

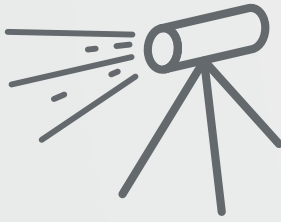
Phenom AsbestoMetric Software

The Automatic fiber detection solution

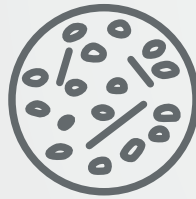


Simplified workflow for increasing accuracy

1. During sampling, a known volume of air is drawn through gold-coated, porous filters.



2. Filters are checked for damage by the analyst.



3. Samples are loaded into the SEM equipped with an EDS detector.



Schematics of the workflow of the asbestos analysis as described in the ISO 14966 norm.

Thermo Scientific™ Phenom AsbestoMetric Software is a dedicated automation package specially developed to facilitate fast and accurate asbestos analysis. The analysis of asbestos fibers, specified in the ISO 14966 norm, is a lengthy and elaborate process consisting of many repetitive steps. Moreover, in the manual evaluation, fibers need to be detected visually by the operators, which could result in inaccuracies in the analysis. With AsbestoMetric Software, the localization of candidate fibers on as many as nine filters per run is fully automated, leaving only the final verification of the fibers' nature to the analyst using the built-in EDS detector.

Asbestos analysis: ISO standard 14966

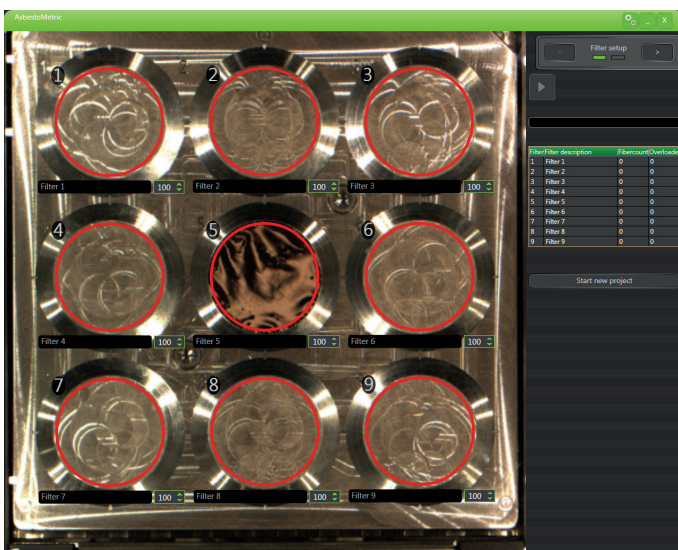
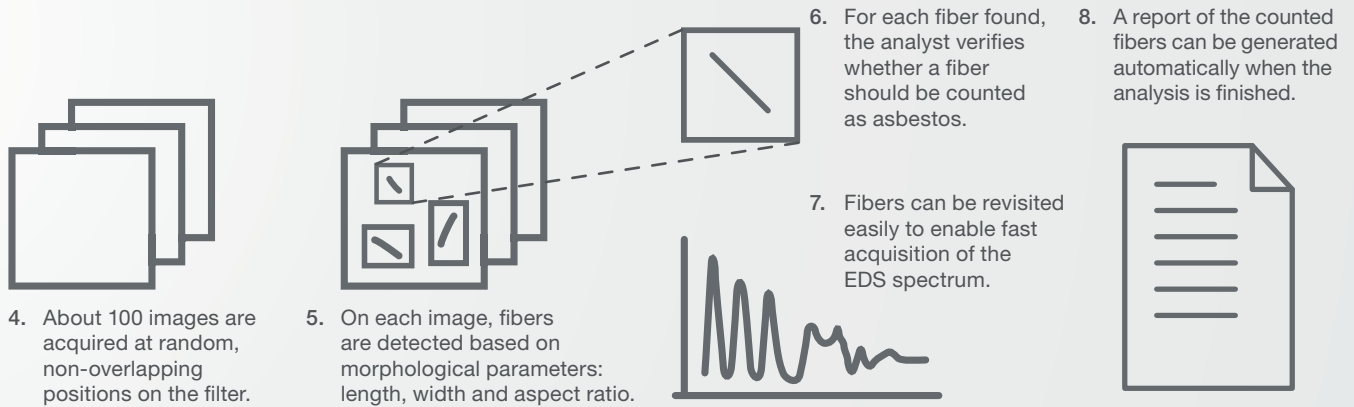
The ISO standard 14966 describes the workflow for the determination of the level of asbestos fibers in ambient air, which is summarized in the schematic overview above. The norm specifies the sampling method **(1)**, in which a known volume of air must be drawn through gold-coated, porous filters. Once the analyst has performed a filter check **(2)** to rule out any damage, the fibers are loaded into a scanning electron microscope (SEM) equipped with an EDS detector.

