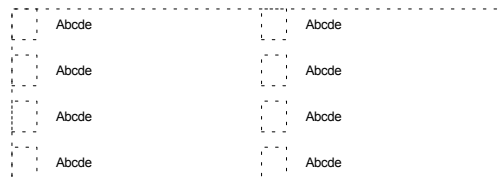


UNIFIED SOIL CLASSIFICATION (ASTM D-2487-98)

| MATERIAL TYPES | CRITERIA FOR ASSIGNING SOIL GROUP NAMES | | | GROUP SYMBOL | SOIL GROUP NAMES & LEGEND |
|---|---|---|---|--------------|---------------------------|
| COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE | GRAVELS >50% OF COARSE FRACTION RETAINED ON NO. 4. SIEVE | CLEAN GRAVELS <5% FINES | $C_u \geq 4$ AND $1 \leq C_c \leq 3$ | GW | WELL-GRADED GRAVEL |
| | | GRAVELS WITH FINES >12% FINES | $C_u \geq 4$ AND/OR $1 \geq C_c \geq 3$ | GP | POORLY-GRADED GRAVEL |
| | | FINES CLASSIFY AS ML OR CL | | GM | SILTY GRAVEL |
| | | FINES CLASSIFY AS CL OR CH | | GC | CLAYEY GRAVEL |
| | SANDS >50% OF COARSE FRACTION PASSES ON NO. 4. SIEVE | CLEAN SANDS <5% FINES | $C_u \geq 6$ AND $1 \leq C_c \leq 3$ | SW | WELL-GRADED SAND |
| | | SANDS AND FINES >12% FINES | $C_u \geq 6$ AND/OR $1 \geq C_c \geq 3$ | SP | POORLY-GRADED SAND |
| | | FINES CLASSIFY AS ML OR MH | | SM | SILTY SAND |
| | | FINES CLASSIFY AS CL OR CH | | SC | CLAYEY SAND |
| FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE | SILTS AND CLAYS LIQUID LIMIT <50 | INORGANIC | $P_i > 7$ AND PLOTS > "A" LINE | CL | LEAN CLAY |
| | | INORGANIC | $P_i > 4$ AND PLOTS < "A" LINE | ML | SILT |
| | | ORGANIC | LL (oven dried)/LL (not dried) < 0.75 | OL | ORGANIC CLAY OR SILT |
| | SILTS AND CLAYS LIQUID LIMIT >50 | INORGANIC | PI PLOTS > "A" LINE | CH | FAT CLAY |
| | | INORGANIC | PI PLOTS < "A" LINE | MH | ELASTIC SILT |
| | | ORGANIC | LL (oven dried)/LL (not dried) < 0.75 | OH | ORGANIC CLAY OR SILT |
| HIGHLY ORGANIC SOILS | | PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR | PT | PEAT | |

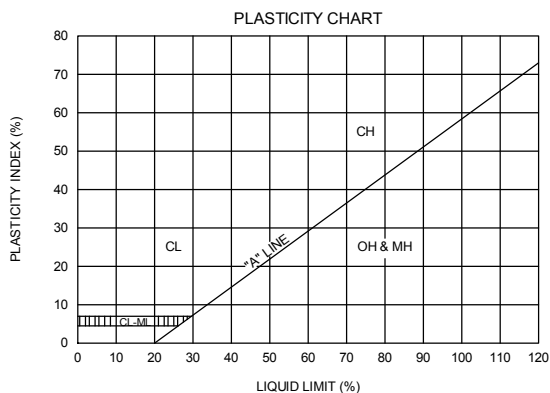
| OTHER MATERIAL SYMBOLS | |
|------------------------------|---------------------------|
| Poorly Graded Sand with Clay | Sand |
| Clayey Sand | Silt |
| Sandy Silt | Well Graded Gravelly Sand |
| Low to High Plasticity Clay | Gravelly Silt |
| Poorly Graded Gravelly Sand | Asphalt |
| Topsoil | Boulders and Cobble |
| Well Graded Gravel with Clay | |
| Well Graded Gravel with Silt | |

SAMPLE TYPES



ADDITIONAL TESTS

| | |
|---|---|
| CA - CHEMICAL ANALYSIS (CORROSIVITY) | (200) - (WITH % PASSING NO. 200 SIEVE) |
| CD - CONSOLIDATED DRAINED TRIAXIAL | |
| CN - CONSOLIDATION | SW - SWELL TEST |
| CU - CONSOLIDATED UNDRAINED TRIAXIAL | TC - CYCLIC TRIAXIAL |
| DS - DIRECT SHEAR | TV - TORVANE SHEAR |
| PP - POCKET PENETROMETER (TSF) | UC - UNCONFINED COMPRESSION |
| (3.0) - (WITH SHEAR STRENGTH IN KSF) | (1.5) - (WITH SHEAR STRENGTH IN KSF) |
| RV - R-VALUE | |
| SA - SIEVE ANALYSIS: % PASSING #200 SIEVE | UU - UNCONSOLIDATED UNDRAINED TRIAXIAL |
| - WATER LEVEL (WITH DATE OF MEASUREMENT) | WA - WASH ANALYSIS |
| | (200%) - (WITH % PASSING NO. 200 SIEVE) |



| PENETRATION RESISTANCE (RECORDED AS BLOWS / 0.5 FT) | | | | |
|--|-------------|-------------|-------------|----------------------------|
| SAND & GRAVEL | | SILT & CLAY | | |
| RELATIVE DENSITY | BLOWS/FOOT* | CONSISTENCY | BLOWS/FOOT* | COMPRESSIVE STRENGTH (TSF) |
| VERY LOOSE | 0 - 4 | VERY SOFT | 0 - 2 | 0 - 0.25 |
| LOOSE | 4 - 10 | SOFT | 2 - 4 | 0.25 - 0.50 |
| MEDIUM DENSE | 10 - 30 | FIRM | 4 - 8 | 0.50 - 1.0 |
| DENSE | 30 - 50 | STIFF | 8 - 15 | 1.0 - 2.0 |
| VERY DENSE | OVER 50 | VERY STIFF | 15 - 30 | 2.0 - 4.0 |
| | | HARD | OVER 30 | OVER 4.0 |

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

| | | |
|----------------|-----------------------------|---------------|
| *company name* | LEGEND TO SOIL DESCRIPTIONS | Figure Number |
| Job No. * | | * |