
Standard Method of Test for

Bearing Capacity of Soil for Static Load on Spread Footings

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ASTM Designation: D 1194-94



AASHTO T 235-96 (2004) is identical to ASTM D 1194-94.



Standard Test Method for Bearing Capacity of Soil for Static Load and Spread Footings¹

This standard is issued under the fixed designation D 1194; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

This standard has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

1. Scope

1.1 This test method covers estimation of the bearing capacity of soil in place by means of field loading tests. This test method can be used as part of a procedure for soil investigation for foundation design. It gives information on the soil only to a depth equal to about two diameters of the bearing plate, and takes into account only part of the effect of time.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI units given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, 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.*

2. Significance and Use

2.1 This test method is used to estimate the bearing capacity of a soil under field loading conditions for a specific loading plate and depth of embedment. The bearing capacity of a soil is not simply a soil strength parameter, but it also depends on the magnitude and distribution of the load, dimension, and geometry of the loading plate and depth of embedment (or elevation of testing). This bearing capacity can be used in soil investigations and for the design of foundations.

3. Apparatus

3.1 *Loading Platforms or Bins* of sufficient size and strength to supply the estimated total load required or equivalent means of supplying the total load reaction anticipated.

3.2 *Hydraulic or Mechanical Jack Assembly* of sufficient capacity to provide and maintain the maximum estimated load for the specific soil conditions involved, but not less than 50 tons (440 kN) in any case, and at least one device, such as a pressure gage, electronic load cell, or proving ring, for measuring the force exerted by the jack. The force-measuring devices should be capable of recording the load with an error not exceeding $\pm 2\%$ of the load increment used.

3.3 *Bearing Plates*—Three circular steel bearing plates,

not less than 1 in. (25 mm) in thickness and varying in diameter from 12 to 30 in. (305 to 762 mm), including the minimum and maximum diameter specified or square steel bearing plates of equivalent area. As an alternative, three small concrete footings of the size mentioned or larger can be cast *in-situ*. Such footings must have a depth of not less than two thirds of their width.

3.4 *Settlement-Recording Devices*, such as dial gages, capable of measuring settlement of the test plates to an accuracy of at least 0.01 in. (0.25 mm).

3.5 *Miscellaneous Apparatus*, including loading columns, steel shims, and other construction tools and equipment required for preparation of the test pits and loading apparatus.

NOTE 1—Testing assemblies may vary widely, depending on job conditions, testing requirements, and equipment available. The testing assembly and program should be planned in advance and approved by the supervising engineer, and in general can permit considerable latitude in details within the specific requirements noted above and outlined in the following test procedure. A typical assembly for conducting load tests is illustrated in Fig. 1.

4. Procedure

4.1 *Selection of Test Areas*—Base the selection of representative test areas for bearing tests on the results of exploratory borings and on the design requirements of the structure. Unless otherwise specified, make the load test at the elevation of the proposed footings and under the same conditions to which the proposed footings will be subjected. At the selected elevation place the bearing plates at the same relative depths (depths expressed in plate diameters) as the actual footing.

NOTE 2—For footings placed under permanently excavated basements the depth of the actual footing is construed as the depth from the basement level or depth over which the surcharge is permanently acting, rather than the depth from the ground surface.

NOTE 3—If the mentioned condition of equal relative depth cannot be met for practical reasons, the test results must be interpreted by using an appropriate theory of bearing capacity. Also make corrections for the effects of the shape and size of the footing and the effects of the water table as appropriate.

4.2 *Test Pits*—At least three test locations are required, and the distance between test locations shall not be less than five times the diameter of the largest plate used in the tests. Carefully level and clean the areas to be loaded by the test plates or footings so that the loads are transmitted over the entire contact areas on undisturbed soil. Prior to loading, protect test pits and areas against moisture changes in the soil unless it is expected that wetting of the soil will occur at some future time, as in the case of hydraulic structures. In this

¹ This test method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.10 on Bearing Tests of Soils in Place.

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