Typically, about 100 images should be acquired **(3)** at random, non-overlapping positions on the filter. All images should be inspected to locate fibers **(4)** that are present. These are difficult to detect visually, even for expert users; therefore, this is a strenuous process, possibly introducing inaccuracies.

Asbestos is a naturally occurring silicate mineral, often used in construction, where it is mixed with cement or woven into fabric. Asbestos is known to be hazardous to human health, causing serious and fatal illnesses, including lung cancer and asbestosis. In more than 50 countries, asbestos has been banned since the early 1970s, with strict regulations in place concerning its use.

The AsbestoMetric Software automatically acquires the required images and detects fibers based on the morphological parameters specified in the ISO 14966 standard. The positions and image fields of potential asbestos fibers are saved, enabling the analyst to revisit them later.

If overloaded image fields are present, extra images are acquired automatically to ensure the analyst will have all the data needed to determine whether or not the asbestos concentration exceeds the safe values.



AsbestoMetric Software user interface: filter selection

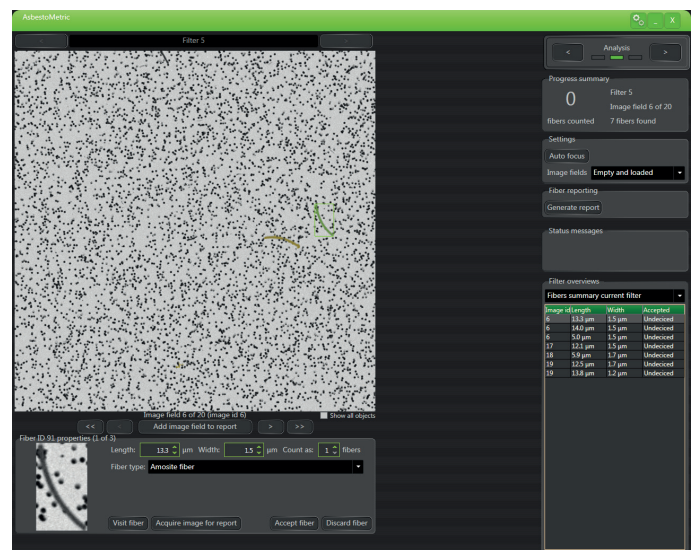
The operator can click through the fibers found (5) and determine whether a fiber should be counted as asbestos. During this classification, the fibers are revisited automatically to enable fast acquisition of the EDS spectrum (6).

Once the operator has verified that a fiber is asbestos, the user can accept or dismiss the fiber (7) accordingly. The progress is displayed in the fiber counting window, such that the analyst can decide at all times when they have gathered enough information.

A report of the counted fibers can be generated automatically when the analyses is finished. Also, an SEM image and EDS results of specific fibers can be added easily throughout the analysis.

AsbestoMetric Software for the Phenom XL Desktop SEM

The AsbestoMetric software has been developed for the Thermo Scientific™ Phenom XL Desktop SEM. A major advantage of this SEM is that it is possible to load up to nine samples simultaneously. The operator merely loads the samples, sets the number of image fields per filter and presses start. No more user interaction is required until all data has been gathered. After the images have been automatically acquired and processed, the operator can simply browse through the detected fibers and establish their nature.



AsbestoMetric Software user interface: detection of asbestos fibers

AsbestoMetric Software benefits

- Compliant to the ISO 14966 standard
- Automated image acquisition and fiber detection
- Assisted elemental composition analysis
- Fast and easy to use
- Improved productivity and throughput
- Improved accuracy and repeatability

Specifications

AsbestoMetric Software for the Phenom XL Desktop SEM

Phenom XL Desktop SEM equipped with BSD, SED and EDS detector

Phenom ProSuite including mini PC and monitor:

- AsbestoMetric Software
- EID

Standard sample holder including 9x25 filter insert

Automated tool:

- Image acquisition
- Fiber detection
- Reporting

Assisted EDX analysis with fiber revisiting

ISO standard report on asbestos analysis

Compliant to the ISO 14966 norm

Find out more at thermofisher.com/EM-Sales