



Standard Test Method for Determination of Rock Hardness by Rebound Hammer Method¹

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1. Scope *

1.1 This test method covers the testing apparatus, sampling, test specimen preparation, and testing procedures for determining the rebound hardness number of rock material using a spring-driven steel hammer, referred to variously as a rebound hammer, impact test hammer, or concrete test hammer.

1.2 This test method is best suited for rock material with uniaxial compressive strengths (see Test Method D 2938) ranging between approximately 1 and 100 MPa.

1.3 The portable testing apparatus may be used in the laboratory or field to provide a means of rapid assessment of rock hardness or to serve as an indicator of rock hardness.

1.4 The values stated in SI units are to be regarded as the standard.

1.5 *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 805 Test Method for Rebound Number of Hardened Concrete²
- D 420 Guide to Site Characterization for Engineering, Design, and Construction Purposes³
- D 653 Terminology Relating to Rock, Soil, and Contained Fluids³
- D 2938 Test Method for Unconfined Compressive Strength of Intact Rock Core Specimens³
- D 3740 Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction³
- D 4543 Practice for Preparing Rock Core Specimens and Determining Dimensional and Shape Tolerances³
- D 4879 Guide for Geotechnical Mapping of Large Underground Openings in Rock³

2.2 ISRM Standards:

Suggested Method for Determination of Schmidt Rebound Hardness⁴

Suggested Method for Quantitative Description of Discontinuities in Rock Masses⁴

3. Terminology

3.1 For common definitions of terms in this standard, refer to Terminology D 653.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *rebound hammer*—a portable, spring loaded, piston-type, steel hammer used to classify the hardness of rock in the field or laboratory.

3.2.2 *rebound hardness number*— H_R , a dimensionless number representing empirically determined, relative hardness of rock material or other hard substance by use of a rebound hammer.

4. Significance and Use

4.1 The rebound hardness method provides a means for rapid classification of the hardness of rock during site characterization for engineering, design, and construction purposes (see Guide D 420), geotechnical mapping of large underground openings in rock (see Guide D 4879), or reporting the physical description of rock core (see Practice D 4543). The rebound hardness number, H_R , can serve in a variety of engineering applications that require characterization of rock material. These applications include, for examples, the prediction of penetration rates for tunnel boring machines, determination of rock quality for construction purposes, and prediction of hydraulic erodibility of rock.

4.2 This test method is of limited use on very soft rock or very hard rock (unconfined compressive strengths less than approximately 1 MPa or greater than 100 MPa).

4.3 The results of this test method are not intended for conversion to strength data suitable for design.

NOTE 1—Several types of rebound hammers are commercially available to accommodate testing of various sizes and types of concrete construction (See Test Method C 805) and rock material.

NOTE 2—The quality of the result produced by this standard is dependent on the competence of the personnel performing it, and the

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

³ *Annual Book of ASTM Standards*, Vol 04.08.

⁴ Brown, E. T., ed., *Suggested Methods: Rock Characterization, Testing, and Monitoring*, International Society of Rock Mechanics: Pergamon Press, London, 1981.

*A Summary of Changes section appears at the end of this standard.