

casting room, revealed that there were 5.6 fibers/ml present for fibers 5 μ m or greater in length in the first segment of the filter while 4.9 fibers/ml were found in the second and 5.8 fibers/ml were counted in the third segment. Sample D, taken in the mixing room, shows an equally good distribution between the three segments of the filter. In the first filter segment 10.5 fibers/ml were counted for fibers 5 μ m or longer in length, while 11.2 fibers/ml were found in the second, and 9.8 fibers/ml were found in the third segment.

Comparing the results of the analysis of Sample C with Sample A, the superiority of the long plenum collection method is apparent. The difference between the high and the low fiber count of Sample C is only 0.9 fiber, while Sample A shows a three times higher discrepancy or 2.7 fibers. The relationship between Sample D and B is even worse. Sample D shows only a 1.4 fiber count difference between the individual filter segments, while a 5.7 fiber count difference exists between the three filter segments of Sample B. The fiber count discrepancy of Sample B is slightly more than four times that of Sample D.

The previously described modified sample collector with the 0.150-inch size air inlet was found acceptable for all other flow rates as specified by the NIOSH standards. Since the recommended flow rate of air is between 1 and 2.5 liters per minutes and the calculations for the lengthened plenum were made for 2 liters per minute of air flow, no difference is expected at either end of the flow rate range. It should be pointed out that the uniform distribution of heavier particles as seen here (*i.e.* > 5 μ m) insures the uniform distribution of smaller particles (*i.e.* < 5 μ m).

Sample Preparation for Identification

Since the index of refraction (ND) of most asbestos fibers is near to the refractive index of the chemically cleared membrane filter, it becomes necessary to eliminate the pres-

ence of the filter. This can best be accomplished using a low temperature asher. This method uses a very slow oxidizing process, that will neither harm nor disturb even the finest particles of asbestos or other non-oxidizable material. This instrument allows the oxidation reaction to occur at a low temperature by converting approximately 20% of the molecular oxygen to atomic oxygen⁵ with the use of a radio frequency field. The atomic oxygen reacts with the oxidizable materials in the specimen chamber. A mechanical vacuum pump then removes the volatile oxidation products. This method also eliminates many other oxidizable airborne particles commonly found in industrial operations. Approximately four hours are required to "ash" the filter. Samples C and D were prepared by this technique. The pressure of the specimen chamber was maintained at a pressure of 0.6 mm of mercury and 300 watts of power was used. The flow rate of the oxygen was 150 cc/minute.

Identification and Measurements of Asbestos Fibers

An extremely convenient and easy method of measuring particles is with an image analyzing microscope (IAM). With the aid of an IAM it is not difficult to measure 50 to 100 fields in a relatively short time. The particles can be bracketed in various size groups, and the measuring of a previously mapped out area can be accomplished. Data collected from 50 fields requires approximately 15 minutes.

In order to determine the number and size of asbestos particles present on a filter, using the IAM, a multi-process procedure is used. The specimen is first ashed (as has been outlined) to eliminate the filter and any oxidizable particles such as lint. The area (or areas) of interest are mapped out, measured, and all the particles present are counted. This will give the total number of particles (asbestos and non-asbestos). A second measurement of the exact same area is