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BS 1377, 1924; EN 13286-4, EN 1997-2

ASTM D1883; AASHTO T193

SUPPLIED AS STANDARD

- TO-1200-BS BS CBR mold with collar and base plate
- TO-1200-BS BS CBR base plate
- TO-1200-BS BS CBR extension collar
- TO-1200-BS BS Penetration piston as per BS
- TO-1200-BS BS Adjustable bracket for penetration dial gage
- TO-1200-BS BS Spacing compacting disc
- TO-1200-BS BS Annular surcharge weight 2kg
- TO-1200-BS BS Split surcharge weight 2kg
- TO-1200-BS BS Perforated swell plate
- TO-1200-BS BS Metal tripod for dial gage
- TO-1201-BS BS CBR cutting collar
- TO-1201-BS BS Electronic CBR kit; digital indicator, 50kN load cell and 20mm LVDT, noVAC, 60Hz
- TO-1201-BS BS Electronic CBR kit; digital indicator, 50kN Load cell and 20mm LVDT, 220VAC, 60Hz
- TO-1201-BS BS Electronic CBR kit; digital indicator, 50kN Load cell and 20mm LVDT, 220VAC, 50Hz
- TO-1202-BS BS Compacting rammer for light compaction 2.5kg x 300mm fall
- TO-1202-H Compacting rammer for heavy compaction 4.5kg x 450mm fall

SUPPLIED AS STANDARD

- TO-1200-ASTM ASTM CBR mold with collar and base plate
- TO-1200-2-ASTM ASTM CBR base plate
- TO-1200-3-ASTM ASTM CBR extension collar
- TO-1200-4-ASTM Penetration piston as per ASTM
- TO-1200-5-ASTM Adjustable bracket for penetration dial gage
- TO-1200-6-ASTM ASTM spacing compacting disc
- TO-1200-7-ASTM ASTM annular surcharge weight 2.27kg
- TO-1200-8-ASTM ASTM split surcharge weight 2.27kg
- TO-1200-9 Perforated swell plate
- TO-1200-0 Metal tripod for dial gage
- TO-1201-ASTM ASTM CBR cutting collar
- TO-1201-01 Electronic CBR kit; digital indicator, 50kN load cell and 20mm LVDT, noVAC, 60Hz
- TO-1201-01 Electronic CBR kit; digital indicator, 50kN Load cell and 20mm LVDT, 220VAC, 60Hz
- TO-1201-01 Electronic CBR kit; digital indicator, 50kN Load cell and 20mm LVDT, 220VAC, 50Hz
- TO-1202-ASTM Compacting rammer for light compaction 2.5kg x 300mm fall
- TO-1202-H Compacting rammer for heavy compaction 4.5kg x 450mm fall

OPTIONAL ACCESSORIES

- TO-1200-BS BS CBR mold with collar and base plate
- TO-1200-BS BS CBR base plate
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- TO-1200-BS BS Perforated swell plate
- TO-1200-BS BS Metal tripod for Dial gage
- TO-1201-BS BS CBR cutting collar
- TO-1202-BS BS Compacting rammer for light compaction 2.5kg x 300mm fall
- TO-1202-H Compacting rammer for heavy compaction 4.5kg x 450mm fall

OPTIONAL ACCESSORIES

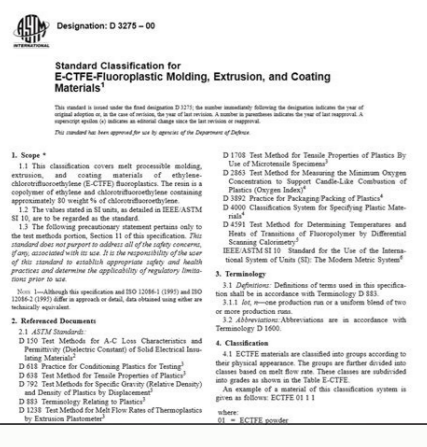
- TO-1200-ASTM ASTM CBR mold with collar and base plate
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- TO-1202-ASTM Compacting rammer for light compaction 2.5kg x 300mm fall
- TO-1202-H Compacting rammer for heavy compaction 4.5kg x 450mm fall

