**­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­USCS Soil Test Example Problem (PLTW application)**

Dry Strength Dilatancy Toughness

Test (PL)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

High – (C) Quick Rxn (S) Easy to form

Low - (M) Rapid Rxn (M) thread (C)

No Rxn (C)

Difficult to

form thread

(M)

# 4

# 40/200

USCS Classification🡪 Determine: % G, S, C, M

Soil Sieve Test

Medium & Coarse

Fine

Course Grained Soils

*> 50% retained on #200*

***or***

Fine grained soils

*< 50% retained # 200,* ***or***

Gravel

Sand

CLEAN

*< 5% Fines*

DIRTY

*> 12% Fines*

*> 50% retained*

*on # 4*

*> 50% passes*

*# 4*

PLASTIC NONPLASTIC

GC GM

SC SM

Plasticity and compressibility

**Interpret**

**Results !**

*Jar test- % silt and clay*

***> 50% retained on (#4 + # 40 + fine sand from bottom pan ) (PLTW) lab)***

*Dry patty test*

*Shake test*

*Rolled thread test*

***< 50% retained on (#4 + #40 + fine sand from bottom pan ) (PLTW lab)***

PLTW Example - **Table of Soil Sample Weights**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | 497.5 | | No 40 sieve | 369.5 | | Bottom Pan | 371.0 | | Mason Jar | 389.5 | | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil | 514.0 |  | | GRAVEL |  |  | | No 40 sieve and retained soil | 494.7 |  | | Med. and coarse SAND |  |  | | Bottom pan and soil | 723.8 |  | | Fine SAND, SILT and CLAY |  |  | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil | 490.0 |  |  |
| Mason jar **and** fine SAND | 411.8 |  |  |
| Soil in mason jar | 100.5 |  |  |
| Fine SAND **in** mason jar | 22.3 |  |  |
| SILT and CLAY **in** mason jar |  |  |  |
| Fine SAND in pan |  |  |  |
| SILT and CLAY in pan |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL |  |  | |
| Med. and coarse SAND |  |  | Total SAND, % |
| Fine SAND |  |  |
| SILT and CLAY |  |  | |

PLTW Example - **Table of Soil Sample Weights**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | 497.5 | | No 40 sieve | 369.5 | | Bottom Pan | 371.0 | | Mason Jar | 389.5 | | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil | 514.0 |  | | GRAVEL |  | 16.5 | | No 40 sieve and retained soil | 494.7 |  | | Med. and coarse SAND |  | 125.2 | | Bottom pan and soil | 723.8 |  | | Fine SAND, SILT and CLAY |  | 352.8 | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil | 490.0 |  |  |
| Mason jar **and** fine SAND | 411.8 |  |  |
| Soil in mason jar | 100.5 |  |  |
| Fine SAND **in** mason jar | 22.3 | 22.2 |  |
| SILT and CLAY **in** mason jar | 78.2 | 78.2 |  |
| Fine SAND in pan |  |  | 78.3 |
| SILT and CLAY in pan |  |  | 274.5 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL | 16.5 | 3.3% | |
| Med. and coarse SAND | 125.2 | 25.3% | Total SAND, %  41.1% |
| Fine SAND | 78.3 | 15.8% |
| SILT and CLAY | 274.5 | 55.5% | |

PLTW Example - **Table of Soil Sample Weights**

**Measurement set 1**

**Tare weights**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | **497.5** | | No 40 sieve | **369.5** | | Bottom Pan | **371.0** | | Mason Jar | **389.5** | | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil |  |  | | GRAVEL |  |  | | No 40 sieve and retained soil |  |  | | Med. and coarse SAND |  |  | | Bottom pan and soil |  |  | | Fine SAND, SILT and CLAY |  |  | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil |  |  |  |
| Mason jar **and** fine SAND |  |  |  |
| Soil in mason jar |  |  |  |
| Fine SAND **in** mason jar |  |  |  |
| SILT and CLAY **in** mason jar |  |  |  |
| Fine SAND in pan |  |  |  |
| SILT and CLAY in pan |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL |  |  | |
| Med. and coarse SAND |  |  | Total SAND, % |
| Fine SAND |  |  |
| SILT and CLAY |  |  | |

