



Standard Practice for Sampling and Determination of Hydrogen Cyanide (HCN) in Combustion Effluents and Other Stationary Sources¹

This standard is issued under the fixed designation D7295; 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 is used to determine the concentration of gaseous hydrogen cyanide (HCN) from any combustion device or atmosphere where cyanide may be present. While primarily designed for the measurement of gas phase HCN, the sample collection described in this practice also includes cyanide ion (CN^-) absorbed particles that may be present in the sampling atmosphere.

1.1.1 Samples can be collected from a closed chamber such as the NBS smoke box described in Test Method E662 provided it is equipped with sampling ports.

1.1.2 Open chambers such as industrial work areas or large scale fires can be monitored for HCN with this practice.

1.1.3 The HCN emissions of a flow through system can be determined by sampling from its discharge stack. Examples of such systems include large scale manufacturing applications and the cone calorimeter described in Test Method E1354.

1.2 This practice can be used to monitor HCN levels in lab scale fire smoke effluents in order to estimate toxicity of gases produced from burning materials. See Guide E800.

1.3 The concentration range of hydrogen cyanide will be dependent on the volume of gas sampled, the volume of sodium hydroxide solution placed in the impinger during sampling, and the analytical method used to measure cyanide. For example, the lower limit of detection would be 0.002-mg/m^3 when 0.1-m^3 of combustion effluent is collected into 100-mL sodium hydroxide solution based on a detection limit of 0.002 mg/L cyanide in the impinger solution when using the flow injection analysis (FIA) system described in Test Method D6888.

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.*

¹ This practice is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.03 on Ambient Atmospheres and Source Emissions.

Current edition approved March 1, 2011. Published March 2011. Originally approved in 2006. Last previous edition approved in 2006 as D7295 – 06. DOI: 10.1520/D7295-11.

2. Referenced Documents

2.1 ASTM Standards:²

- D1193 Specification for Reagent Water
- D1356 Terminology Relating to Sampling and Analysis of Atmospheres
- D2036 Test Methods for Cyanides in Water
- D2777 Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D19 on Water
- D3154 Test Method for Average Velocity in a Duct (Pitot Tube Method)
- D3614 Guide for Laboratories Engaged in Sampling and Analysis of Atmospheres and Emissions
- D3685/D3685M Test Methods for Sampling and Determination of Particulate Matter in Stack Gases
- D4841 Practice for Estimation of Holding Time for Water Samples Containing Organic and Inorganic Constituents
- D5337 Practice for Flow Rate Adjustment of Personal Sampling Pumps
- D6696 Guide for Understanding Cyanide Species
- D6888 Test Method for Available Cyanide with Ligand Displacement and Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection
- D7365 Practice for Sampling, Preservation and Mitigating Interferences in Water Samples for Analysis of Cyanide
- E337 Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry-Bulb Temperatures)
- E662 Test Method for Specific Optical Density of Smoke Generated by Solid Materials
- E800 Guide for Measurement of Gases Present or Generated During Fires
- E1354 Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter

3. Terminology

3.1 Refer to Terminology D1356 for terminology related to sampling and analysis of atmospheres.

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.