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Standard Guide for Selection of Minimum Set of Data Elements Required to Identify Locations Chosen for Field Collection of Information to Describe Soil, Rock, and Their Contained Fluids[1]

This standard is issued under the fixed designation D6168; 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 This guide[2] covers factors to consider for the selection of the minimum set of data elements required for the accurate location and cataloging of information collected for geological science (geoscience) investigations, which includes geoecology.

1.1.1 Geoscience investigations include soil surveys, foundation investigations, geologic studies, hydrologic evaluations, environmental appraisals, contamination inquiries, archaeological surveys, and other studies that involve the soil, rock, and contained fluids from the lands surface to any explored depth underground.

1.2 A unique geoscience data location, on or below the earth's surface, can be described by X, Y, and Z coordinates and by that method establish the dimensional relationship to data of a similar nature. Additional location information needed depends upon the type of geoscience data collection locality.

1.2.1 The basic type is a single position described by finite X, Y, and Z coordinates. The X, Y, and Z coordinates uniquely position the location on or below the earth's surface.

NOTE 1—An example is the latitude and longitude in horizontal coordinates and the altitude (or elevation) in vertical distance of a ground-water location or site. Data collected at the site, for example, water levels, are measured by the vertical interval as referenced to the altitude.

1.2.2 Another type of location is described by finite X and Y coordinates that has multiple vertically positioned Z coordinates. This is equivalent to the location type described in 1.2.1, except that multiple vertical dimensions are stated as Z coordinates, rather than vertical intervals.

NOTE 2—An example is latitude, longitude, and multiple altitudes of a soil sampling location or site. Each altitude represents a different sampling position that has the same latitude and longitude coordinate. The upper and lower limit of a sampling interval can be expressed by altitudes.

1.2.3 Another type is a location described by finite X and Y coordinates with multiple Z coordinates that are not vertically oriented from X and Y coordinates.

NOTE 3—An example is a slanted borehole where the top is at a different latitude and longitude coordinate than the sampling positions in the hole. Methods of describing these sampling points are: treat each position as a separate location with finite latitude, longitude, and altitude values; describe the horizontal deviation of the sampling point from the finite latitude and longitude coordinates at the top of the borehole.

1.2.4 Another type is a location with considerable horizontal dimension that cannot be described by a finite X and Y coordinate, however, a single Z coordinate may be acceptable.

NOTE 4—Examples are sinkholes, waste disposal pits, septic systems, underground injection facilities, mines, archaeological sites, and some ponds or lakes. These locations can be described by including additional information that gives the horizontal components of the location along with the latitude, longitude, and altitude coordinates or by multiple sets of X and Y coordinates that encompass the location.

1.3 Additional key data elements are needed to simplify the identification and cataloging of the geoscience data.

1.3.1 These elements describe political entities, data sources, and individual characteristics of the location.

NOTE 5—The data assist in file organization by placing the information into logical categories and to further identify the geoscience location by use of familiar terminology. A carefully designed minimum set of data elements contributes to the recoverability and the future value of the entire data file.

1.4 *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.*

1.5 *This guide offers an organized collection of information or a series of options and does not recommend a specific course of action. This guide cannot replace education or*

[1] This guide is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.21 on Ground Water and Vadose Zone Investigations.

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[2] As defined by ASTM—a guide is a series of options or instructions that do not recommend a specific course of action. The purpose of a guide is to offer guidance, based on a consensus of view-points, but not to establish a fixed procedure.

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experience and should be used in conjunction with professional judgment. Not all aspects of this guide may be applicable in all circumstances. This guide 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 guide 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:*[3]

D420 Guide to Site Characterization for Engineering Design and Construction Purposes

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D2487 Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

D2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)

D2607 Classification of Peats, Mosses, Humus, and Related Products[4]

D3282 Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes

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

D4083 Practice for Description of Frozen Soils (Visual-Manual Procedure)

D4220 Practices for Preserving and Transporting Soil Samples

D4427 Classification of Peat Samples by Laboratory Testing

D4448 Guide for Sampling Ground-Water Monitoring Wells

D4700 Guide for Soil Sampling from the Vadose Zone

D4879 Guide for Geotechnical Mapping of Large Underground Openings in Rock

D5092 Practice for Design and Installation of Ground Water Monitoring Wells

D5254 Practice for Minimum Set of Data Elements to Identify a Ground-Water Site

D5299 Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities

D5408 Guide for Set of Data Elements to Describe a Ground-Water Site; Part One—Additional Identification Descriptors

D5409 Guide for Set of Data Elements to Describe a Ground-Water Site; Part Two—Physical Descriptors

D5410 Guide for Set of Data Elements to Describe a Ground-Water Site;Part Three—Usage Descriptors

D5434 Guide for Field Logging of Subsurface Explorations of Soil and Rock

D5474 Guide for Selection of Data Elements for Ground-Water Investigations

D5730 Guide for Site Characterization for Environmental Purposes With Emphasis on Soil, Rock, the Vadose Zone and Ground Water

D5911 Practice for Minimum Set of Data Elements to Identify a Soil Sampling Site

3. Terminology

3.1 *Definitions:* Except as listed or noted below, all definitions are in accordance with Terminology D653. Additional definitions are in References (**1-17**).[5] See Guide D420, Classification D2487, Practice D2488, Classifications D2607 and D3282, Practices D3740, D4083, and D4220, Classification D4427, Guides D4448, D4700, and D4879, Practice D5092, and Guides D5299 and D5434.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *altitude*—the vertical distance, in feet (or metres), of a level, a point, or an object considered as a point, above or below a reference datum surface, usually mean sea level. The Z coordinate for geoscience locations. The term elevation has been used synonymously with altitude in some segments of the geoscience discipline.

3.2.2 *geological science*—any of the subdisciplinary specialties that are part of the science of geology; for example, geophysics, geochemistry, paleontology, petrology, etc. The term is commonly used in the plural (**1**).

3.2.3 *geoscience*—a short form, sometimes used in the plural, denoting the collective disciplines of the geological sciences (**1**).

3.2.4 *geoscience location*—a geographic area or single point where geoscience data are collected and can be uniquely positioned by X, Y, and Z coordinates at the location or some point within the location.

3.2.5 *key data elements*—as used in this guide, information that is essential for the accurate location and cataloging of information collected for geoscience investigations.

3.2.6 *latitude*—the coordinate representation that indicates locations on the surface of the earth using the earth's equator as the respective latitudinal origin. The X coordinate for geoscience locations.

3.2.7 *longitude*—the coordinate representation that indicates locations on the surface of the earth using the prime meridian (Greenwich, England) as the longitudinal origin. The Y coordinate for geoscience locations.

4. Significance and Use

4.1 Adequately documented geoscience data are beneficial to studies utilizing traditional and computer technology for conducting resource surveys and in analyzing environmental concerns.

4.1.1 Geoscience data that include the standard coordinates pinpoint the location of the information on or below the earth's

[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.

[4] Withdrawn.

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

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