SILT or CLAY with moderate to high plasticity	
HIGHLY ORGANIC SOILS			PT	PEAT soils with high organic contents	

**NOTES:**

- 1) Sample descriptions are based on visual field and laboratory observations using classification methods of ASTM D2488. Where laboratory data are available, classifications are in accordance with ASTM D2487.
- 2) Solid lines between soil descriptions indicate change in interpreted geologic unit. Dashed lines indicate stratigraphic change within the unit.
- 3) Fines are material passing the U.S. Std. #200 Sieve.