ORDERING INFORMATION

- TO-1201-01-BS BS CBR Test Apparatus with accessories, 110VAC, 60Hz
- TO-1201-01-BS BS CBR Test Apparatus with accessories, 220VAC, 60Hz
- TO-1201-01-BS BS CBR Test Apparatus with accessories, 220VAC, 50Hz

ORDERING INFORMATION

- TO-1201-01-ASTM ASTM CBR Test Apparatus with accessories, 110VAC, 60Hz
- TO-1201-01-ASTM ASTM CBR Test Apparatus with accessories, 220VAC, 60Hz
- TO-1201-01-ASTM ASTM CBR Test Apparatus with accessories, 220VAC, 50Hz



Note: This content does not supersede or replace specifications in any test standard for performance of the California Bearing Ratio Test. We recommend that the user read and thoroughly understand applicable ASTM or AASHTO test methods before proceeding.



In situ cbr test astm. Cbr test astm d1883. How is cbr test calculated. Astm cbr test pdf. Field cbr test astm. Astm standard for cbr test. Cbr test as per astm. Astm cbr test procedure pdf.

Designation: D 1883 - 07 Standard Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils¹ This standard is issued under the fixed designation D 1883; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval. This standard has been approved for use by agencies of the Department of Defense. 1.6 Unless specified otherwise by the requesting agency, or unless it has been shown to have no effect on test results for the material being tested, all specimens shall be soaked prior to penetration. 1.7 For the determination of CBR of field compacted materials, see Test Method D 4429. 1.8 The values stated in inch-pound units are to be regarded as the standard. The SI equivalents shown in parentheses may be approximate. 1.9 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D 6026. 1.9.1 The procedures used to specify how data are collected, recorded or calculated in this standard are regarded as the industry standard. In addition they are representative of the significant digits that generally should be retained. The procedures used do not constitute a method for determining the precision of the test results. 1.9.2 The procedures used to specify how data are collected, recorded or calculated in this standard are regarded as the industry standard. In addition they are representative of the significant digits that generally should be retained. The procedures used do not constitute a method for determining the precision of the test results. 1.10 This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. 1. Scope* 1.1 This test method covers the determination of the CBR (California Bearing Ratio) of pavement subgrade, subbase, and base course materials from laboratory compacted specimens. The test method is primarily intended for (but not limited to) evaluating the strength of materials having maximum particle sizes less than 3/4 in. (19 mm). 1.2 When materials having maximum particle sizes greater than 3/4 in. (19 mm) are to be tested, this test method provides for modifying the gradation of the material so that the material used for tests all passes the 3/4-in. sieve while the total gravel (+No. 4 to 3 in.) fraction remains the same. While traditionally this method of specimen preparation has been used to avoid the error inherent in testing materials containing large particles in the CBR test apparatus, the modified material may have significantly different strength properties than the original material. However, a large experience base has developed using this test method for materials for which the gradation has been modified, and satisfactory design methods are in use based on the results of tests using this procedure. 1.3 Past practice has shown that CBR results for those materials having substantial percentages of particles retained on the No. 4 sieve are more variable than for finer materials. Consequently, more trials may be required for these materials to establish a reliable CBR. 1.4 This test method provides for the determination of the CBR of a material at optimum water content or a range of water content from a specified compaction test and a specified dry unit weight. The dry unit weight is usually given as a percentage of maximum dry unit weight determined by Test Methods D 698 or D 1557. 1.5 The agency requesting the test shall specify the water content or range of water content and the dry unit weight for which the CBR is desired. 1 This test method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.05 on Strength and Compressibility of Soils. Current edition approved Nov. 15, 2007. Published December 2007. Originally approved in 1961. Last previous edition approved in 2005 as D 1883 - 05. *A Summary of Changes section appears at the end of this standard. Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. 1 D 1883 - 07 4. Summary of Test Method 4.1 The California Bearing Ratio (CBR) test is a load test applied to the surface and used in soil investigations as an aid to the design of pavements. The laboratory test uses a circular piston to penetrate material compacted in a mold at a constant rate of penetration. The CBR is expressed as the ratio of the unit load on the piston required to penetrate 0.1 in. (2.5 mm) and 0.2 in (5 mm) of the test soil to the unit load required to penetrate a standard material of well-graded crushed stone. 