Designation: D7201 – 06 (Reapproved 2011)

Standard Practice for Sampling and Counting Airborne Fibers, Including Asbestos Fibers, in the Workplace, by Phase Contrast Microscopy (with an Option of Transmission Electron Microscopy)[1]

This standard is issued under the fixed designation D7201; 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 practice[2] describes the determination of the concentration of fibers, expressed as the number of such fibers per millilitre of air, using phase contrast microscopy and optionally transmission electron microscopy to evaluate particulate material collected on a membrane filter in the breathing zone of an individual or by area sampling in a specific location. This practice is based on the core procedures provided in the International Organization for Standardization (ISO) Standard ISO 8672 (**1**)[3], the National Institute for Occupational and Health (NIOSH) Manual of Analytical Methods, NIOSH 7400 (**2**), and the Occupational Safety and Health Administration (OSHA) Method ID 160 (**3**). This practice indicates the important points where these methods differ, and provides information regarding the differences, which will allow the user to select the most appropriate procedure for a particular application. However, selecting portions of procedures from different published methods generally requires a user to report that they have used a modification to a method rather than claim they have used the method as written.

1.2 The practice is used for routine determination of an index of occupational exposure to airborne fibers in workplaces. Workplaces are considered those places where workers are exposed to airborne fibers including asbestos. Additional information on sampling strategies, sample collection (including calibration) and use of sample results for asbestos abatement projects is provided in a standard Practice for Air Monitoring for Management of Asbestos-Containing Materials (WK 8951) currently being considered by ASTM subcommittee E06.24. A further practice has been approved for the specific purpose of sampling and counting airborne fibers in mines and quarries (Practice D7200), although the practice herein may also be used for this purpose. The current practice may be used as a means of monitoring occupational exposure to asbestos fibers when asbestos fibers are known *a priori* to be present in the airborne dust. The practice gives an index of airborne fiber concentration. This practice may be used in conjunction with electron microscopy (See Appendix X1) for assistance in identification of fibers. This practice may be used for other materials such as fibrous glass, or man-made mineral fibers by using alternate counting rules (see Annex A4).

1.3 This practice specifies the equipment and procedures for sampling the atmosphere in the breathing zone of an individual and for determining the number of fibers accumulated on a filter membrane during the course of an appropriately-selected sampling period. The practice may also be used to sample the atmosphere in a specific location or room of a building (area sampling), where this may be helpful in assessing exposure to workers handling fiber-containing products.

1.4 The ideal working range of this test practice extends from 100 fibers/mm^2 to 1300 fibers/mm^2 of filter area. For a 1000-L air sample, this corresponds to a concentration range from approximately 0.04 to 0.5 fiber/mL (or fiber/cm^3). Lower and higher ranges of fiber concentration can be measured by reducing or increasing the volume of air collected. However, when this practice is applied to sampling the presence of other, non-asbestos dust, the level of total suspended particulate may impose an upper limit to the volume of air that can be sampled if the filters produced are to be of appropriate fiber loading for fiber counting.

1.5 Users should determine their own limit of detection using the procedure in Practice D6620. For Reference the NIOSH 7400 method gives the limit of detection as 7 fibers/mm^2 of filter area. For a 1000 L air sample, this corresponds to a limit of detection of 0.0027 fiber/mL (or fiber/cm^3). For OSHA method ID 160 the limit of detection is given as 5.5 fibers/mm^2 of filter area. For a 1000 L air sample, this corresponds to a limit of detection of 0.0022 fiber/mL (or fiber/cm^3).

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

Current edition approved Oct. 1, 2011. Published October 2011. Originally approved in 2006. Last previous edition approved in 2006 as D7201 – 06. DOI: 10.1520/D7201-06R11.

[2] This test method is based on NIOSH 7400, OSHA Method ID 160, and ISO 8672. Users of this ASTM standard are cautioned that if they wish to comply with one of these specific procedures exactly they should follow that procedure, otherwise they should document the modification

[3] Boldface numbers in parentheses refer to the list of references appended to this method.

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. United States