



Designation: E 1436 - 91

AMERICAN SOCIETY FOR TESTING AND MATERIALS
1916 Race St. Philadelphia, Pa 19103
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Standard Practice for Handling Densified Articles of Silicon Nitride Reinforced with Silicon Carbide Whiskers¹

This standard is issued under the fixed designation E 1436; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This practice describes recommended procedures for the safe handling of densified articles made from nonfibrous silicon nitride reinforced with silicon carbide whiskers.

1.2 The information in this practice is intended for a material safety data sheet (MSDS) for densified articles of silicon nitride reinforced with silicon carbide whiskers.

1.3 This MSDS does not apply to products with a final density such that, during abrasion or other conditions of handling or use, SiC whiskers are released in excess of the limits of this practice.

1.4 Other materials may be included in the final product (for example, sintering aids); information specific to these additional materials should be included in each manufacturer's MSDS.

1.5 This standard does not purport to address all of the safety problems, 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. For specific hazard and precaution statements, see Sections 4, 6, 8, and 9.

2. Referenced Document

2.1 ASTM Standard:

E 1437 Silicon Carbide Whiskers Material Handling Method²

3. Terminology

3.1 Descriptions of Terms Specific to This Standard:

3.1.1 *aspect ratio*—ratio of whisker length divided by whisker diameter.

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

4. Hazardous Ingredients/Identity Information

4.1 *Hazardous Components [Specific Chemical Identity; Common Name(s)]*—Silicon Nitride Reinforced with Silicon Carbide Whiskers. Chemical components are silicon nitride at CAS 12033-89-5. OSHA PEL specifications are not determined. ACGIH TLV specifications are not determined.

4.2 *Silicon Carbide (SiC) Whiskers*—An acicular form of

silicon carbide, which is CAS 409-21-2. A CAS number specific to SiC whiskers has not been assigned. OSHA PEL specifications are not established at this time. ACGIH TLV specifications are not established at this time. Other limits recommended are 0.2 fibers/cc 8-h time weighted average (TWA) greater than 5 μm in length with an aspect ratio equal to or greater than 5:1 and a diameter less than 3 μm .

5. Physical/Chemical Characteristics

5.1 The following data are relevant:

5.1.1 *Boiling Point*—Not applicable.

5.1.2 *Vapor Pressure (mm Hg)*—Not applicable.

5.1.3 *Vapor Density (AIR = 1)*—Not applicable.

5.1.4 *Solubility in Water*—Insoluble.

5.1.5 *Relative Density (Specific Gravity)*—Variable per supplier.

5.1.6 *Melting Point*—Variable, decomposes above 1700°C.

5.1.7 *pH*—Not applicable.

5.1.8 *Evaporation Rate (Butyl Acetate = 1)*—Not applicable.

5.1.9 *Appearance and Odor*—Variable, no odor.

6. Fire and Explosion Hazard Data

6.1 The following data are relevant:

6.1.1 *Flash Pt*—Non-flammable.

6.1.2 *Flammable Limits*—Not applicable.

6.1.3 *LEL*—Not applicable.

6.1.4 *UEL*—Not applicable.

6.1.5 *Extinguishing Media*—Not applicable.

6.1.6 *Special Fire Fighting Procedures*—Not applicable.

6.1.7 *Unusual Fire and Explosion Hazards*—Not applicable.

7. Reactivity Data

7.1 The following data are relevant:

7.1.1 *Stability*—Stable.

7.1.2 *Conditions to Avoid*—None.

7.1.3 *Incompatibility (Materials to Avoid)*—None under conditions of normal use.

7.1.4 *Hazardous Polymerization*—Will not occur.

7.1.5 *Conditions to Avoid*—None.

8. Health Hazard Data

8.1 *General*—There is no known health hazard of the article as supplied. However, as indicated by the conditions of use, employ mechanical guards, protective clothing, and safety glasses to prevent burns or other injury to the body or eyes from hot parts, flying particles, or chips (see also 9.4).

¹ This practice 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 Sept. 15, 1991. Published December 1991.

² Annual Book of ASTM Standards, Vol 11.03.