4.2 This test method is used to determine the CBR of a material compacted in a specified mold. It is incumbent on the requesting agencies to specify the scope of testing to satisfy agency protocol or specific design requirements. Possible scope of testing includes: 4.2.1 CBR penetration tests are performed on each point of a compaction test performed in accordance with Method C of D 698 or D 1557. The CBR mold with the spacer disk specified in this standard has the same internal dimensions as a 6-in. (150-mm) diameter compaction mold. 4.2.2 Another alternative is for CBR test to be performed on material compacted to a specific water content and density. Alternatively, a water content range may be stated for one or more density values. This will often require a series of specimens prepared using two or three compactive efforts for the specified water content or over the range of water contents requested. The compactive efforts are achieved by following procedures of D 698 or D 1557 but varying the blows per layer to produce densities above and below the desired density. 2. Referenced Documents 2.1 ASTM Standards: 2 D 422 Test Method for Particle-Size Analysis of Soils D 653 Terminology Relating to Soil, Rock, and Contained Fluids D 698 Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 lbf-ft/3600 kN-m/m³) D 1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 lbf-ft/lb³/700 kN-m/m³) D 2168 Test Methods for Calibration of Laboratory Mechanical-Rammer Soil Compactors D 2216 Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass D 2487 Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) D 2488 Practice for Description and Identification of Soils (Visual-Manual Procedure) D 3740 Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction D 4318 Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils D 4753 Guide for Evaluating, Selecting, and Specifying Balances and Standard Masses for Use in Soil, Rock, and Construction Materials Testing D 6026 Practice for Using Significant Digits in Geotechnical Data E 11 Specification for Wire Cloth and Sieves for Testing Purposes 5. Significance and Use 5.1 This test method is used to evaluate the potential strength of subgrade, subbase, and base course material, including recycled materials for use in road and airfield pavements. The CBR value obtained in this test forms an integral part of several flexible pavement design methods. 5.2 For applications where the effect of compaction water content on CBR is small, such as cohesionless, coarse-grained materials, or where an allowance is made for the effect of differing compaction water contents in the design procedure, the CBR may be determined at the optimum water content of a specified compaction effort. The dry unit weight specified is normally the minimum percent compaction allowed by the using agency's field compaction specification. 5.3 For applications where the effect of compaction water content on CBR is unknown or where it is desired to account for its effect, the CBR is determined for a range of water contents, usually the range of water content permitted for field compaction by using agency's field compaction specification. 5.4 The criteria for test specimen preparation of self-cementing (and other) materials which gain strength with time must be based on a geotechnical engineering evaluation. As directed by the engineer, self-cementing materials shall be properly cured until bearing ratios representing long term service conditions can be measured. 3. Terminology 3.1 Definitions: All definitions are in accordance with Terminology D 653. 3.2 Definitions of Terms Specific to This Standard: 3.2.1 water content of the compaction specimen, w_i—water content in percent of material used to compact the test specimen. 3.2.2 water content top 1 in. (25.4 mm) of material removed after soaking and penetration. 3.2.3 water content after testing, w_f—water content in percent of material after soaking and final penetration; does not include material described in 3.2.2. 3.2.4 dry density as compacted and before soaking, ρ_d—dry density of the as-compacted test specimen using the measured wet mass and calculating the dry mass using the water content defined in 3.2.1. NOTE 1—The agency performing this test can be evaluated in accordance with Practice D 3740. Notwithstanding the statements on precision and bias contained in this test method, the precision of this test method is dependent on the competence of the personnel performing it, and the 2 For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website. 2 D 1883 - 07 uniformly over the surface of the soil when compacting in a 6-in. (152.4-mm) diameter mold. The mechanical rammer must be calibrated and adjusted in accordance with Test Methods D 2168. 6.5 Expansion-Measuring Apparatus—An adjustable metal stem and perforated metal plate, similar in configuration to that shown in Fig. 1. The perforated plate shall be 5/78 to 515/16 in. (149.23 to 150.81 mm) in diameter and have at least forty-two 1/16-in. (1.59-mm) diameter holes uniformly spaced over the plate. A metal tripod to support the dial gage for measuring the amount of swell during soaking is also required. The expansion measuring apparatus shall not weigh more than 2.8 lbf (1.27 kg). 