
Standard Method of Test for Determining Chloride Ions in Concrete and Concrete Materials by Specific Ion Probe

AASHTO Designation: T 332-22¹

Technically Revised: 2022

Technical Subcommittee: 3c, Hardened Concrete



**American Association of State Highway and Transportation Officials
555 12th Street NW, Suite 1000
Washington, DC 20004**

Standard Method of Test for

Determining Chloride Ions in Concrete and Concrete Materials by Specific Ion Probe

AASHTO Designation: T 332-22¹

AASHTO

Technically Revised: 2022

Technical Subcommittee: 3c, Hardened Concrete

1. SCOPE

- 1.1. This method covers the procedures for determining acid-soluble chloride ions in concrete and concrete mix ingredients.
- 1.2. The age of concrete, mortar, or hydrated portland cement at the time of sampling will have an effect on the acid-soluble chloride ion content. Therefore, unless early age studies are desired, it is recommended that the material be well cured and at least 28 days of age before sampling.
- 1.3. *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.*
- 1.4. *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:*
- M 231, Weighing Devices Used in the Testing of Materials
 - M 339M/M 339, Thermometers Used in the Testing of Construction Materials
 - R 18, Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
 - T 260, Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials
- 2.2. *ASTM Standards:*
- D1193, Standard Specification for Reagent Water
 - E1, Standard Specification for ASTM Liquid-in-Glass Thermometers
 - E11, Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
 - E879, Standard Specification for Thermistor Sensors for General Purpose and Laboratory Temperature Measurements
-

< E1137/E1137M, Standard Specification for Industrial Platinum Resistance Thermometers

2.3. *International Electrotechnical Commission Standard:*

< IEC 60751:2008, Industrial Platinum Resistance Thermometers and Platinum Temperature Sensors

3. SUMMARY OF TEST METHOD

3.1. A 3.0-g drilled concrete powder sample is digested in 20 mL of an acid digestion solution and stabilized by the addition of 80 mL of a stabilizing solution. Millivolt readings, taken for the sample solution using a specific chloride ion probe, are converted mathematically into equivalent total percent chloride content or chloride content in kg/m^3 (lb/yd^3) of concrete.

4. INTERFERENCES

4.1. The operational response of the specific ion electrode is subject to interference by the presence of OH^- , S^{2-} , Br^- , I^- , and CN^- in the measured solution and is based on the electrode manufacturer's allowable chloride interference ratio.

4.2. Sulfides are known to interfere with the determination of chloride in solution. This test procedure is, therefore, unsuitable for determining the chloride content of concrete containing mineral aggregates containing significant quantities of pyrite.

5. SIGNIFICANCE AND USE

5.1. This method provides a rapid means of sampling and testing for total chloride ions in concrete in the field.

6. APPARATUS

6.1. *Impact Hammer*—A heavy-duty rotary impact hammer with a drilling stop gauge is used. See Figures 1 through 3.