Example - **Table of Soil Sample Weights**

**Measurement set 1**

**Tare weights**

**Measurement Set 2**

**Sample + container** weights

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | **497.5** | | No 40 sieve | **369.5** | | Bottom Pan | **371.0** | | Mason Jar | **389.5** | | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil | **514.0** |  | | GRAVEL |  |  | | No 40 sieve and retained soil | **494.7** |  | | Med. and coarse SAND |  |  | | Bottom pan and soil | **723.8** |  | | Fine SAND, SILT and CLAY |  |  | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil |  |  |  |
| Mason jar **and** fine SAND |  |  |  |
| Soil in mason jar |  |  |  |
| Fine SAND **in** mason jar |  |  |  |
| SILT and CLAY **in** mason jar |  |  |  |
| Fine SAND in pan |  |  |  |
| SILT and CLAY in pan |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL |  |  | |
| Med. and coarse SAND |  |  | Total SAND, % |
| Fine SAND |  |  |
| SILT and CLAY |  |  | |

Example - **Table of Soil Sample Weights**

**Calculation Set 1**

**Soil type weights**

**Measurement set 1**

**Tare weights**

**Measurement Set 2**

**Sample + container** weights

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | **497.5** | | No 40 sieve | **369.5** | | Bottom Pan | **371.0** | | Mason Jar | **389.5** | | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil | **514.0** |  | | GRAVEL |  | **16.5** | | No 40 sieve and retained soil | **494.7** |  | | Med. and coarse SAND |  | **125.2** | | Bottom pan and soil | **723.8** |  | | Fine SAND, SILT and CLAY |  | **352.8** | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil |  |  |  |
| Mason jar **and** fine SAND |  |  |  |
| Soil in mason jar |  |  |  |
| Fine SAND **in** mason jar |  |  |  |
| SILT and CLAY **in** mason jar |  |  |  |
| Fine SAND in pan |  |  |  |
| SILT and CLAY in pan |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL |  |  | |
| Med. and coarse SAND |  |  | Total SAND, % |
| Fine SAND |  |  |
| SILT and CLAY |  |  | |

Example - **Table of Soil Sample Weights**

**Calculation Set 1**

**Soil type weights**

**Measurement set 1**

**Tare weights**

**Measurement Set 2**

**Sample + container** weights

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | **497.5** | | No 40 sieve | **369.5** | | Bottom Pan | **371.0** | | Mason Jar | **389.5** |   **Measurement Set 3 and 4**  **Sample + container before and after washing** | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil | **514.0** |  | | GRAVEL |  | **16.5** | | No 40 sieve and retained soil | **494.7** |  | | Med. and coarse SAND |  | **125.2** | | Bottom pan and soil | **723.8** |  | | Fine SAND, SILT and CLAY |  | **352.8** | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil | **490.0** |  |  |
| Mason jar **and** fine SAND | **411.8** |  |  |
| Soil in mason jar |  |  |  |
| Fine SAND **in** mason jar |  |  |  |
| SILT and CLAY **in** mason jar |  |  |  |
| **Fine SAND in pan** |  |  |  |
| **SILT and CLAY in pan** |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL |  |  | |
| Med. and coarse SAND |  |  | Total SAND, % |
| Fine SAND |  |  |
| SILT and CLAY |  |  | |

Example - **Table of Soil Sample Weights**

**Calculation Set 1**

**Soil type weights**

**Measurement set 1**

**Tare weights**

**Measurement Set 2**

**Sample + container** weights

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | **497.5** | | No 40 sieve | **369.5** | | Bottom Pan | **371.0** | | Mason Jar | **389.5** |   **Measurement Set 3 and 4**  **Sample + container before and after washing** | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil | **514.0** |  | | GRAVEL |  | **16.5** | | No 40 sieve and retained soil | **494.7** |  | | Med. and coarse SAND |  | **125.2** | | Bottom pan and soil | **723.8** |  | | Fine SAND, SILT and CLAY |  | **352.8** | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil | **490.0** |  |  |
| Mason jar **and** fine SAND | **411.8** |  |  |
| Soil in mason jar | **100.5** |  | **Calculation Set 2**  **Fine soil type weights and percentages**  **(represented in jar sample)** |
| Fine SAND **in** mason jar | **22.3** | **22.2** |  |
| SILT and CLAY **in** mason jar | **78.2** | **77.8** |  |
| Fine SAND in pan |  |  |  |
| SILT and CLAY in pan |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL |  |  | |
| Med. and coarse SAND |  |  | Total SAND, % |
| Fine SAND |  |  |
| SILT and CLAY |  |  | |

