



Standard Guide for Packaging of Unbound Respirable Silicon Carbide Whiskers¹

This standard is issued under the fixed designation E 1516; 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 guide covers the packaging of unbound respirable silicon carbide (SiC) whiskers and materials containing respirable silicon carbide whiskers. Airborne respirable silicon carbide whiskers are considered a potential health hazard.

1.2 All applicable federal, state, county, local or other regulations must be complied with when this guide is used.

1.3 *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:

- E 1437 Practice for Handling Silicon Carbide Whiskers²
- E 1451 Guide for Disposal of Wastes Containing Respirable Silicon Carbide Whiskers²
- E 1718 Guide for Administrative and Engineering Controls for Silicon Carbide Whisker Work Areas²

2.2 ANSI Standard:

- ANSI Z9.2-1979, Fundamentals Governing the Design and Operation of Local Exhaust Systems³

3. Terminology

3.1 Definitions:

3.1.1 *respirable silicon carbide whiskers, n*—a crystalline silicon carbide fiber, approximately cylindrical in shape, with a diameter less than 3.0 μm and an aspect ratio equal to or greater than 5:1.

3.1.2 *unbound silicon carbide whiskers, n*—whiskers and fibers with the potential to become airborne.

4. Significance and Use

4.1 Packaging of unbound respirable SiC whiskers, and materials containing unbound respirable SiC whiskers, may

result in a potential respirable exposure to SiC whiskers.

4.2 This guide is intended for use by health and safety professionals as well as packaging specialists in preparing procedures for safe packaging, and in preparing relevant documentation.

5. Material Characteristics to Be Considered in Packaging Design

5.1 Silicon carbide whiskers can be electrostatically charged; therefore, packaging capable of generating electrostatic charges may attract and hold whiskers on the outside surface, eventually allowing contamination of areas outside the immediate work area during subsequent container handling.

5.2 The aerodynamic equivalent diameter of unbound silicon carbide whiskers is such that they easily become airborne.

5.3 Angles as steep as 70° may be necessary to ensure flow of some unbound whiskers or unbound whisker-containing materials.

6. Packaging Recommendations to Limit Potential Personnel Exposure

6.1 Rigid, non-porous, tightly-sealing containers with smooth inner surfaces are preferred to rough or porous containers. Examples of these preferred containers include plastic drums, fiber drums coated internally, metal drums, metal drums coated internally, and bulk containers. Containers having porous or rough surfaces, such as uncoated fiberboard (paper) drums, which may entrap whiskers, should not be used when the container will be in contact with the silicon carbide whiskers.

6.2 Bags, plastic or other, when used as container liners allow whisker release during opening and closing of the bags. Plastic bags should be used only inside a supporting container for either product transfer or waste disposal.

6.3 The inside and outside surfaces of a reusable container should be wet-wiped or vacuumed to remove any adhering loose SiC whiskers and the cleanup residue disposed according to Guide E 1451.

6.4 The container openings for removal or transferring of silicon carbide whiskers should be as small as practicable for the process in question.

6.5 A bag or container of respirable SiC whiskers should be opened/closed, and all transferring of materials should occur, in a manner that minimizes whisker-release and allows capture

¹ This guide is under the jurisdiction of ASTM Committee E-34 on Occupational Health and Safety and is the direct responsibility of Subcommittee E34.70 on Single Crystal Ceramic Whiskers.

Current edition approved Apr. 10, 1998. Published June 1998. Originally published as E 1516 – 93. Last previous edition E 1516 – 93.

² *Annual Book of ASTM Standards*, Vol 11.03.

³ Available from American National Standards Institute, 11 W. 42nd St., 13th floor, New York, NY 10036.