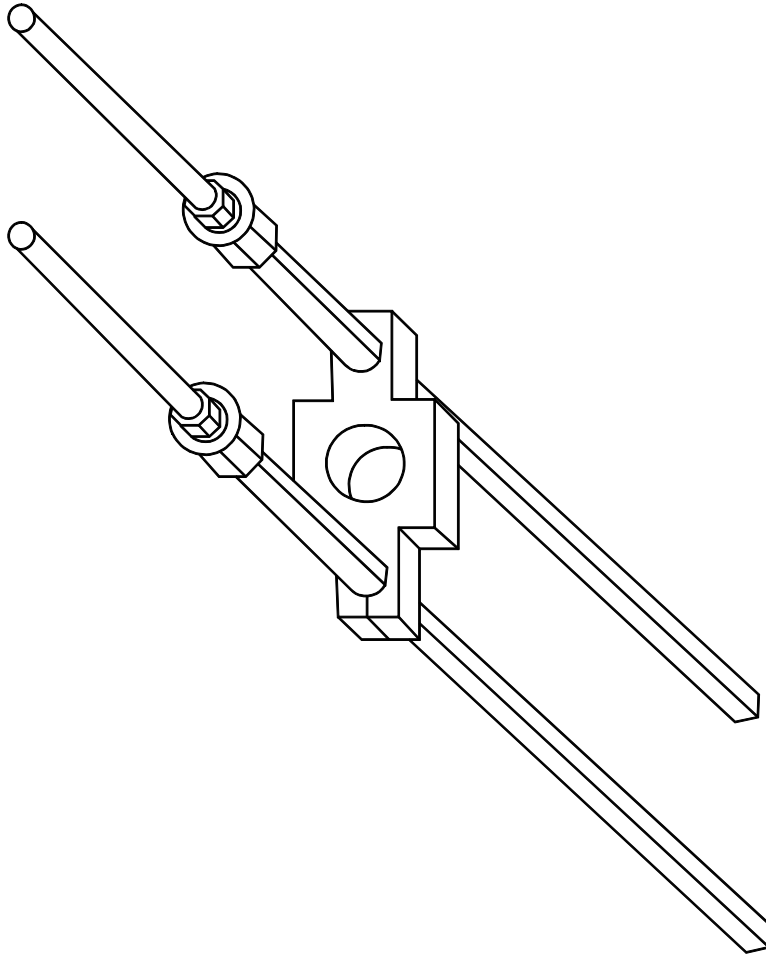
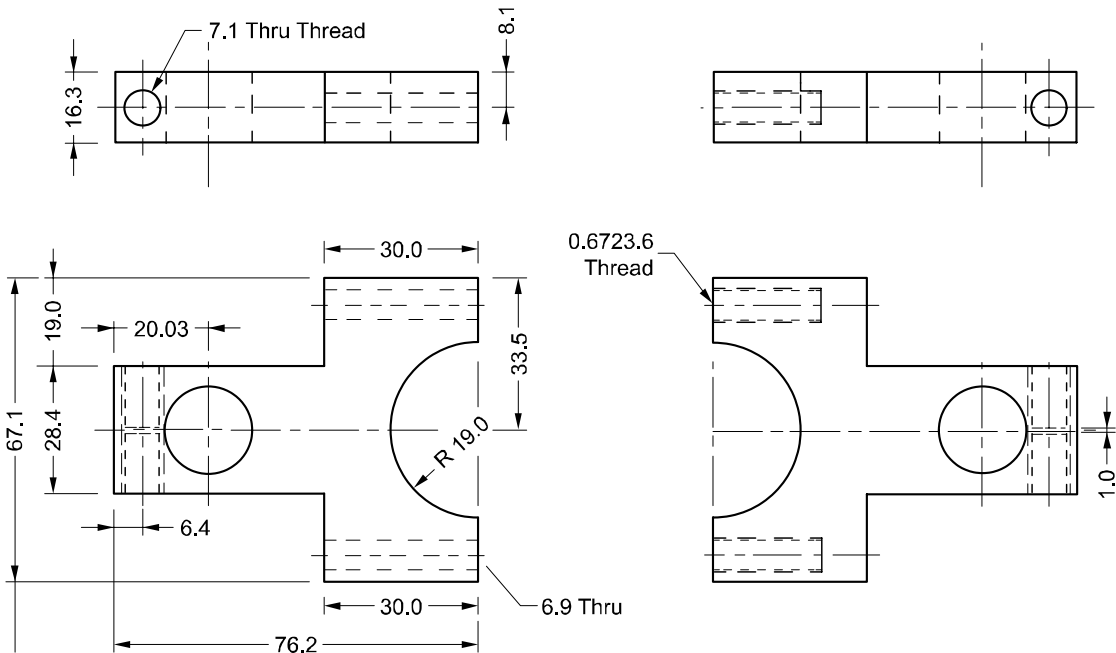
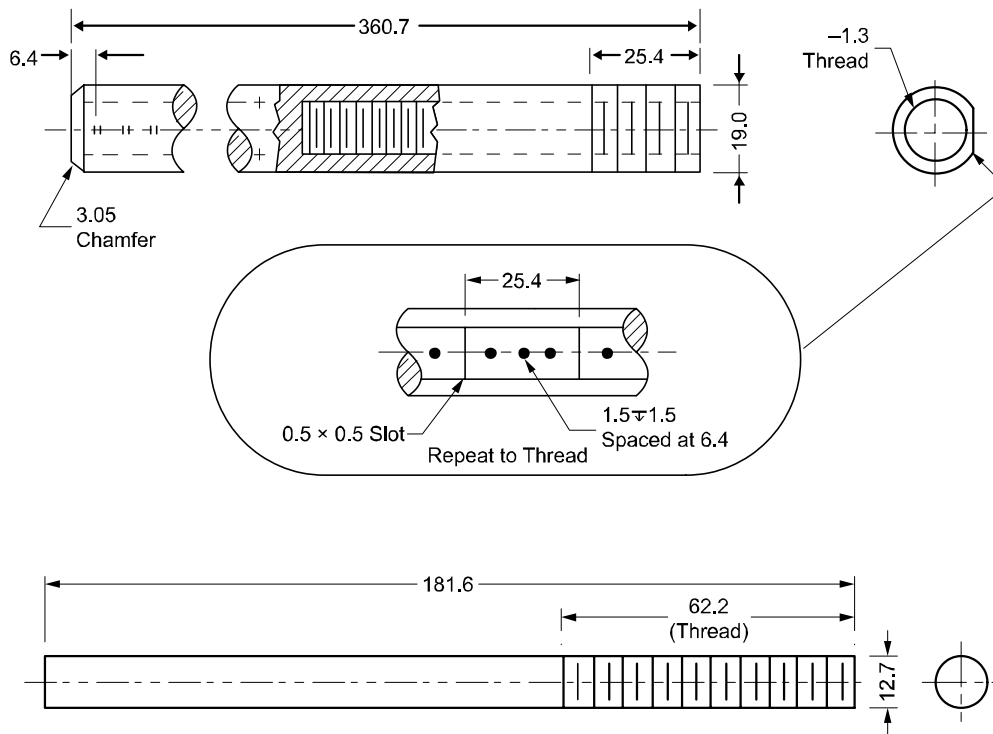


Figure 1—Overall View of the Drilling Stop Gauge to Be Mounted on the Impact Hammer



Note: All dimensions shown in millimeters unless otherwise noted.

Figure 2—Details of the Split Ring Collar for the Drilling Stop Gauge



Note: All dimensions shown in millimeters unless otherwise noted.

Figure 3—Details of the Depth Rods for the Drilling Stop Gauge