



Standard Practice for Flow Control and Temperature Control for On-Line Water Sampling and Analysis¹

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1. Scope

1.1 This practice covers the conditioning of a flowing water sample for the precise measurement of various chemical and physical parameters of the water, whether continuous or grab. This practice addresses the conditioning of both high- and low-temperature and pressure sample streams, whether from steam or water.

1.2 This practice provides procedures for the precise control of sample flow rate to minimize changes of the measured variable(s) due to flow changes.

1.3 This practice provides procedures for the precise control of sample temperature to minimize changes of the measured variable(s) due to temperature changes.

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

2. Referenced Documents

2.1 *ASTM Standards:*²

D1066 Practice for Sampling Steam

D1129 Terminology Relating to Water

D3370 Practices for Sampling Water from Closed Conduits

D3864 Guide for On-Line Monitoring Systems for Water 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.

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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*—For definitions of terms used in this practice, refer to Terminology D1129.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *approach temperature, n*—the difference in temperature between cooling water temperature in and sample temperature out.

3.2.1.1 *Discussion*—This term is used in heat exchanger applications and applies to all types of heat exchangers. The term is defined as: the difference between the outlet temperature in one stream and the inlet temperature in the other stream.

3.2.2 *crud deposition, n*—on interior surfaces of sample tubing or other hardware, the disposition of fine insoluble particles (of iron oxides and other byproducts of metallic corrosion) that are present throughout the system.

3.2.2.1 *Discussion*—The term “crud” is generally used for all types of fouling.

3.2.3 *sample conditioning, n*—reduction of the temperature and pressure of a flowing sample from process conditions to a controlled temperature and pressure, and maintenance of a constant flow rate both in incoming sample lines and through on-line analyzers.

3.2.4 *sample cooler, n*—a small heat exchanger designed to cool small streams of water or steam.

3.2.5 *temperature compensation, n*—by the use of electronic adjustment or data manipulation, the adjustment of the analyzer's measured temperature for variation in sample temperature from a preestablished value.

4. Summary of Practice

4.1 This practice covers the system design, operating procedures, and selection of equipment to help ensure the appropriate flow and temperature control for analysis of water and steam samples. This control is essential to ensure the accuracy and repeatability of on-line analyzers. Variations in types of analysis, sample characteristics, and their effect on sample conditioning are included.

4.2 The equipment and procedures described in this practice are intended to represent current state-of-the art technology available from major manufacturers of sample conditioning