



Standard Practice for Sampling Steam¹

This standard is issued under the fixed designation D1066; 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 practice covers the sampling of saturated and superheated steam. It is applicable to steam produced in fossil fired and nuclear boilers or by any other process means that is at a pressure sufficiently above atmospheric to establish the flow of a representative sample. It is also applicable to steam at lower and subatmospheric pressures for which means must be provided to establish representative flow.

1.2 For information on specialized sampling equipment, tests or methods of analysis, reference should be made to the *Annual Book of ASTM Standards*, Vols 11.01 and 11.02, relating to water.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

A269 Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service

A335/A335M Specification for Seamless Ferritic Alloy-Steel Pipe for High-Temperature Service

D1129 Terminology Relating to Water

D3370 Practices for Sampling Water from Closed Conduits

D5540 Practice for Flow Control and Temperature Control for On-Line Water Sampling and Analysis

¹ This practice is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.03 on Sampling Water and Water-Formed Deposits, Analysis of Water for Power Generation and Process Use, On-Line Water Analysis, and Surveillance of Water.

Current edition approved June 15, 2011. Published July 2011. Originally approved in 1949. Last previous edition approved in 2006 as D1066 – 06. DOI: 10.1520/D1066-11.

² 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.

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this practice, refer to definitions given in Practice D1129.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *isokinetic sampling, n*—a condition wherein the sample entering the port (tip) of the sampling nozzle has the same as the velocity vector (velocity and direction) as the stream being sampled. Isokinetic sampling ensures a representative sample of dissolved chemicals, solids, particles, chemicals absorbed on solid particles, and in the case of saturated and wet steam, water droplets are obtained.

3.2.2 *sample cooler, n*—a small heat exchanger designed to provide cooling/condensing of small process sampling streams of water or steam.

3.2.3 *sampling, n*—the withdrawal of a representative portion of the steam flowing in the boiler drum lead or pipeline by means of a sampling nozzle and the delivery of this portion of steam in a representative manner for analysis.

3.2.4 *saturated steam, n*—a vapor whose temperature corresponds to the boiling water temperature at the particular existing pressure.

3.2.5 *superheated steam, n*—a vapor whose temperature is above the boiling water temperature at the particular existing pressure.

4. Summary of Practice

4.1 This practice describes the apparatus, design concepts and procedures to be used in extracting and transporting samples of saturated and superheated steam. Extraction nozzle selection and application, line sizing, condensing requirements and optimization of flow rates are all described. Condensed steam samples should be handled in accordance with Practices D3370 and D5540.

5. Significance and Use

5.1 It is essential to sample steam representatively in order to determine the amount of all impurities (dissolved chemicals, solid particles, chemicals absorbed on solid particles, water