6.6 Weights—One or two annular metal weights having a total mass of 4.54 ± 0.02 kg and slotted metal weights each having masses of 2.27 ± 0.02 kg. The annular weight shall be 5/78 to 515/16 in. (149.23 to 150.81 mm) in diameter and shall have a center hole of approximately 2 1/8 in. (53.98 mm). 6.7 Penetration Piston—A metal piston 1.954 ± 0.005 in. (49.63 ± 0.13 mm) in diameter and not less than 4 in. (101.6 mm) long (see Fig. 1). If, from an operational standpoint, it is advantageous to use a piston of greater length, the longer piston may be used. 6.8 Swell Measurement Device—Generally mechanical dial indicators capable of reading to 0.001 in. (0.025 mm) with a range of 0.200-in. (5-mm) minimum. 6.9 Balance—A class G₁ balance meeting the requirements of Specifications D 4753 for a balance of 1-g readability. 6.10 Drying Oven—Thermostatically controlled, preferably of a forced-draft type and capable of maintaining a uniform temperature of 230 ± 9°F (110 ± 5°C) throughout the drying chamber. 6.11 Sieves—3/4 in. (19 mm) and No. 4 (4.75 mm), conforming to the requirements of Specification E 11. 6.12 Filter Paper—Fast filtering, high wet strength filter paper, 15-cm diameter. 6.13 Straightedge—A stiff metal straightedge of any convenient length but not less than 10 in. (254 mm). The total length of the straightedge shall be machined straight to a tolerance of 60.005 in. (60.1 mm). The scraping edge shall be beveled if it is thicker than 1/8 in. (3 mm). 6.14 Soaking Tank or Pan—A tank or pan of sufficient depth and breath to allow free water around and over the assembled mold. The tank or pan should have a bottom grating that allows free access of water to the perforations in the mold's base. 6.15 Mixing Tools—Miscellaneous tools such as mixing pan, spoon, trowel, spatula, etc., or a suitable mechanical device for thoroughly mixing the sample of soil with water. suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D 3740 are generally considered capable of competent and objective testing. Users of this test method are cautioned that compliance with Practice D 3740 does not in itself ensure reliable testing. Reliable testing depends on many factors; Practice D 3740 provides a means of evaluating some of those factors. 8.1.2 Where the CBR is desired at optimum water content and some percentage of maximum dry unit weight, compact three specimens from soil prepared to within 60.5 percentage point of optimum water content and using the specified compaction but using a different number of blows per layer for each specimen. The number of blows per layer shall be varied as necessary to prepare specimens having unit weights above and below the desired value. Typically, if the CBR for soil at 95 % of maximum dry unit weight is desired, specimens compacted using 56, 25, and 10 blows per layer is satisfactory. Penetration shall be performed on each of these specimens. 8.2 Bearing Ratio for a Range of Water Contents—Prepare specimens in a manner similar to that described in 8.1.2, except that each specimen used to develop the compaction curve shall be penetrated. In addition, the complete water content-unit weight relationship for the 25-blow and 10-blow per layer compactions shall be developed and each test specimen compacted shall be penetrated. Perform all compaction in the CBR mold. In cases where the specified unit weight is at or near 100 % maximum dry unit weight, it will be necessary to include a compactive effort greater than 56-blow per layer (Note 3). NOTE 3—Where the maximum dry unit weight was determined from compaction in the 4-in. (101.6-mm) mold, it may be necessary to compact specimens as described in 8.1.2, using 75 blows per layer or some other NOTE 4—A semilog plot of dry unit weight versus compactive effort usually gives a straight line relationship when compactive effort in ft-lb/ft³ is plotted on the log scale. This type of plot is useful in establishing the 8. Test Specimens 8.1 Bearing Ratio at Optimum Water Content Only—Using material prepared as described in 7.1, conduct a control compaction test with a sufficient number of test specimens to establish the optimum water content for the soil using the compaction method specified, either Test Methods D 698 or D 1557. A previously performed compaction test on the same material may be substituted for the compaction test just described, provided that if the sample contains material retained on the 3/4-in. (19-mm) sieve, soil prepared as described in 7.1 is used (Note 2). NOTE 2—Maximum dry unit weight obtained from a compaction test performed in a 4-in. (101.6-mm) diameter mold may be slightly greater than the maximum dry unit weight obtained from compaction in the 6-in. (152.4-mm) compaction mold or CBR mold. 4 D 1883 - 07 NOTE 1—See Table 2 for metric equivalents. FIG. 1 Bearing Ratio Test Apparatus 8.2.4 Remove the extension collar and carefully trim the compacted soil even with the top of the mold by means of a straightedge. Patch with smaller size material any holes that may have developed in the surface by the removal of coarse material. Remove the perforated base plate and spacer disk, weigh, and record the mass of the mold plus compacted soil. Place a disk of coarse filter paper on the perforated base plate, invert the mold and compacted soil, and clamp the perforated base

