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# Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes<sup>1</sup>

This standard is issued under the fixed designation D 1587; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense.*

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~~<sup>ε1</sup>Note—Editorial changes were made in June 2007.~~

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## 1. Scope\*

1.1 This practice covers a procedure for using a thin-walled metal tube to recover relatively ~~undisturbed~~<sup>intact</sup> soil samples suitable for laboratory tests of engineering properties, such as strength, compressibility, permeability, and density. Thin-walled tubes used in piston, plug, or rotary-type samplers should comply with Section 6.3 of this practice which describes the thin-walled tubes.

NOTE 1—This practice does not apply to liners used within the samplers.

1.2 This Practice is limited to soils that can be penetrated by the thin-walled tube. This sampling method is not recommended for sampling soils containing gravel or larger size soil particles cemented or very hard soils. Other soil samplers may be used for sampling these soil types. Such samplers include driven split barrel samplers and soil coring devices (D 1586, D 3550, and D 6151). For information on appropriate use of other soil samplers refer to D 6169.

1.3 This practice is often used in conjunction with fluid rotary drilling (D 1452, D 5783) or hollow-stem augers (D 6151). Subsurface geotechnical explorations should be reported in accordance with practice (D 5434). This practice discusses some aspects of sample preservation after the sampling event. For information on preservation and transportation process of soil samples, consult Practice D 4220. This practice does not address environmental sampling; consult D 6169 and D 6232 for information on sampling for environmental investigations.

~~1.4 The values stated in inch-pound units are to be regarded as the standard. The SI values given in parentheses are provided for information purposes only. The tubing tolerances presented in~~

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4.1 The tubing tolerances presented in Table 1 are from sources available in North America. Use of metric equivalent is acceptable as long as thickness and proportions are similar to those required in this standard.

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.*

1.6 This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice 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:<sup>2</sup>

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

D 1452 Practice for Soil Investigation and Sampling by Auger Borings

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<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.02 on Sampling and Related Field Testing for Soil Evaluations.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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

**TABLE 1 Dimensional Tolerances for Thin-Walled Tubes**

Nominal Tube Diameters from Table 2 <sup>A</sup> Tolerances						
Size Outside Diameter	2 in.	50.8 mm	3 in.	76.2 mm	5 in.	127 mm
Outside diameter, $D_o$	+0.007 -0.000	+0.179 -0.000	+0.010 -0.000	+0.254 -0.000	+0.015 -0.000	0.381 -0.000
Inside diameter, $D_i$	+0.000 -0.007	+0.000 -0.179	+0.000 -0.010	+0.000 -0.254	+0.000 -0.015	+0.000 -0.381
Wall thickness	$\pm 0.007$	$\pm 0.179$	$\pm 0.010$	$\pm 0.254$	$\pm 0.015$	$\pm 0.381$
Ovality	0.015	0.381	0.020	0.508	0.030	0.762
Straightness	0.030/ft	2.50/m	0.030/ft	2.50/m	0.030/ft	2.50/m

<sup>A</sup> Intermediate or larger diameters should be proportional. Specify only two of the first three tolerances; that is,  $D_o$  and  $D_i$ , or  $D_o$  and Wall thickness, or  $D_i$  and Wall thickness.

- D 1586 Test Method for Penetration Test (SPT) and Split-Barrel Sampling of Soils
- D 2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)
- D 3550 Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils
- D 3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
- D 4220 Practices for Preserving and Transporting Soil Samples
- D 5434 Guide for Field Logging of Subsurface Explorations of Soil and Rock
- D 5783 Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices
- D 6151 Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling
- D 6169 Guide for Selection of Soil and Rock Sampling Devices Used With Drill Rigs for Environmental Investigations
- D 6232 Guide for Selection of Sampling Equipment for Waste and Contaminated Media Data Collection Activities

**3. Terminology**

3.1 *Definitions:*

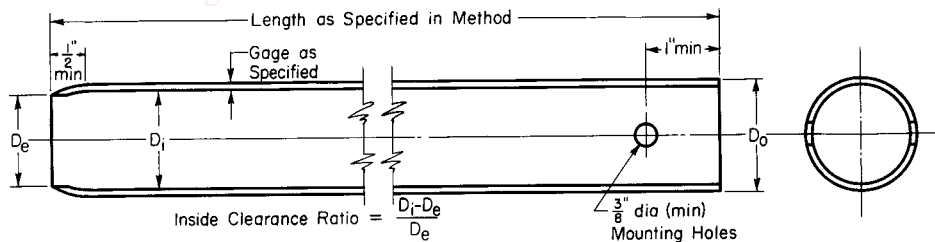
3.1.1 For common definitions of terms in this standard, refer to Terminology D 653.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *inside clearance ratio, %, n*—the ratio of the difference in the inside diameter of the tube,  $D_i$ , minus the inside diameter of the cutting edge,  $D_e$ , to the inside diameter of the tube,  $D_i$  expressed as a percentage (see Fig. 1).

3.2.2 *ovality, n*—the cross section of the tube that deviates from a perfect circle.

<https://standards.iteh.ai/catalog/standards/sist/43314876-3deb-44e6-bbe5-5f962f841d05/astm-d1587-08>



NOTE 1—Minimum of two mounting holes on opposite sides for  $D_o$  smaller than 4 in. (101.6 mm).

NOTE 2—Minimum of four mounting holes equally spaced for  $D_o$  4 in. (101.6 mm) and larger.

NOTE 3—Tube held with hardened screws or other suitable means.

NOTE 4—2-in (50.8 mm) outside-diameter tubes are specified with an 18-gage wall thickness to comply with area ratio criteria accepted for “undisturbed samples.” Users are advised that such tubing is difficult to locate and can be extremely expensive in small quantities. Sixteen-gage tubes are generally readily available.

**Metric Equivalent Conversions**

in.	mm
3/8	9.53
1/2	12.7
1	25.4
2	50.8
3	76.2
4	101.6
5	127

**FIG. 1 Thin-Walled Tube for Sampling**