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Point-Counting of Bulk Samples for Asbestos

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1. History

Prior to 1988, when NVLAP started providing quality assurance samples that had been analyzed for weight percent, the quantitation of asbestos in bulk samples was by "guestimate" in most laboratories. The percentages to be reported were passed down from analyst to analyst, and while multiple-analyst labs were internally consistent, estimates from different labs varied widely. Quality assurance round robins merely tracked positive or negative with little emphasis on quantitation. Most if not all labs over-estimated the asbestos percentage. Subsequent NVLAP rounds have shown that some labs have as much as a 500% positive bias on certain samples. Point-counting was described in the EPA "Interim" method in 1982. Because it takes extra time (perhaps 3-4 times longer than "guestimating"), few labs utilized it. However, with the gross over-estimation observed in the 1988 and 1989 NVLAP rounds, point-counting was thought to be more accurate, and was included in the NESHAP revision of 1990. The revision originally required that all friable materials estimated to contain <10% asbestos were to be point-counted. Due to complaints by users of asbestos analysis, a "clarification" letter (8 May 1991) allows users to use estimation rather than point-count to call a friable material positive. Friable materials still have to be point-counted in order to call them negative (and unregulated). Therefore, any friable layer reported as≤1% must be point-counted to prove it or be assumed to be positive despite the estimate. Non-friable samples are not mandated to be point-counted by NESHAP regardless of their estimate percentage.

2. Point-Count Procedure

The point-count procedure mandated by NESHAP is the one in the EPA "Interim" Bulk Method. For each layer to be point-counted, eight mounts are made by dispersing 8 pinches of sample in suitable fluid. Each of the mounts is examined under the polarizing light microscope using an eyepiece reticule that superimposes a grid of points over the field of view. Fifty non-empty points are examined for each mount, yielding 400 points – some of which would be identified as asbestos and the rest as non-asbestos material. A simple calculation gives the % asbestos, *e.g.* 4 points in 400 would be 1.0%.

3. Point-Count Accuracy

Fiberquant started point-counting all friable layers <10% asbestos just after the 1990 NESHAP revision, and continued that policy for more that 2 years, even though no longer required for samples 1-10%. We used the point-counting as a way to rid ourselves of the standard lab positive bias alluded to above. At the same time, we implemented a program of standards analysis that was eventually found to be better for analyst calibration than point-counting. Point-counting takes precedence over estimation for NESHAP, but it is not as accurate or precise as desired. First of all, a point-count is a count of fairly randomly dispersed points. The 1% cut-off is defined by a small number of positive points, namely 4. As a record of random events, the standard deviation of the count can be expected to be the square root of the count. The 95% confidence range would be +/- two standard deviations, so for our 1% cut-off example, the result could be expressed as 1.0% +/- 1.0% (to 95% confidence). This means that any single point count of our theoretical 1% sample could end up anywhere from 0% to 2%, a considerable uncertainty straddling the positive/negative cut-off. Second, we have found that a point count is very dependent on the quality and representativeness of its mounts. Certain materials, such as joint compound or wall texture tend to yield representative mounts because they break into fairly uniform particles. However, ceiling textures, which often contain large pieces of plastic foam or books of mica, do not yield representative mounts; even if the large pieces can be fit under the cover slips, the disparity in particle size between such large pieces and asbestos skews the results. Such samples are better quantified by gravimetric methods, which are also available at Fiberquant. Third, non-friable materials were excluded from consideration for point-counting by NESHAP for good reason. In order to disperse a non-friable sample, its matrix is necessarily dissolved. Therefore, the particles seen during a point-count comprise less than 100% of the original material, and any asbestos % thus computed would be biased high. Most non-friable samples are better done by gravimetric methods.

4. Fiberquant Policy

Most labs do not point-count samples unless asked. To be in compliance with NESHAP, a consultant using those labs would have to examine the results layer-by-layer, and request a point-count on any friable layer reported as negative. As a result, most surveys are *illegal* - not in compliance with NESHAP. At Fiberquant, though, layers required to be point-counted by NESHAP are automatically point-counted at no extra charge; any report that leaves our lab is already in compliance with NESHAP. Part of the Fiberquant philosophy is to make life worry-free for our clients by keeping them in compliance with regulations.

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