plate to the mold with compacted soil in contact with the filter paper. 8.2.5 Place the surcharge weights on the perforated plate and adjustable stem assembly lower than the top of the specimen in the mold. Apply a surcharge equal to the weight of the base material and pavement within 5 lbf (2.27 kg), but in no case shall the total weight used be less than 10 lbf (4.54 kg). If no pavement weight is specified, use 10 lbf (4.54 kg). The mass of the Expansion Measuring Apparatus is ignored unless its mass is more than 2.9 lbf (1.27 kg). Immerse the mold and weights in water allowing free access of water to the top and bottom of the specimen. Take initial measurements for swell and allow the specimen to soak for 96 h. Maintain a constant water level during this period. A shorter immersion period is permissible for fine grained soils or granular soils that take up moisture readily, if tests show that the shorter period does not affect the results. At the end of 96 h, take final swell compactive effort and number of blows per layer needed to bracket the specified dry unit weight and water content range. 8.2.1 If the CBR test specimen is to be soaked, take a representative sample of the material for the determination of water content in accordance with Test Method D 2216. If the compaction process is conducted under reasonable controlled temperatures (65 to 75 F (18 to 24 C) and the processed soil is kept sealed during the compaction process, only one representative water content sample is required. However if the compaction process is being conducted in an uncontrolled environment take two water content samples one at the beginning of compaction and another sample of the remaining material after compaction. Use Test Method D 2216 to determine the water contents and average the two values for reporting. The two samples should not differ more than 1.5 percentage points to assume reasonable uniformity of the compacted specimen's water content. 8.2.2 If the sample is not to be soaked, take a water content sample in accordance with Test Methods D 698 or D 1557 if the average water content is desired. 8.2.3 Clamp the mold (with extension collar attached) to the base plate with the hole for the extraction handle facing down. Insert the spacer disk over the base plate and place a disk of filter paper on top of the spacer disk. Compact the soil-water mixture into the mold in accordance with 8.1, 8.1.1, or 8.1.2. 5 D 1883 - 07 measurements and calculate the swell as a percentage of the initial height of the specimen. 8.2.6 Remove the free water and allow the specimen to drain downward for 15 min. Take care not to disturb the surface of the specimen during the removal of the water. It may be necessary to tilt the specimen in order to remove the surface water. Remove the weights, perforated plate, and filter paper, and determine and record the mass. The user may find it convenient to set the mold's base on the rim of a shallow pan to provide the tilt and carefully using a bulb syringe and adsorbent towels to remove free water. 9. Procedure for Bearing Test 9.1 Place a surcharge of weights on the specimen sufficient to produce an intensity of the loading specified; if no pavement weight is specified, use 10-lbf (4.54 kg) mass. If the specimen has been soaked previously, the surcharge shall be equal to that used during the soaking period. To prevent upheaval of soil into the hole of the surcharge weights, place the 5-lbf (2.27-kg) annular weight on the soil surface prior to seating the penetration piston, after which place the remainder of the surcharge weights. FIG. 3 Dry Density Versus CBR determining the load penetration relation. Attach the penetrating measuring device in accordance with 6.1.2. NOTE 5—At high loads the supports may torque and affect the reading of the penetration gauge. Checking the depth of piston penetration is one means of checking for erroneous strain indications. 