



# Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration<sup>1</sup>

This standard is issued under the fixed designation C 1202; 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 covers the determination of the electrical conductance of concrete to provide a rapid indication of its resistance to the penetration of chloride ions. This test method is applicable to types of concrete where correlations have been established between this test procedure and long-term chloride ponding procedures such as those described in AASHTO T 259. Examples of such correlations are discussed in Refs 1-5.<sup>2</sup>

1.2 The values stated in inch-pound units are to be regarded as the standard, except where SI units are given first followed by inch-pound units in parentheses. The values 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. Referenced Documents

### 2.1 ASTM Standards:

C 31 Practice for Making and Curing Concrete Test Specimens in the Field<sup>3</sup>

C 42 Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete<sup>3</sup>

C 192 Practice for Making and Curing Concrete Test Specimens in the Laboratory<sup>3</sup>

C 670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Purposes<sup>3</sup>

### 2.2 AASHTO Standard:

T 259 Method of Test for Resistance of Concrete to Chloride Ion Penetration<sup>4</sup>

## 3. Summary of Test Method

3.1 This test method consists of monitoring the amount of electrical current passed through 2-in. (51-mm) thick slices of 4-in. (102-mm) nominal diameter cores or cylinders during a 6-h period. A potential difference of 60 V dc is maintained across the ends of the specimen, one of which is immersed in a sodium chloride solution, the other in a sodium hydroxide solution. The total charge passed, in coulombs, has been found to be related to the resistance of the specimen to chloride ion penetration.

## 4. Significance and Use

4.1 This test method covers the laboratory evaluation of the electrical conductance of concrete samples to provide a rapid indication of their resistance to chloride ion penetration. In most cases the electrical conductance results have shown good correlation with chloride ponding tests, such as AASHTO T259, on companion slabs cast from the same concrete mixtures (Refs 1-5).

4.2 This test method is suitable for evaluation of materials and material proportions for design purposes and research and development.

4.3 The numerical results (total charge passed, in coulombs) from this test method must be used with caution, especially in applications such as quality control and acceptance testing. The qualitative terms in the right-hand column of Table 1 should be used in most cases.

4.4 Care should be taken in interpreting results of this test when it is used on surface-treated concretes, for example, concretes treated with penetrating sealers. The results from this test on some such concretes indicate low resistance to chloride ion penetration, while 90-day chloride ponding tests on companion slabs show a higher resistance.

4.5 The details of the test method apply to 4-in. (102-mm) nominal diameter specimens. This includes specimens with actual diameters ranging from 3.75 in. (95 mm) to 4.0 in. (102 mm). Other specimen diameters may be tested with appropriate changes in the applied voltage cell design (see 7.5 and Fig. 1).

4.5.1 For specimen diameters other than 3.75 in. (95 mm), the test result value for total charge passed must be adjusted following the procedure in 11.2. For specimens with diameters less than 3.75 in. (95 mm), particular care must be taken in

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<sup>2</sup> The boldface numbers in parentheses refer to the list of references at the end of this standard.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 04.02.

<sup>4</sup> *Methods of Sampling and Testing*, 1986, American Association of State Highway and Transportation Officials, 444 N. Capitol St., NW, Washington, DC 20001.