

Friability in PLM Analysis

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Fiberquant Analytical Services makes a friability determination of a bulk sample as a part of its polarized light microscopy (PLM) analysis.

1. Definition of Friability

"Friable material is material that can be crumbled, pulverized, or reduced to powder in the hand. Friable material may be an asbestos-containing material or it may be a material that contains other fibers such as cellulose and glass fibers."

"Soft or loosely bound (i.e. friable) asbestos-containing materials can release asbestos fibers following only minor disturbance to the material."

Asbestos-Containing Material in School Buildings - A guidance Document, Part 1, p. 3. (1979)

Even though the above definitions categorized building materials into only friable and non-friable categories, there is a tremendous range of properties within each category. Friable materials range from materials such as duct tape, which can be crumbled in the hand, but, due to its long fibers, does not produce many airborne fibers, to materials such as magnesia-amosite pipe insulation, which can produce airborne fibers from the slightest breeze over its surface.

Non-friable materials also exhibit a range of properties. In recognition of this fact, the National Emission Standards for Hazardous Air Pollutants (NESHAP), 1990 defined two categories of non-friable materials:

"Category I nonfriable asbestos-containing material (ACM) means asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos"

"Category II nonfriable ACM means any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos ... that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure."

As the EPA has clarified on a number of occasions, the intent of categorizing a material as friable or non-friable is to distinguish between those materials which will release fibers into the air relatively easily and those materials which will not.

2. Fiberquant Analytical Services Friability Categories

We report nonfriable categories I and II, as defined by NESHAP above and their guidance and clarification statements. Our interpretation of these statements is such that Category I materials that are significantly damaged or weathered are to be up-graded to category II as befits their increased potential for fiber release.

We report friable materials in two categories of our own definition: Friable Category III and Friable Category IV. Category III includes ceiling tile, sprayed coatings, etc. while Category IV is reserved for extremely fragile types of pipe insulation and extremely damaged friable materials.

Therefore, a given sample analyzed at Fiberquant is assigned a number between 1 and 4, and the higher the number, the more friable the sample appeared. The analyst uses in-house guidelines and/or consultation with other analysts to assign a friability number to a sample.

3. Friability in the Field vs. Friability in the Laboratory

Almost by definition, the samples that we receive in the laboratory are damaged materials. The sampling process has broken, sheared or crumbled the material. The friability that we determine is based on the *condition of the sample as we analyze it*. We cannot guess what the material was like originally. We are therefore determining the friability of damaged material. For this reason, some materials which might be categorized as non-friable in the field may be categorized as friable in the laboratory. Likewise, some materials which might be categorized as Non-friable Category I in the field may be categorized as Non-friable Category II in the lab. Examples would include wall texture and some plasters which are non-friable in place, but friable once sampled.

The laboratory-determined friability is intended as an aid to the client who cannot make a friability determination for himself. It is not intended as a replacement for a friability determined in the field. If both a field and lab friability have been determined, *it is the field determination which takes precedence*, since the field personnel has much more information available as to the overall condition of the material.

It can be expected that the lab analysis may provide information that might change the field personnel's recommendations. For example, roofing caulk may appear Non-friable Category I in the field, but upon microscopic examination will be found to have weathered to a white surface. Such a surface will transfer white powder to the hands when handled which is pure asbestos. Such a material would generally be upgraded to Non-friable Category II on its laboratory analysis, and a note would be written alerting the client to the potential hazard of handling this material. How the material is handled or whether such material is removed prior to demolition is left to the field personnel.