Example - **Table of Soil Sample Weights**

**Calculation Set 1**

**Soil type weights**

**Measurement set 1**

**Tare weights**

**Measurement Set 2**

**Sample + container** weights

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | **497.5** | | No 40 sieve | **369.5** | | Bottom Pan | **371.0** | | Mason Jar | **389.5** |   **Measurement Set 3 and 4**  **Sample + container before and after washing** | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil | **514.0** |  | | GRAVEL |  | **16.5** | | No 40 sieve and retained soil | **494.7** |  | | Med. and coarse SAND |  | **125.2** | | Bottom pan and soil | **723.8** |  | | Fine SAND, SILT and CLAY |  | **352.8** | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil | **490.0** |  |  |
| Mason jar **and** fine SAND | **411.8** |  |  |
| Soil in mason jar | **100.5** |  | **Calculation Set 2**  **Fine soil type weights and percentages**  **(represented in jar sample)** |
| Fine SAND **in** mason jar | **22.3** | **22.2** |  |
| SILT and CLAY **in** mason jar | **78.2** | **77.8** |  |
| Fine SAND in pan |  |  | **78.3**  **Calculation Set 3**  **Fine soil type weights (present in original pan sample based on % from mason jar)** |
| SILT and CLAY in pan |  |  | **274.5** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL |  |  | |
| Med. and coarse SAND |  |  | Total SAND, % |
| Fine SAND |  |  |
| SILT and CLAY |  |  | |

Example - **Table of Soil Sample Weights**

**Calculation Set 1**

**Soil type weights**

**Measurement set 1**

**Tare weights**

**Measurement Set 2**

**Sample + container** weights

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | **497.5** | | No 40 sieve | **369.5** | | Bottom Pan | **371.0** | | Mason Jar | **389.5** |   **Measurement Set 3 and 4**  **Sample + container before and after washing** | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil | **514.0** |  | | GRAVEL |  | **16.5** | | No 40 sieve and retained soil | **494.7** |  | | Med. and coarse SAND |  | **125.2** | | Bottom pan and soil | **723.8** |  | | Fine SAND, SILT and CLAY |  | **352.8** | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil | **490.0** |  |  |
| Mason jar **and** fine SAND | **411.8** |  |  |
| Soil in mason jar | **100.5** |  | **Calculation Set 2**  **Fine soil type weights and percentages**  **(represented in jar sample)** |
| Fine SAND **in** mason jar | **22.3** | **22.2** |  |
| SILT and CLAY **in** mason jar | **78.2** | **77.8** |  |
| Fine SAND in pan |  |  | **78.3**  **Calculation Set 3**  **Fine soil type weights (present in original pan sample)** |
| SILT and CLAY in pan |  |  | **274.5** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results**  **Calculation Set 4**  **Soil types**  **percentages**  **(present in original soil sample)** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL | **16.5** | **3.3%** | |
| Med. and coarse SAND | **125.2** | **25.3%** | Total SAND, %  41.1% |
| Fine SAND | **78.3** | **15.8%** |
| SILT and CLAY | **274.5** | **55.5%** | |

**PLTW- FINE GRAIN SOILS ANALYSIS**

**Dry Stength Test** *(Patty test)*

The dried patty crushed with moderate effort (Slight to medium range)

(***M or C****- maybe more silt content than clay)*

**Dilatancy** (*shake test)*

The cubed soil reacted rapidly (fast appearance of water on surface)

(***M****- more silt content than clay)*

**Toughness** *(rolled thread test)*

Samples crumbled relatively easily

*(****M****- more silt content than clay)*

OR

Atterberg limits-

Advanced lab Testing- Plasticity Limit (PL) = 30%, Liquid Limit (LL) = 45%

**OVERALL SOIL ANALYSIS**

Probably more like **ML**

Or

From Plasticity Chart: PI = LL – PL = 15, read from chart; soil type = **ML**

**ML (Fine grained, low liquid limit)**

From Activity 4.5.1A Soil Types and Properties Chart:

value as an embankment- *poor stability(*may be used for embankments

with proper control)

value as foundation material- *fair*

frost action- *very high*

drainage- *poor*

maximum gradient- *1.25:1*

*USC Soil Analysis-* **Table of Soil Sample Weights (Step 1)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | 504.9 | | No 40 sieve | 526.6 | | Bottom Pan | 448.0 | | Mason Jar | 420.0 | | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil | 537.7 |  | | GRAVEL |  |  | | No 40 sieve and retained soil | 709.8 |  | | Med. and coarse SAND |  |  | | Bottom pan and soil | 784.2 |  | | Fine SAND, SILT and CLAY |  |  | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil | 482.8 |  |  |
| Mason jar **and** fine SAND | 446.7 |  |  |
| Soil in mason jar | 62.8 |  |  |
| Fine SAND **in** mason jar | 26.7 |  |  |
| SILT and CLAY **in** mason jar |  |  |  |
| Fine SAND in pan |  |  |  |
| SILT and CLAY in pan |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL |  |  | |
| Med. and coarse SAND |  |  | Total SAND, % |
| Fine SAND |  |  |
| SILT and CLAY |  |  | |

