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Subscribe to The Constructor to ask questions, answer questions, write articles, and connect with others. VIP members receive additional benefits. Do you have an account? Mark Value and Use 5.1 This standard classifies soils from any geographic location into categories representing the results of prescribed laboratory tests to determine particle size, liquid limit, and plasticity index. 5.2 The designation of the group name and symbol (s) along with the descriptive information required in practice by D2488 can be used to describe the soil to assist in the assessment of its significant properties for engineering use. 5.3 Different groups of this classification system have been developed to general correlate with soil engineering behaviour. This standard provides a useful first step in any field or laboratory research for geotechnical engineering purposes. 5.4 This standard can also be used as an aid in training staff for the application of D2488. 5.5 This standard can be used in conjunction with the practice of D4083 when dealing with frozen soils. Note 5: Despite the claims of accuracy and bias contained in this standard: the accuracy of this test method depends on the competence of the personnel in performing it, and the suitability of the equipment and facilities used. Institutions that meet the criteria of D3740 practice are generally considered capable of competent and objective testing. Users of this testing method are warned that compliance with the D3740 practice alone does not provide reliable testing. Reliable testing depends on several factors; The D3740 provides the means to assess some of these factors. 1. Scope 1.1 This practice describes a system of classification of mineral and organo-mineral soils for engineering purposes based on laboratory definition of particle size, liquid limit and plasticity index and is used as needed for accurate classification. Note 1: Using this standard will result in a single classification of the group symbol and group name, unless the soil contains 5 to 12% penalties, or when the section of the liquid limit and the value of the plasticity index falls into the cross area of the plasticity chart. In these two cases, a dual symbol is used, such as GP-GM, CL-ML. When laboratory test results show that the soil is close to another soil classification group, the boundary state can be indicated with two symbols separated by slash. The first symbol should be based on this standard, such as CL/CH, GM/SM, SC/CL. Border symbols are especially useful when the liquid limit value of clay soils is close to 50. These soils may have extensive characteristics, and the use of the boundary symbol (CL/CH, CH/CL) will alert the user to the assigned classifications of the extensive 1.2 Part of the group symbol of this system is based on laboratory tests carried out on a piece of soil, soil, soil, (75 mm) sieve (see E11 specification). 1.3 As a classification system, the standard is limited to natural soils. Note 2: Group names and symbols used in this testing method can be used as a narrative system applied to materials such as shale, clay stone, shells, crushed rock, etc. 1.4 This standard is only for quality use. Note 3: When quantitative information is required for the detailed design of important structures, this testing method must be supplemented by laboratory tests or other quantitative data to determine performance characteristics in expected field conditions. 1.5 This standard is a version of the ASTM version of the Unified Soil Classification System. The basis for the classification scheme is the airfield classification system developed by A. Casagrande in the early 1940s. It became known as the Unified Soil Classification System when several U.S. government agencies adopted a modified version of the airfield system in 1952. 1.6 This standard is not designed to address all security issues, if any, related to its use. The user of this standard is responsible for establishing good safety, health and environmental practices and determining the applicability of regulatory restrictions before they are applied. 1.7 This practice offers a set of instructions for one or more specific operations. This document is no substitute for education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice can be applied under all circumstances. This ASTM standard is not intended to represent or replace the standard of care that should assess the adequacy of this professional service, and this document should not be applied without taking into account many unique aspects of the project. The word Standard in the title of this document only means that the document has been approved as part of the ASTM consensus process. 1.8 This international standard was developed in accordance with the internationally recognized standardization principles established in the International Standards, Guidelines and Recommendations Decision issued by the World Trade Organization Committee on Trade Barriers to Trade (TBT). 