



Standard Test Method for Determining the Penetration of Chloride Ion into Concrete by Ponding¹

This standard is issued under the fixed designation C 1543; 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.

1. Scope

1.1 This test method determines the penetration of chloride ion into concrete from a sodium-chloride solution pond. This method is applicable to all types of concrete, as well as to concretes treated with systems such as sealants, penetrating sealers, or thin-bonded overlays.

1.2 The values stated in SI units are to be regarded as 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.*

2. Referenced Documents

2.1 ASTM Standards:

C 125 Terminology Relating to Concrete and Concrete Aggregates²

C 192/C 192M Practice for Making and Curing Concrete Test Specimens in the Laboratory²

C 672/C 672M Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals²

C 1152/C 1152M Test Method for Acid-Soluble Chloride in Mortar and Concrete²

C 1202 Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration²

2.2 AASHTO Standard:

T 259 Method of Test for Resistance of Concrete to Chloride Ion Penetration

3. Terminology

3.1 Terms used in this standard are defined in Terminology C 125.

4. Summary of Test Method

4.1 A sodium-chloride solution is ponded on the surface of concrete specimens. Samples from specified depths are peri-

odically extracted and chemically analyzed to determine the chloride content of the concrete at those depths. The curing and moisture conditioning to which a specimen is subjected prior to ponding affects the mechanisms involved in chloride-ion penetration. These factors must be considered carefully in interpreting the results. Information on the mechanisms of chloride penetration into concrete is given in the appendix.

5. Significance and Use

5.1 This test method is suitable for evaluation of materials and material proportions for construction purposes as well as for research and development.

5.2 This test method can be used to establish the correlation between indirect measures of the chloride-ion penetration of concrete (see Test Method C 1202) and the actual chloride-ion penetration under controlled conditions.

5.3 This test method is not intended to provide a measure of the length of service that may be expected from use of a specific concrete mixture or sealing material.

6. Apparatus

6.1 *Glass Plates or Polyethylene Sheets*, of sufficient size to cover the ponded surface of the specimen.

6.2 *Molds*, of the proper size for the test specimens to be used, and conforming to the applicable requirements of Practice C 192/C 192M.

7. Reagents

7.1 *Ponding Solution*—3 % reagent grade sodium chloride (NaCl) by mass in distilled water (see Note 1).

NOTE 1—Other chloride-bearing solutions or different sodium-chloride concentrations may be used when there is a need to evaluate their specific effects. The concentration of the solution can be checked using a hydrometer calibrated to indicate the mass fraction of sodium chloride.

8. Specimens

8.1 Use as ponding specimens in this test method slabs having a surface area of at least 0.030 m² and a thickness of 90 ± 15 mm. At least two replicate specimens shall be made for each combination of variables to be tested.

8.2 Fabricate and cure molded ponding specimens in accordance with applicable sections of Test Method C 672/C 672M, unless otherwise specified.

¹ This test method is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.66 on Concrete's Resistance to Fluid Penetration.

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² *Annual Book of ASTM Standards*, Vol 04.02.