



Standard Test Method for High-Volume Sampling for Solid Particulate Matter and Determination of Particulate Emissions¹

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1. Scope

1.1 This test method can be used to estimate the particulate matter concentration in stationary source stacks.

1.2 With the nozzle sizes specified herein, the method can be used for stack stream velocities from approximately 4 to 45 m/s (800 to 8 000 ft/min).

1.3 Particulate matter present in a gaseous phase at the filtration temperature will not be collected. If significant quantities of condensible particulate matter are expected, this test method may not be the method of choice. If the temperature of the sampled gas at the filter is below the stream dewpoint this test method will not work. If moisture is expected to condense between the filter and the orifice, this test method is not applicable unless a moisture collection device is placed immediately upstream of the orifice and the sampling rate is adjusted for the volume of gas that condensed upstream of the orifice.

1.4 The values stated in SI units are to be regarded as the 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:

D 1071 Test Methods for Volumetric Measurement of Gaseous Fuel Samples²

D 1356 Terminology Relating to Sampling and Analysis of Atmospheres³

D 2986 Practice for Evaluation of Air Assay Media by the Monodisperse DOP (Diocetyl Phthalate) Smoke Test³

D 3154 Test Method for Average Velocity in a Duct (Pitot Tube Method)³

D 3464 Test Method for Average Velocity in a Duct Using a Thermal Anemometer³

E 1 Specification for ASTM Thermometers⁴

2.2 Other Documents:

40 CFR, Part 60, Environmental Protection Agency Method 2, Appendix A,

Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)⁵

Oregon State Method, Standard Sampling Method, Determination of Particulate Emissions from Cyclones (High Volume Method)⁶

3. Terminology

3.1 For definitions of terms relating to this test method, refer to Terminology D 1356.

3.2 Symbols:

E	= total particulate emission rate: kg/h (lb/h)
F_p	= pitot tube calibration factor (standard-type = 1.0)
I	= percent isokinetic, %
A_a	= area of stack at sampling points, m ² (ft ²)
A_n	= area of nozzle, m ² (ft ²)
C_g	= particulate concentration, g/m ³ (grains/ft ³)
M	= molecular weight of moist gas at stack conditions
M_a	= volume fraction of moisture in stack gas, %
M_o	= 29.0, (molecular weight of air)
P_{std}	= standard atmospheric pressure, 101.32 kPa (29.92 in. Hg)
P_a	= absolute pressure of stack gas kPa (in. Hg)
P_{bar}	= barometric pressure corrected for elevation, kPa (in. Hg)
P_o	= orifice pressure drop, kPa (in. of water)
P_s	= stack velocity pressure, kPa (in. of water)
Q	= stack volumetric flow rate, dry m ³ /s (dry ft ³ /min)
T_s	= stack temperature, degrees K (R)
T_{std}	= standard temperature, 298.2 K (537 R)
T_o	= average orifice meter temperature, degrees K (R)

¹ This test method is under the jurisdiction of ASTM Committee D-22 on Sampling and Analysis of Atmospheres and is the direct responsibility of Subcommittee D22.03 on Ambient Atmospheres and Source Emissions.

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² Annual Book of ASTM Standards, Vol 05.05.

³ Annual Book of ASTM Standards, Vol 11.03.

⁴ Annual Book of ASTM Standards, Vol 14.03.

⁵ Available from Superintendent of Documents, U.S. Printing Office, Washington, DC 20402.

⁶ Available from Oregon Department of Environmental Quality, Control Division, April 1972.