



Standard Test Method for Rebound Number of Hardened Concrete¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope *

1.1 This test method covers the determination of a rebound number of hardened concrete using a spring-driven steel hammer.

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

2. Referenced Documents

2.1 ASTM Standards:

C 125 Terminology Relating to Concrete and Concrete Aggregates²

C 670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials²

E 18 Test Methods for Rockwell and Rockwell Superficial Hardness of Metallic Materials³

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this test method, refer to Terminology C 125.

4. Summary of Test Method

4.1 A steel hammer impacts, with a predetermined amount of energy, a steel plunger in contact with a surface of concrete, and the distance that the hammer rebounds is measured.

5. Significance and Use

5.1 This test method is applicable to assess the in-place uniformity of concrete, to delineate regions in a structure of

poor quality or deteriorated concrete, and to estimate in-place strength development.

5.2 To use this test method to estimate strength requires establishing a relationship between strength and rebound number. The relationship shall be established for a given concrete mixture and given apparatus. The relationship shall be established over the range of concrete strength that is of interest. To estimate strength during construction, establish the relationship by performing rebound number tests on molded specimens and measuring the strength of the same or companion molded specimens. To estimate strength in an existing structure, establish the relationship by correlating rebound numbers measured on the structure with the strengths of cores taken from corresponding locations. See ACI 228.1R⁴ for additional information on developing the relationship and on using the relationship to estimate in-place strength.

5.3 For a given concrete mixture, the rebound number is affected by factors such as moisture content of the test surface, the method used to obtain the test surface (type of form material or type of finishing), and the depth of carbonation. These factors need to be considered in preparing the strength relationship and interpreting test results.

5.4 Different hammers of the same nominal design may give rebound numbers differing from 1 to 3 units. Therefore, tests should be made with the same hammer in order to compare results. If more than one hammer is to be used, perform tests on a range of typical concrete surfaces so as to determine the magnitude of the differences to be expected.

5.5 This test method is not intended as the basis for acceptance or rejection of concrete because of the inherent uncertainty in the estimated strength.

6. Apparatus

6.1 *Rebound Hammer*, consisting of a spring-loaded steel hammer that when released strikes a steel plunger in contact with the concrete surface. The spring-loaded hammer must travel with a consistent and reproducible velocity. The rebound

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

³ *Annual Book of ASTM Standards*, Vol 03.01.

⁴ ACI 228.1R-95, "In-Place Methods to Estimate Concrete Strength," *ACI Manual of Concrete Practice-Part 2, 2000*, American Concrete Institute, 38800 Country Club Drive, Farmington Hills, MI 48331.