9.3 Apply the load on the penetration piston so that the rate of penetration is approximately 0.05 in. (1.27 mm)/min. Record the load readings at penetrations of 0.025 in. (0.64 mm), 0.050 in. (1.27 mm), 0.075 in. (1.91 mm), 0.100 in. (2.54 mm), 0.125 in. (3.18 mm), 0.150 in. (3.81 mm), 0.175 in. (4.45 mm), 0.200 in. (5.08 mm), 0.300 in. (7.62 mm), 0.400 in. (10.16 mm) and 0.500 in. (12.70 mm). Note the maximum load and penetration if it occurs for a penetration of less than 0.500 in. (12.70 mm). With manually operated loading devices, it may be necessary to take load readings at closer intervals to control the rate of penetration. Measure the depth of piston penetration into the soil by putting a ruler into the indentation and measuring the difference from the top of the soil to the bottom of the indentation. If the depth does not closely match the depth of penetration gauge, determine the cause and test a new sample. 9.4 If the test specimen was previously soaked, remove the soil from the mold and determine the water content of the top 1-in. (25.4-mm) layer. Take the water content sample in accordance with Test Methods D 698 or D 1557. Each water content sample shall weigh not less than 100 g for fine-grained soils nor less than 500 g for granular soils. NOTE 1—See Table 2 for metric equivalents. FIG. 2 Correction of Load-Penetration Curves NOTE 6—The load readings at penetrations of over 0.300 in. (7.6 mm) may be omitted if the testing machine's capacity has been reached. 9.2 Seat the penetration piston with the smallest possible load, but in no case in excess of 10 lbf (44 N). Either set both the load and penetration gauges to zero or make provisions to subtract any initial values from all subsequently collected data. This initial load is required to ensure satisfactory seating of the piston and shall be considered as the zero load when 10. Calculation 10.1 Load-Penetration Curve—Calculate the penetration stress in pounds per square inch or megapascals and plot the stress penetration curve. In some instances, the stress-penetration curve may be concave upward initially, because of surface irregularities or other causes, and in such cases the zero point shall be adjusted as shown in Fig. 2. 6 D 1883 - 07 S D S s 5 h i NOTE 7—Fig. 2 should be used as an example of correction of load-penetration curves only. It is not meant to imply that the 0.2-in. penetration is always more than the 0.1-in. penetration, where: s = swell that occurred during soaking, % S = vertical swell determined from the final minus initial swell measurement, in. (mm) hi = height of test specimen before swell, in. (mm) 10.2 Bearing Ratio—Using corrected stress values taken from the stress penetration curve for 0.100 in. (2.54 mm) and 0.200 in. (5.08 mm) penetrations, calculate the bearing ratios for each by dividing the corrected stresses by the standard stresses of 1000 psi (6.9 MPa) and 1500 psi (10.3 MPa) respectively, and multiplying by 100. Also, calculate the bearing ratios for the maximum stress, if the penetration is less than 0.200 in. (5.08 mm) by interpolating the standard stress. The bearing ratio reported for the soil is normally the one at 0.100 in. (2.54 mm) penetration. When the ratio at 0.200 in. (5.08 mm) penetration is greater, rerun the test. If the check test gives a similar result, use the bearing ratio at 0.200 in. (5.08 mm) penetration. 11. Report 11.1 The report shall include, as a minimum, the following: 11.1.1 Method used for preparation and compaction of specimen: Test Methods D 698 or D 1557, or other, with description. 11.1.2 Condition of sample (unsoaked or soaked). 11.1.3 Dry density (unit weight) of sample as compacted (before soaking). 11.1.4 Water content of sample in percent. 11.1.4.1 As compacted. 11.1.4.2 Top 1-in (25.4-mm) layer after soaking. 11.1.5 Swell (percentage of initial height). 11.1.6 Bearing ratio of sample (unsoaked or soaked), percent. 11.1.7 Surcharge amount. 11.1.8 Any special sample preparation and testing procedures (for example, for self-cementing materials). 11.1.9 Sample identification (location, boring number, etc.). 