



Designation: D4543 – 19

# Standard Practices for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerances<sup>1</sup>

This standard is issued under the fixed designation D4543; 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 These practices specify procedures for preparing rock test specimen of rock core from drill core obtained in the field or from block samples for strength and deformation testing and for determining the conformance of the test specimen dimensions with tolerances established by this practice. Cubical, rectangular, or other shapes are not covered by this practice. However, some of the information contained within this practice and in standard Test Method C170 may still be of use to preparing other test specimen shapes.

1.2 Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content and chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For rock types which are difficult to prepare, all reasonable efforts should be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial and error that this is not possible, prepare the rock specimen to the closest tolerances practicable and consider this to be the best effort (Note 1) and report it as such and if allowable or necessary for the intended test, capping the ends of the specimen as discussed in this practice is permitted.

NOTE 1—Best effort in surface preparation refers to the use of a well-maintained, suitable surface grinder, lathe or lapping machine and any required ancillary equipment are utilized by an experienced operator and in which a reasonable number of attempts has been made to meet the tolerances required in this procedure.

1.3 This practice covers some, but not all of the curatorial issues that should be implemented. For curatorial issues that should be followed before and during specimen preparation

refer to Practices D5079 and to the specific test standards in 2.1 for which the specimens are being prepared.

1.4 This practice also prescribes tolerance checks on the length-to-diameter ratio, straightness of the elements on the cylindrical surface, the flatness of the end bearing surfaces, and the perpendicularity of the end surfaces with the axis of the core.

NOTE 2—This practice does not purport to cover all the issues that will or could be encountered that may control the quality of the specimen preparation required. Each laboratory may have their own issues, especially for different compression load frames or rock types. For example, stiff testing frames versus traditional load frames and loading platens with or without spherical seating. Specimens for a stiff testing load frame with no spherical seat may need to have more stringent requirements depending on the type of rock being tested. This procedure has tried to show the methods and QA that may be involved while keeping in mind those materials that are difficult to work with and for which the specimens will still be suitable to be tested. The available literature and input on this subject from D18.12 members were considered as much as possible for this standard.<sup>2</sup>

1.5 The requirement for specifying the moisture condition and volume of the test specimen is also stated. However, the requirements in the specific test standards in 2.1 should be followed too.

1.6 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026, unless superseded by this standard.

1.6.1 The practices/procedures used to specify how data are collected/recorded and calculated in this standard are regarded as the industry standard. In addition, they are representative of the significant digits that generally should be retained. The procedures used do not consider material variation, purpose for obtaining the data, special purpose studies, or any considerations for the user's objectives; and it is common practice to increase or reduce significant digits of reported data to be commensurate with these considerations. It is beyond the scope

<sup>1</sup> These practices 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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<sup>2</sup> Needless Stringency in Sample Preparation Standards for Laboratory Testing of Weak Rocks, P.J.N. Pells (Coffey & Partners Pty Ltd, North Ryde) | M.J. Ferry (Postgraduate Scholar, University of Sydney), International Society for Rock Mechanics Source 5th ISRM Congress, 10-15 April, Melbourne, Australia Publication Date 1983.

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