2. Reference documents (purchase separately) Documents listed below are mentioned within the subject standard, but are not provided within the standard. ASTM Standards C117 Testing Method for Thinner Materials than the 75th (No. 200) Sieve in Mineral Aggregates by washing the C136 Testing Method for sieve analysis of thin and rough C702 units Practice to reduce the sample unit to test the size of the D653 Terminology relating to soil, Rock, and contained liquid D1140 testing methods to determine the amount of material thinner than the 75th (No. washing D2216 Testing methods for laboratory water determination (moisture) Soil and rock content by mass D2488 Practice for description and identification identification (Visual-manual procedures) D3740 Practice for minimum requirements for agencies involved in testing and/or soil and rock inspections used in the engineering and construction of the D4083 Practice to describe frozen soils (visually-manual procedures) D4318 testing methods for liquid limit, Plastic Limit, and Soil Plasticity Index D4427 Classification of Peat Samples by Laboratory Testing D6913 Testing Methods for Particle Size Distribution (Gradation) of Soil using Sieve Analysis E11 Specification for Woven Wire Test Sieve Fabric and Sieves ICS ICS Code Number 93.020 (Land Works, Excavation, Underground Works) Referring to this standard DOI: 10.1520/D2487-17E01 Citation format ASTM D2487-17e1. Standard Classification Practice Soils for Engineering Purposes (Unified Soil Classification System), ASTM International, West Conshohocken, PA, 2017, www.astm.org Back to Top The Unified Soil Classification System (USCS) is a soil classification system used in engineering and geology to describe the texture and size of soil grains. The classification system can be applied to most unconsolidated materials and is represented by a two-ken symbol. Each letter is described below (except Pt): First and/or second letter Second letter Definition G gravel S sand M il C organic letter Definition P poorly graded (uniform particle sizes) W well graded (diversified particle sizes) H high plasticity L low plasticity If the soil has 5-12% weight penalties, passing #200 sieve (5% 15%), there is a significant amount of sieve. 12%), both grain' size and plasticity have a significant effect on the) engineering' properties' of the soil, and dual' notation' may' be' used for the group's symbol.' well-graded gravel with the silt.' if the soil has more than 15% by weight and retained on a #4' sieve (r4)gt; amount of gravel, and a suffix with gravel can be added to the group name but the group symbol doesn't change. For example, SP-SM may refer to poorly graded SAND with silt or poorly graded SAND with silt and gravel. The symbol chart of the Group's Main Division Symbol Group is the name rough grainy soil by more than 50% saved at or above No.200 (0.075 mm) sieve gravel; 50% of the rough fraction is saved at No. 4 (4.75 mm) sieve q It.5% smaller q no.200' sieve The gravel is fine to coarse gravel and the poorly graded gravel with 12% of GM gravel fines and CK gravel gravel≥ 50% of the rough fraction passes No. 4 (4.75 mm) of a sieve of pure sand. 50 inorganic ML silt CL clay of low plasticity, lean clay organic OL organic silt. Organic clay silt and clayliquid limit ≥ 50 inorganic MH silt of high plasticity, elastic silt CH clay of high plasticity, fat clay organic 50' inorganic' ml' silt' of' of= low= plasticity. = lean= clay= organic= of= organic= silt.= organic= clay= silt= and= clayliquid= limit= ≥= 50= inorganic= mh= silt= of= high= plasticity.= elastic= silt= ch= clay= of= high= plasticity.= fat= clay= organic=>>&t/50 inorganic ML silt CL clay of low plasticity, lean clay organic OL organic silt, organic clay silt and clayliquid limit > 50 inorganic MH silt of high plasticity, elastic silt CH clay of high plasticity, fat clay organic &t; SW хорошо градуированный песок, штраф за грубый песок SP плохо градуированный песок песка с &t;12% штрафов SM ил песок SC глиняный песок Мелкие зернистые почв>50% или более прохождения No 200 (0,075 мм) сито ил и глиняного предела&t/5%&t; предела&t/5%&t; Organic Clay, Organic II High Organic Soil Pt Peat ASTM D-2487 Criteria for assigning group symbols and group names using laboratory soil testing Soil Classification Group Symbol Name COARSE-GRAINED SOILS More than 50% is retained at No 200 Sieve Gravels Over 50% rough fraction at No. 4 Sieve Clean Gravels Less than 5% penalties Cu ≥ 4 and 1 ≤ Cc ≤ 3 GW Well Graded Gravel Cu zlt; 4 and/or Cc zlt; 1 or Cc zgt; 3 GP Poorly graded gravel with fines of more than 12% fines classified as ML or MH CM Silty Gravel Fines classified as CL or CH Clay Ccey Sands % or rough fraction passes No. 4 sieve Net Sands Less 5% penalties Cu ≥ 6 and 1 ≤ Cc ≤ 3 SW Well Graded Sand Cu zlt; 6 and/or Cc zlt; 1 or Cc zgt; 3 SP Poorly Graded Sand Sands With Penalties Over 12% Penalties Penalties Classified as ML or MH SM Silty Sand Penalties Penalties classified as CL or CH SC Clay Sand FINE-GRAINED SOILS 50% or more passes no. 200 Sieve Silts and Clays Liquid limit less than 50 inorganic PI to 7 and plots on or above the A line of CL Lean Clay PI zlt; 4 and plots below A line ML Silt organic liquid limit-oven dried zlt; 0.75 OL organic clay liquid limit- not dried OL organic silt silt and clay liquid liquid limit of 50 or more inorganic PI plots on or above A line of CH fat clay PI parcels below the A line MH elastic silt silt organic liquid-oven-dried-dried 0.75 OH Organic Clay Liquid Limit - Not Dried OH Organic YI HIGHLY ORGANIC SOILS PT Peat ; Annual ASTM Standards Book, D 2487-83, 04, American Society of Testing and Materials, 1985, page 395-408 Evett, Jack and Cheng Liu (2007), Soils and Foundations (7 ed.), Prentice Hall, p. 9-29, ISBN 978-0132221382 Specific Standard ASTM D2487, 2000, Standard Soil Classification Practice for Engineering Purposes (Unified Soil Classification System), ASTM International, West Conshohocken, PA, 2000,DOI: 10.1520/D2487-00, www.astm.org. D 2487 - 06. Standard soil classification practice for engineering purposes (Single Soil Classification System) (PDF) (Technical Report). ASTM International. 2006. Extracted from unified soil classification system chart pdf. unified soil classification system astm pdf. unified soil classification system flow chart pdf

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