11.1.10 Any pertinent testing done to identify the sample such as: soil classifications per Test Method D 2487, visual classification per Practice D 2488, Atterberg Limits per Test Method D 4318, gradation per Method D 422, etc. 11.1.11 The percent material retained on the 19-mm sieve for those cases where scalping and replacement is used. NOTE 8—On occasion the testing agency may be requested to determine the CBR value for a dry density not represented by the laboratory compaction curve. For example, the corrected CBR value for the dry density at 95 % of maximum dry density and at optimum water content might be requested. A recommended method to achieve this value is to compact two or three CBR test specimens at the same molded water content but compact each specimen to different compaction energies to achieve a density below and above the desired value. The corrected CBR values are plotted against the dry density and the desired CBR value interpreted as illustrated in Fig. 3. For consistency the corrected CBR values should be of identical origin, for example, all either soaked or un-soaked and all either at 0.1 or 0.2 corrected penetration values. 10.3 Calculate the dry density, rd, of the compacted specimen (before soaking) as follows: Msas rd 5 V m where: 12. Precision and Bias 12.1 Precision—Test data on precision is not presented due to the nature of the materials tested by this test method. It is either not feasible or too costly at this time to have ten or more laboratories participate in a round-robin testing program. Notwithstanding this statement the following is offer for guidance: 12.1.1 One user, based on seven repetitions, has developed a IS % of 9.2 % (compacted per Test Method D 698) and 6.9 % (compacted per Test Method D 1557). See Appendix X1 for the data used. 12.1.2 Subcommittee D18.05 is seeking any data from the users of this test method that might be used to make a more thorough statement on precision. 12.2 Bias—There is no accepted reference value for this test method, therefore, bias cannot be determined. Mm 1 ws = Mm Msac 5 -1 1 wac1 = dry mass of soil as compacted, Mg/m3 or g/cm3, Mm + ws = wet mass of soil as molded plus mold mass, Mg or g = mold mass, Mg or g, Mm = water content determination of representative wac scraps taken during the compaction process, and v = volume of mold (area of mold 3 initial Vm height), a calibrate value, m3 or cm3. 10.3.1 Conversion of dry density units: Msac gd 5 9.8066 3 rd, kN/m3 or, gd 5 62.428 3 rd, lb/ft3 3 100 13. Keywords 13.1 This standard is indexed under the following terms: 3 California Bearing Ratio Pavement Subgrade Pavement Subbase Subbase Pavement Base Course Base Course Strength of Soil where: = dry unit weight, kN/m3 or lb/ft3, gd 9.8066 = conversion factor, Mg/m3 or g/cm3 to kN/m3, and 62.428 = conversion factor, Mg/m3 or g/cm3 to lb/ft3. 10.4 If the test specimen was soaked, calculate the percent swell as follows: 7 Used For, Narrower Term Used For, Narrower Term Related Term, Broader Term Used For, Narrower Term Used For, Broader Term Used For, Narrower Term Used For, Broader Term Used For D 1883 - 07 Pavement Design Acceptance Tests Bearing Capacity Materials Evaluations Bearing Ratio Load Penetration Curve Design Used Used Used Used For, Narrower Term Used For, Narrower Term Related Term, Broader Term Used For, Broader Term Earthfill Cohesive Soils Compressive Strength Flexible Pavements FoundationInvestigations Soil Tests Related To Used For Used For Used For Used For APPENDIX (Nonmandatory Information) X1. See Fig. X1.1 for more information. FIG. X1.1 Compactive Effort SUMMARY OF CHANGES Committee D18 has identified the location of selected changes to this standard since the last issue (D 1883 - 05) that may impact the use of this standard. (Approved November 15, 2007.) CBRs for penetrations other than 0.1 and 0.2 in. (7) Eliminated old 9.4 and Figure 4 as these items pertain to engineering design. (8) Added formulas to Calculation section. (9) Modified the report section to include only essential information. (10) Modified Precision and Bias section to conform to D18 Standards Preparation Manual. (1) Revised Section 1 to include requirements of significant digits. (2) Revised Section 1.1 to include Practice D 6026. (3) Added new Section 3, Terminology. (4) Added note referencing Practice D 3740 to Significance and Use section. (5) Added details to Apparatus section (6) Eliminated Note 8 that provided guidance for determining 8 D 1883 - 07 ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility. This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. 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