



Standard Test Method for Measurement of Respirable Crystalline Silica in Workplace Air by Infrared Spectrometry¹

This standard is issued under the fixed designation D7948; 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.

^{ε1} NOTE—Editorial corrections made throughout in July 2016.

1. Scope

1.1 This standard specifies a test method for collection and analysis of samples of airborne particulate matter for measurement of respirable crystalline silica by infrared (IR) spectrometry.

1.2 This test method is applicable to the analysis of crystalline silica (the polymorphs quartz, cristobalite and tridymite) over a working range of 0.025 to 0.4 mg/m³ for a 400 L air sample or 0.02 to 0.25 mg/m³ for a 1000 L air sample, depending on the analytical method.

1.3 The methodology is applicable to personal sampling of the respirable fraction of airborne particles and to static (area) sampling.

1.4 This test method describes three different procedures for sample preparation and infrared analysis of airborne crystalline silica samples, which are delineated in **Annex A1 – Annex A3**, respectively: (1) a potassium bromide (KBr) disc IR measurement method, (2) indirect IR analysis after redeposition onto a filter used for measurement, and (3) direct on-filter IR analysis.

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

1.6 *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

¹ This test method is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.04 on Workplace Air Quality.

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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.

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D4532 Test Method for Respirable Dust in Workplace Atmospheres Using Cyclone Samplers

D4840 Guide for Sample Chain-of-Custody Procedures

D6061 Practice for Evaluating the Performance of Respirable Aerosol Samplers

E1370 Guide for Air Sampling Strategies for Worker and Workplace Protection

2.2 ISO Standards:³

ISO 7708 Air quality — Particle size fraction definitions for health-related sampling

ISO 3534-1 Statistics — Vocabulary and symbols — Part 1: Probability and general statistical terms in metrology

ISO 6879 Air quality — Performance characteristics and related concepts for air quality measuring methods

ISO 13137 Workplace air — Pumps for personal sampling of chemical and biological agents — Requirements and test methods

ISO 15202-1 Workplace air — Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry — Part 1: Sampling

ISO 15767 Workplace atmospheres – Controlling and characterizing errors in weighing collected aerosols

ISO 24095 Workplace air — Guidance for the measurement of respirable crystalline silica

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this test method, refer to Terminology D1356.

3.2 Definitions of General Terms Specific to This Standard:

3.2.1 *respirable crystalline silica (RCS)*, *n*—inhaled particles of crystalline silica that penetrate into the unciliated airways.

ISO 24095

3.2.2 *chemical agent*, *n*—any chemical element or compound, on its own or admixed as it occurs in the natural

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.