



SOIL DESCRIPTION

Color

GROUP NAME (Symbol): color, grain size, moisture, density/consistency, other descriptors, etc.

i.e.: Poorly Graded sand (SP): Brown, fine to medium grained, slightly micaceous, moist, dense, slight hydrocarbon odor

UNIFIED SOIL CLASSIFICATION SYSTEM¹

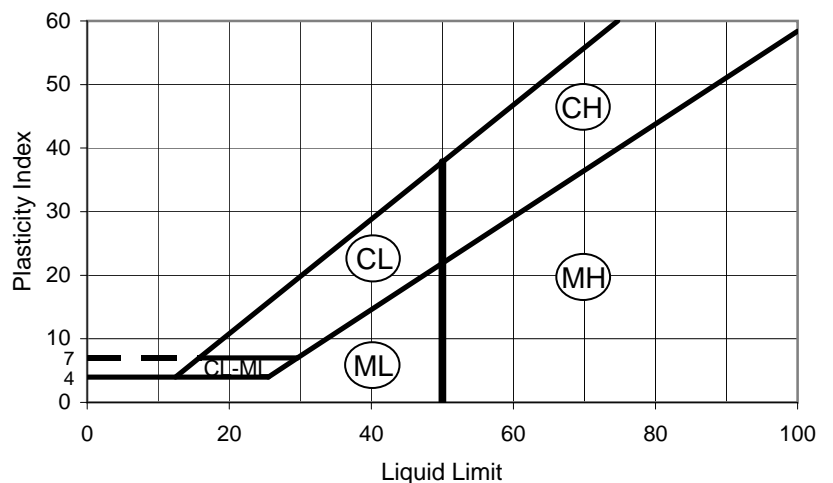
Dark Gray

COARSE-GRAINED SOILS < 50% fines passes #200 sieve	GRAVELS < 50% coarse fraction passes #4	< 5% fines (Passes #200 sieve)	GW	Well-graded Gravels, gravel-sand mixtures, little or no fines	Light Gray	
		5 to 12% fines use dual classification e.g. GP-GM	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines	Olive Brown	
			GM	Silty Gravels, poorly graded gravel-sand-silt mixtures	Gray Brown	
		> 12% fines	GC	Clayey gravels, poorly graded gravel-sand-clay mixture	Gray Brown	
	SANDS > 50% coarse fraction passes #4	< 5% fines (Passes #200 sieve)	SW	Well-graded sands, gravelly sands, little or no fines	Olive	
		5 to 12% fines use dual classification e.g. SP-SM	SP	Poorly-graded sands, gravelly sands, little or no fines	Dark Brown	
			SM	Silty sands, poorly graded sand-gravel-silt mixtures	Dark Brown	
		> 12% fines	SC	Clayey sands, poorly graded sand-gravel-silt mixtures	Dark Brown	
	FINE-GRAINED SOILS > 50% fines passes #200 sieve	SILTS AND LEAN CLAYS Liquid Limit < 50		ML	Inorganic silts, silty fine sands and clayey silts, silty clays	Red Gray
				CL	Inorganic lean clay, gravelly clays, sandy clays and silty clays, low to medium plasticity	Red
OL				Organic silts and clays, low plasticity	Yellow Brown	
ELASTIC SILTS AND FAT CLAYS Liquid Limit > 50		MH	inorganic elastic silts diatomaceous or micaceous silt, medium to high plasticity	Yellow Brown		
		CH	Inorganic fat clay, high plasticity	Brown		
		OH	Organic silts and clays, medium to high plasticity	Yellow		
HIGHLY ORGANIC SOILS			PT	Peat, humus, swamp soils with high organic content	Yellow	

LABORATORY CLASSIFICATION CRITERIA¹

GW	C_u greater than 4; C_c between 1 and 3	
GP	Not meeting all gradation requirements for GW	
SW	C_u greater than 6; C_c between 1 and 3	
SP	Not meeting all gradation requirements for SW	
CH	Liquid Limit (LL) > 50 and Plasticity Index (PI) above A-line	
MH	Liquid Limit (LL) > 50 and Plasticity Index (PI) below A-line	
CL	LL < 50 and PI above 'A' line	Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols
ML	LL < 50 and PI below 'A' line	

