



Standard Test Methods for Laboratory Determination of Rock Anchor Capacities by Pull and Drop Tests¹

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1. Scope

1.1 These test methods cover the quantitative determination of the working and ultimate static or dynamic capacities of full scale rock anchors. Dynamic capacities are determined to simulate rockburst and blasting conditions (**1**).² The rock anchors are installed in steel pipe to simulate standard boreholes sizes. Rock anchor capacities are determined as a function of resin to steel bolt bond strength and steel bolt yield strength. These tests are not intended to determine rock anchor to borehole rock surface shear strength.

1.2 These test methods are applicable to mechanical, resin, or other similar anchor systems.

1.3 Two methods are provided to determine the capacities of rock anchors, as follows:

1.3.1 *Method A*—Using a horizontal hydraulically loaded pull test system.

1.3.2 *Method B*—Using a vertical dynamically loaded drop test system.

1.4 The values stated in SI units are to be regarded as the standard. No other units of measurement are included in this standard.

1.5 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice **D6026**.

1.6 *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.*

¹ These test methods are under the jurisdiction of ASTM Committee **D18** on Soil and Rock and are the direct responsibility of Subcommittee **D18.12** on Rock Mechanics.

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² The boldface numbers in parentheses refer to a list of references at the end of this standard.

2. Referenced Documents

2.1 *ASTM Standards*:³

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

D4435 Test Method for Rock Bolt Anchor Pull Test

D4436 Test Method for Rock Bolt Long-Term Load Retention Test

D6026 Practice for Using Significant Digits in Geotechnical Data

3. Terminology

3.1 *Definitions*—Refer to Terminology **D653** for specific definitions.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *linescan camera*—a camera with high optical linear resolution that captures two-dimensional images by moving the object perpendicularly to the scan line.

3.2.2 *maximum load*—represents the highest load value recorded during the test.

3.2.3 *rock anchor*—usually constructed of steel, which is inserted into pre-drilled holes in rock and secured with a fixing agent for the purpose of ground control.

3.2.4 *RPM*—acronym for revolutions per minute.

3.2.5 *transverse stiffness*—the ability of the borehole or steel tube wall to deform radially.

3.2.6 *yield load*—corresponds to the onset of plastic deformation.

4. Summary of Test Methods

4.1 A rock anchor is installed in a steel pipe instead of a borehole the same manner and in the same material as its

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.