



Standard Test Method for Determining Concentration of Airborne Single-Crystal Ceramic Whiskers in the Workplace Environment by Phase Contrast Microscopy¹

This standard is issued under the fixed designation D 6057; 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 (€) indicates an editorial change since the last revision or reapproval.

€¹ NOTE—Apparatus supplier name in Footnote 6 was deleted editorially in November 2001.

1. Scope

1.1 This test method covers the sampling methods and analysis techniques used to assess the airborne concentration of single-crystal ceramic whiskers (SCCW), such as silicon carbide and silicon nitride, which may occur in and around the workplace where these materials are manufactured, processed, transported, or used. This test method is based on the collection of fibers by filtration of a known quantity of air through a filter. The filter is subsequently evaluated with a phase contrast microscope (PCM) for the number of fibers meeting appropriately selected counting criteria. This test method cannot distinguish among different types of fibers. This test method may be appropriate for other man-made mineral fibers (MMMMF).

1.2 This test method is applicable to the quantitation of fibers on a collection filter that are greater than 5 µm in length, less than 3 µm in width, and have an aspect ratio equal to or greater than 5:1. The data are directly convertible to a statement of concentration per unit volume of air sampled. This test method is limited by the diameter of the fibers visible by PCM (typically greater than 0.25 µm in width) and the amount and type of coincident interference particles.

1.3 A more definitive analysis may be necessary to confirm the identity and dimensions of the fibers located with the PCM, especially where other fiber types may be present. Such techniques may include scanning electron microscopy (SEM) or transmission electron microscopy (TEM). The use of these test methods for the identification and size determination of SCCW is described in Practice D 6058 and Test Methods D 6059 and D 6056.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.5 *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:

D 1193 Specification for Reagent Water²

D 1356 Terminology Relating to Sampling and Analysis of Atmospheres³

D 4532 Test Method for Respirable Dust in Workplace Atmospheres³

D 6056 Test Method for Determining Concentration of Airborne Single-Crystal Ceramic Whiskers in the Workplace Environment by Transmission Electron Microscopy³

D 6058 Practice for Determining Concentration of Airborne Single-Crystal Ceramic Whiskers in the Workplace Environment³

D 6059 Test Method for Determining Concentration of Airborne Single-Crystal Ceramic Whiskers in the Workplace Environment by Scanning Electron Microscopy³

E 691 Practice for Conducting Interlaboratory Study to Determine the Precision of a Test Method⁴

3. Terminology

3.1 Definitions:

3.1.1 *analytical sensitivity, n*—airborne fiber concentration represented by a single fiber counted in the PCM.

3.1.1.1 *Discussion*—Although the terms *fiber* and *whisker* are, for convenience, used interchangeably in this test method, whisker is correctly applied only to single-crystal fibers whereas a fiber may be single- or poly-crystalline or may be noncrystalline.

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

Current edition approved December 10, 1996. Published February 1997.

² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Annual Book of ASTM Standards*, Vol 11.03.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