PLASTICITY CHART



Red Yellow

GRAIN SHAPE							
	ANGULAR	SUBANGULAR	SUBROUNDED	ROUNDED	WELL ROUNDED		
RELATIVE DENSITY - COARSE GRAINED SOIL ³			GRAIN SIZE ¹				
Relative Density	Sampler		Description	Grain Size		N-value conversion $N_{60} = 0.15N_{crr}$	
	SPT (blow/ft)	CALIFORNIA (blow/ft)		(Inches)	Sieve		
Very Loose	<4	<5	Boulders	> 12	> 12 in		
Loose	4 to 10	5 to 12	Cobbles	3 to 12	3 in to 12 in		
Medium Dense	11 to 30	13 to 35	Gravel	Course	3/4 to 3		3 in to 3/4 in
				Fine	0.19 to 0.75		3/4 to #4
Dense	31 to 50	36 to 60	Sand	Course	0.079 to 0.19		#4 to #10
				Medium	0.017 to 0.079		#10 to #40
Very Dense	>50	>60	Fine	0.0029 to 0.017	#40 to #200		
Use N_1 values corrected for overburden.			Fines	< 0.0029	< #200		
CEMENTATION ²			ODOR ³		OTHER DESCRIPTORS		
Classification	Description		Description		Examples:		
Weak	Crumbles or breaks with handling or little finger pressure		None	no odor	1. Mineral content (e.g. slightly micaceous, carbonate stringers, caliche, etc.)		
Moderate	Crumbles or breaks with considerable finger pressure			Earthy		Musty or moldy smell	
Strong	Will not crumble or break with finger pressure		Chemical		methane, hydrocarbon, or other chemicals	2. Staining (e.g. Iron-oxide staining)	
MOISTURE CLASSIFICATION ²				Organic	Manure or decay	3. Debris (e.g. fragments of brick present)	
Classification	Description					4. Interbedded soil (e.g. 1/2-in inerbeds of silt)	
Dry	Dusty; dry to the touch						
Slightly Moist	Some moisture, but still has a dry appearance						
Moist	Damp, But no visible water						
Very Moist	Enough moisture to wet the hands						
Wet	Saturated; visible free water						
CONSISTENCY CLASSIFICATION FOR FINE-GRAINED SOILS ⁴							
Classification	Description	SPT N_{60} value	Undrained Shear Strength, S_u				
			(kPa)	(lb/ft ²)			
Very Soft	Thumb penetrate easily; extrudes between fingers when squeezed	< 2	< 12	<250			
Soft	Thumb will penetrate soil about 25 mm; molds with light finger pressure	2-4	12-25	250-500			
Medium	Thumb will penetrate about 6 mm with moderate effort; molds with strong finger pressure	4-8	25-50	500-1000			
Stiff	Thumb indents easily, and will penetrate 12 mm with great effort	8-15	50-100	1000-2000			
Hard	Thumb will not indent soil, but thumbnail readily indents it	15-30	100-200	2000-4000			
Very Hard	Thumbnail will not indent soil or will indent it only with difficulty	> 30	>200	>4000			
LOG KEY SYMBOLS		UTILITY COLOR CODE		GRADATION PARAMETERS			
	Standard Penetration Slit Spoon Sampler (SPT)		RED Electric	$C_u = \frac{D_{60}}{D_{10}}$ $C_c = \frac{D_{30}^2}{D_{10}D_{60}}$			
	California Sampler		ORANGE Telephone - CATV				
	Shelby Tube		YELLOW Gas - Oil	REFERENCES			
	CPP Sampler		GREEN Sewer	1 - ASTM Test Methods D 2487 and D2488			
	Bulk/ Bag Sample		BLUE Water	2 - Coduto (1999) <i>Geotechnical Engineering principles and Practices</i>			
	Stabilized Ground water		PURPLE Reclaimed water lines	3 - Laney, M., <i>Terracon Field Logging Guide</i>			
	Groundwater At time of Drilling		PINK Survey	4 - Terzaghi & Peck (1967) <i>Soil Mechanics in Engineering Practice</i>			
			WHITE Proposed excavation	<p align="center">Call Before Digging</p> <p align="center">USA Dig Alert 1-800-227-2600</p> <p align="center">CPP Facilities 909-869-3030</p>			
			BACK	Ver 1.3 CVS & WAK 20080813			