



Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica¹

This standard is issued under the fixed designation E1132; 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—Appendix X1 editorially corrected in August 2013.

INTRODUCTION

Silicon dioxide (silica, SiO₂) is encountered in nature and industry in a wide variety of forms. These range from essentially anhydrous types with or without a very high degree of crystallinity, to highly hydroxylated or hydrated types which are amorphous by x-ray diffraction examination. Crystalline silica² exists in a number of forms or polymorphs. The three major forms, quartz, cristobalite, and tridymite, pertain to this practice. Quartz (or alpha quartz) is the more common form encountered as airborne particulates. Two of the polymorphs, cristobalite and tridymite, are formed at elevated temperatures and are much less common in nature, but might be encountered in several occupations where silicas are fired (calcined) at high temperatures.³ These silica materials have a broad range of physical and chemical properties.

1. Scope

1.1 This practice covers a description of several actions that should be taken to reduce the risk of harmful occupational exposures to humans in environments containing respirable crystalline silica. This practice is intended for, but not limited to, industries regulated by the U.S. Mine Safety and Health Administration (MSHA) and the U.S. Occupational Safety and Health Administration (OSHA). A separate practice, designed for the unique conditions of the construction industry has been designated Practice E2625.

1.2 Nothing in this practice shall be interpreted as requiring any action that violates any statute or requirement of any federal, state, or other regulatory agency.

1.3 *Units*—The values stated in SI units are to be regarded as the standard. No other units of measurement are included in this standard.

¹ This practice is under the jurisdiction of ASTM Committee E34 on Occupational Health and Safety and is the direct responsibility of Subcommittee E34.80 on Industrial Health.

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² Smith, Deane K., Opal, cristobalite, and tridymite: Noncrystallinity versus crystallinity, nomenclature of the silica minerals and bibliography, *Powder Diffraction*, Vol 13, 1998, pp. 1–18.

³ Miles, W. J., Crystalline silica analysis of Wyoming bentonite by X-ray diffraction after phosphoric acid digestion, *Analytical Chemistry Acta*, Vol 286, 1994, pp. 97–105.

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. It is the responsibility of the user to consult all material safety data sheets and labels pertaining to any hazardous materials used in this standard.*

2. Referenced Documents

2.1 ASTM Standards:⁴

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

E2625 Practice for Controlling Occupational Exposure to Respirable Crystalline Silica for Construction and Demolition Activities

2.2 ANSI Standards:⁵

ANSI/AIHA Z9.2 Fundamentals Governing the Design and Operation of Local Exhaust Systems

ANSI Z9.7

Z88.2 American National Standard Practice for Respiratory Protection

⁴ 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.

⁵ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.