



Standard Test Method for Determination of Total Suspended Particulate (TSP) Hexavalent Chromium in Ambient Air Analyzed by Ion Chromatography (IC) and Spectrophotometric Measurements¹

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1. Scope

1.1 This test method specifies a procedure for the sampling and analysis of airborne particulate matter for hexavalent chromium in ambient air samples.

1.2 The method involves drawing 21.6 m³ ambient air (at 15 L/min for 24 hours) through a sodium bicarbonate cellulose acid washed filter. Atmospheric hexavalent chromium is stabilized on the alkaline coated filter.

1.3 This method uses ion chromatography with post-column derivatization with 1,5-diphenylcarbazide (DPC) and a Ultraviolet/Visible (UV/VIS) detector.

1.4 This method is applicable to the determination of masses of 0.10 to 20.0 ng of hexavalent chromium per sample without dilution.

1.5 This method is applicable for hexavalent chromium measurement in the atmosphere from 0.004 ng/m³ to 0.926 ng/m³ assuming a 21.6 m³ sample volume. The range can be increased using appropriate dilutions.

1.6 Interconversion of trivalent and hexavalent chromium during sampling is minimized to the extent possible by using these sampling procedures.

1.7 The corresponding method for workplace air samples is ASTM Test Method **D6832**.

1.8 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.9 *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 test method 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.

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2. Referenced Documents

2.1 ASTM Standards:²

D4840 Guide for Sample Chain-of-Custody Procedures

D1193 Specification for Reagent Water

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D1357 Practice for Planning the Sampling of the Ambient Atmosphere

D3195 Practice for Rotameter Calibration

D3586 Test Method for Chromium in Workplace Atmospheres (Colorimetric Method) (Withdrawn 1990)³

D5281 Test Method for Collection and Analysis of Hexavalent Chromium in Ambient Atmospheres (Withdrawn 2014)³

D6832 Test Method for the Determination of Hexavalent Chromium in Workplace Air by Ion Chromatography and Spectrophotometric Measurement Using 1,5-diphenylcarbazide

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology **D1356**.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *eluent*—the mobile phase used to transport the sample through the ion exchange column.

3.2.2 *resolution*—the ability of a column to separate constituents under specified test conditions.

4. Summary of Test Method (**1, 2, 3, 4**)⁴

4.1 A known volume of air is drawn through a sodium bicarbonate coated cellulose filter at a rate of 9.0 to 16.0 L/min for 24 hours.

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 The last approved version of this historical standard is referenced on www.astm.org.

⁴ The boldface numbers in parentheses refer to a list of references at the end of this standard.