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An American National Standard

Standard Practice for Sampling Steam[1]

This standard is issued under the fixed designation D 1066; 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 representative sample flow. 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.[2,3]

1.3 The values stated in either inch-pound units or SI units are to be regarded as standard. Within the text, the inch-pound units are shown in parentheses. The values stated in each system are not exact equivalents. Therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with this specification.

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:*

A 269 Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service[4]

A 335/A 335M Specification for Seamless Ferritic Alloy-Steel Pipe for High Temperature Service[4]

D 1129 Terminology Relating to Water[3]

D 3370 Practices for Sampling Water in Closed Conduits[3]

D 5540 Practices for Flow Control and Temperature Control for On-Line Water Sampling and Analysis[3]

3. Terminology

3.1 *Definitions*:

3.1.1 For definitions of terms used in this practice, refer to definitions given in Practice D 1129.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *isokinetic sampling*—a condition wherein the velocity of the sample entering the port or ports of the sample nozzle(s) is the same as the velocity in the stream being sampled.

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

3.2.3 *sampling*—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*—a vapor whose temperature corresponds to the boiling water temperature at the particular existing pressure.

3.2.5 *superheated steam*—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 in detail. Condensed steam samples should be handled in accordance with Practices D 3370 and D 5540.

5. Significance and Use

5.1 It is essential to sample steam representatively in order to determine the amount of impurities, including moisture, in it. An accurate measure of the purity of steam provides information, which may be used to determine whether the purity of the steam is within necessary limits to prevent damage or deterioration of subsequent equipment, such as turbines, etc. Impurities in the steam may be derived from

[1] This practice is under the jurisdiction of ASTM Committee D19 on Water , and is the direct responsibility of Subcommittee D19.03 on Sampling of Water and Water-Formed Deposits, Surveillance of Water and Flow Measurement of Water Samples.

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[2] *Annual Book of ASTM Standards*, Vol 11.01.

[3] *Annual Book of ASTM Standards*, Vol 11.02.

[4] *Annual Book of ASTM Standards*, Vol 01.01.

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