
Standard Method of Test for Splitting Tensile Strength of Cylindrical Concrete Specimens

AASHTO Designation: T 198-22

Technically Revised: 2022

Technical Subcommittee: 3c, Hardened Concrete

ASTM Designation: C496/C496M-17



**American Association of State Highway and Transportation Officials
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1. SCOPE

- 1.1. This test method covers the determination of the splitting tensile strength of cylindrical concrete specimens, such as molded cylinders and drilled cores.
Note 1—For methods of molding cylindrical specimens, see R 39 and R 100. For methods of obtaining drilled cores, see T 24M/T 24.
- 1.2. The values stated in either inch-pound or SI units are to be regarded separately as standard. The SI units are shown in parentheses. The values stated in each system may not be exactly equivalent; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.
- 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.*
- 1.4. The text of this standard references notes that provide explanatory material. These notes shall not be considered as requirements of the standard.
- 1.5. *The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of R 18 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with R 18 alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of R 18 or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.*

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
- R 18, Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
 - R 39, Making and Curing Concrete Test Specimens in the Laboratory
 - R 100, Making and Curing Concrete Test Specimens in the Field
 - T 22M/T 22, Compressive Strength of Cylindrical Concrete Specimens

- T 24M/T 24, Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

2.2. *ASTM Standards:*

- C670, Standard Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials
- C125, Standard Terminology Relating to Concrete and Concrete Aggregates

3. TERMINOLOGY

- 3.1. *Definitions*—For definitions of terms used in this test method, refer to Terminology in ASTM C125.

4. SUMMARY OF TEST METHOD

- 4.1. This test method consists of applying a diametral compressive force along the length of a cylindrical concrete specimen at a rate that is within a prescribed range until failure occurs. This loading induces tensile stresses on the plane containing the applied load and relatively high compressive stresses in the area immediately around the applied load. Tensile failure occurs rather than compressive failure because the areas of load application are in a state of triaxial compression, thereby allowing them to withstand much higher compressive stresses than would be indicated by a uniaxial compressive strength test result.
- 4.2. Thin plywood bearing strips are used to distribute the load applied along the length of the cylinder.
- 4.3. The maximum load sustained by the specimen is divided by appropriate geometrical factors to obtain the splitting tensile strength.

5. SIGNIFICANCE AND USE

- 5.1. Splitting tensile strength is generally greater than direct tensile strength and lower than flexural strength (modulus of rupture).
- 5.2. Splitting tensile strength is used in the design of structural lightweight concrete members to evaluate the shear resistance provided by concrete and to determine the development length of reinforcement.

6. APPARATUS

- 6.1. *Testing Machine*—The testing machine shall conform to the requirements of T 22M/T 22 and be of a type with sufficient capacity that will provide the rate of loading prescribed in Section 8.5.
- 6.2. *Supplementary Bearing Bar or Plate*—If the diameter or the largest dimension of the upper bearing face or the lower bearing block is less than the length of the cylinder to be tested, a supplementary bearing bar or plate of machined steel shall be used. The surfaces of the bar or plate shall be machined to within ± 0.001 in. (0.025 mm) of planeness, as measured on any line of contact of the bearing area. It shall have a width of at least 2 in. (50 mm) and a thickness not less than the distance from the edge of the spherical or rectangular bearing block to the end of the cylinder. The bar or plate shall be used in such manner that the load will be applied over the entire length of the specimen.