USC Soil Analysis - **Table of Soil Sample Weights (Step 2)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | 504.9 | | No 40 sieve | 526.6 | | Bottom Pan | 448.0 | | Mason Jar | 420.0 | | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil | 537.7 |  | | GRAVEL |  | **32.8** | | No 40 sieve and retained soil | 709.8 |  | | Med. and coarse SAND |  | **183.2** | | Bottom pan and soil | 784.2 |  | | Fine SAND, SILT and CLAY |  | **336.2** |   **Legend for Calculation Steps**  Step 1- Red font  Step 2- Blue font  Step 3- Green font  Step 4- Purple font |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil | 482.8 |  |  |
| Mason jar **and** fine SAND | 446.7 |  |  |
| Soil in mason jar | 62.8 |  |  |
| Fine SAND **in** mason jar | 26.7 | **42.5** |  |
| SILT and CLAY **in** mason jar | **36.1** | **57.5** |  |
| Fine SAND in pan |  |  | **142.9** |
| SILT and CLAY in pan |  |  | **193.3** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL | **32.8** | **5.9%** | |
| Med. and coarse SAND | **197.1** | **33.2%** | Total SAND, %  **59.1%** |
| Fine SAND | **142.9** | **25.9%** |
| SILT and CLAY | **193.3** | **35%** | |

**USC- FINE GRAIN SOILS ANALYSIS**

**Dry Strength Test** *(Patty test)*

The dried patty crushed with moderate effort (medium range)

(*Maybe clayey or silty*)

**Dilatancy** (*shake test)*

The cubed soil reacted slow (fairly slow rate of appearance of water on surface)

(*clayey*)

**Toughness** *(rolled thread test)*

Samples crumbled with moderate (medium) effort

(*Maybe clayey or silty*)

**All three tests together- SC- CL (Clayey sand)**

**Sample Table of Soil Sample Weights**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve |  | | No 40 sieve |  | | Bottom Pan |  | | Mason Jar |  | | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil |  |  | | GRAVEL |  |  | | No 40 sieve and retained soil |  |  | | Med. and coarse SAND |  |  | | Bottom pan and soil |  |  | | Fine SAND, SILT and CLAY |  |  | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil |  |  |  |
| Mason jar **and** fine SAND |  |  |  |
| Soil in mason jar |  |  |  |
| Fine SAND **in** mason jar |  |  |  |
| SILT and CLAY **in** mason jar |  |  |  |
| Fine SAND in pan |  |  |  |
| SILT and CLAY in pan |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL |  |  | |
| Med. and coarse SAND |  |  | Total SAND, % |
| Fine SAND |  |  |

PLTW Example - **Table of Soil Sample Weights**

**Calculation Set 1**

**Soil type weights**

**Measurement set 1**

**Tare weights**

**Measurement Set 2**

**Sample + container** weights

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Item | Weight, grams | | No 4 sieve | **497.5** | | No 40 sieve | **369.5** | | Bottom Pan | **371.0** | | Mason Jar | **389.5** |   **Measurement Set 3 and 4**  **Sample + container before and after washing** | |  |  |  | | --- | --- | --- | | Item | Weight, grams | Soil Sample wgt, grams | | No 4 sieve and retained soil | **514.0** |  | | GRAVEL |  |  | | No 40 sieve and retained soil | **494.7** |  | | Med. and coarse SAND |  |  | | Bottom pan and soil | **723.8** |  | | Fine SAND, SILT and CLAY |  |  | |

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Weight, grams | Fraction in mason jar | Soil Sample wgt, grams |
| Mason jar **and** soil | **490.0** |  |  |
| Mason jar **and** fine SAND | **411.8** |  |  |
| Soil in mason jar |  |  | **Calculation Set 2**  **Fine soil type weights and percentages**  **(represented in jar sample)** |
| Fine SAND **in** mason jar |  |  |  |
| SILT and CLAY **in** mason jar |  |  |  |
| Fine SAND in pan |  |  | **Calculation Set 3**  **Fine soil type weights (present in original pan sample)** |
| SILT and CLAY in pan |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Presentation of results**  **Calculation Set 4**  **Soil types percentages**  **(present in original soil sample)** | | | |
| Item | Soil Sample wgt, grams | Percent in soil sample | |
| GRAVEL |  |  | |
| Med. and coarse SAND |  |  | Total SAND, %  41.1% |
| Fine SAND |  |  |
| SILT and CLAY |  |  | |