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Standard Guide for Selecting Surface Geophysical Methods¹

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1. Scope*

1.1 This guide covers the selection of surface geophysical methods, as commonly applied to geologic, geotechnical, hydrologic, and environmental site investigations and subsequent site characterization, as well as forensic and archaeological applications. These geophysical methods are rarely the sole method used in the site investigation and are often used for pre-screening to guide how and where drilling, sampling or other targeted in situ testing are conducted. This guide does not describe the specific procedures for conducting geophysical surveys. Individual guides have been developed for many surface geophysical methods.

1.2 Surface geophysical methods yield direct and indirect measurements of the physical properties of soil and rock and pore fluids, as well as buried objects.

1.3 This guide provides an overview of applications for which surface geophysical methods are appropriate. It does not address the details of the theory underlying specific methods, field procedures, or interpretation of the data. Numerous references are included for that purpose and are considered an essential part of this guide. It is recommended that the user of this guide be familiar with the references cited (**1-27**)² and with Guides **D420**, **D5730**, **D5753**, **D5777**, **D6285**, **D6430**, **D6431**, **D6432**, **D6820**, **D7046**, and **D7128**, as well as Practices **D5088**, **D5608**, **D6235**, and Test Methods **D4428/D4428M**, **D7400/D7400M**, and **G57**.

1.4 To obtain detailed information on specific geophysical methods, ASTM standards, other publications, and references cited in this guide, should be consulted.

1.5 The success of a geophysical survey is dependent upon many factors. One of the most important factors is the competence of the person(s) responsible for planning, carrying out the survey, and interpreting the data. An understanding of

the method's theory, field procedures, and interpretation along with an understanding of the site geology, is necessary to successfully complete a survey. Personnel not having specialized training or experience should be cautious about using geophysical methods and should solicit assistance from qualified professionals. All references in this standard to the "qualified professional" refers to individuals (such as engineers, soil scientists, geophysicists, engineering geologists or geologists), who have the appropriate experience and, if required by local regulations, applicable certification, licensure or registration. The term "engineering" must be understood to be associated with the practices or activities of that qualified professional.

1.6 *Units*—The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only and are not considered standard. Reporting of test results in units other than SI shall not be regarded as nonconformance with this standard.

1.7 *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 judgment. 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.*

1.8 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This guide is under the jurisdiction of ASTM Committee **D18** on Soil and Rock and is the direct responsibility of Subcommittee **D18.01** on Surface and Subsurface Investigation.

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

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