



Standard Guide for Using Rock-Mass Classification Systems for Engineering Purposes¹

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1. Scope *

1.1 This guide covers the selection of a suitable system of classification of rock mass for specific engineering purposes, such as tunneling and shaft-sinking, excavation of rock chambers, ground support, modification and stabilization of rock slopes, and preparation of foundations and abutments. These classification systems may also be of use in work on rippability of rock, quality of construction materials, and erosion resistance. Although widely used classification systems are treated in this guide, systems not included here may be more appropriate in some situations, and may be added to subsequent editions of this standard.

1.2 The valid, effective use of this guide is contingent upon the prior complete definition of the engineering purposes to be served and on the complete and competent definition of the geology and hydrology of the engineering site. Further, the person or persons using this guide must have had field experience in studying rock-mass behavior. An appropriate reference for geological mapping in the underground is provided by Guide D 4879.

1.3 This guide identifies the essential characteristics of seven classification systems. It does not include detailed guidance for application to all engineering purposes for which a particular system might be validly used. Detailed descriptions of the first five systems are presented in STP 984 (1),² with abundant references to source literature. Details of two other classification systems and a listing of seven Japanese systems are also presented.

1.4 The range of applications of each of the systems has grown since its inception. This guide summarizes the major fields of application up to this time of each of the seven classification systems.

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.*

¹ This test method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.12 on Rock Mechanics.

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

1.6 *This guide offers an organized collection of information or a series of options and does not recommend a specific course of action. This document cannot replace education or experience and should be used in conjunction with professional judgement. Not all aspects of this guide may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.*

2. Referenced Documents

2.1 ASTM Standards:

D 653 Terminology Relating to Soil, Rock, and Contained Fluids³

D 2938 Test Method for Unconfined Compressive Strength of Intact Rock Core Specimens³

D 4879 Guide for Geotechnical Mapping of Large Underground Openings in Rock³

3. Terminology

3.1 Definitions:

3.1.1 *classification, n*—a systematic arrangement or division of materials, products, systems, or services into groups based on similar characteristics such as origin, composition, properties, or use (*Regulations Governing ASTM Technical Committees*).⁴

3.1.2 *rock mass (in situ rock), n*—rock as it occurs in situ, including both the rock material and its structural discontinuities (Modified after Terminology D 653 [ISRM]).

3.1.2.1 *Discussion*—Rock mass also includes at least some of the earth materials in mixed-ground and soft-ground conditions.

3.1.3 *rock material (intact rock, rock substance, rock element), n*—rock without structural discontinuities; rock on which standardized laboratory property tests are run.

3.1.4 *structural discontinuity (discontinuity), n*—an interruption or abrupt change in a rock's structural properties, such

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

⁴ Available from ASTM Headquarters, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

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