



Asbestos in Water Testing Overview & FAQ

Background

In 1974 the EPA passed the Safe Drinking Water Act (SDWA) in an effort to determine the level of contamination in drinking water to which no adverse health effects are likely to occur. The first Asbestos in Water method, EPA 100.1, was written in 1983 as the “Analytical Method for Determination of Asbestos Fibers in Water” (EPA-600/4-83-043).

In 1992, the EPA established the first maximum contaminant level and added to the Federal Register that the analysis of asbestos in water should be conducted using Transmission Electron Microscopy (TEM). It was then that the EPA 100.1 method did not meet the needs of this new 1992 regulation, so the EPA issued a memorandum to clarify how the EPA 100.1 standard could be used for compliance. A new method EPA 100.2 was issued in 1994 (“Determination of Asbestos Structures Over 10 μ m in Length in Drinking Water, EPA/600/R-94/134) and was written specifically to respond to the asbestos drinking water standard. It also incorporated quality assurance objectives developed under the Asbestos Hazard Emergency Response Act (AHERA).

Asbestos was added as a contaminant to the Safe Water Drinking Act in 1992, and was added to the National Primary Drinking Water Regulations (NPDWR) in 1995. These regulations are legally enforceable primary standards that apply to public water systems only. The EPA has set a maximum contaminant level of *7 million fibers (>10 micron in length), per liter (MFL)*. The EPA periodically reviews this act to determine if the MCL still protects human health. States and other local agencies may set more stringent drinking water MCL’s for asbestos than the EPA, so it is always best to check with your local authorities prior to interpreting your laboratory results.

Test Method: EPA 100.2 - Asbestos in Drinking Water (*EMSL recommended method*)

The EPA 100.2 method is recommended for the determination of the identification and quantification of asbestos in water (potable and non-potable). Only asbestos fibers greater than 10 μ m in length are counted in this method, however all fiber sizes >0.5 μ m may be reported upon request for an additional charge. Although most agencies use the EPA regulatory limit (7MFL asbestos fibers >10 μ m) it is best to check with your state to ensure the regulatory limit and fiber size requirement. Excessive sediment in a water sample reduces the amount of water that can be filtered to achieve a “readable” grid, so lesser volumes must be filtered, raising the analytical sensitivity. An elevated analytical sensitivity may be reduced by analyzing more filter area, but this is an additional cost.

Test Method: EPA 100.1 - Asbestos in Water

Although still a valid, EPA method EPA 100.1 has widely been replaced by EPA 100.2. EPA 100.1 is for determining the concentration of asbestos fibers in water samples and counts asbestos fibers >0.5 μ m in length with aspect ratios of 3:1 or greater. Results are expressed in millions of fibers per liter (MFL). Excessive sediment in a water sample reduces the amount of water that can be filtered to achieve a “readable” grid, so lesser volumes must be filtered, raising the analytical sensitivity. An elevated analytical sensitivity may be reduced by analyzing more filter area, but often at additional cost. EPA 100.1 is only available in select EMSL laboratories. Please check with your sales representative.



Comparison of Methodologies: EPA 100.2 Versus EPA 100.1

Test:	EPA 100.1	EPA 100.2
Typical Use:	Research Project	Regulatory compliance
Matrices Accepted:	Potable / Non-Potable Water	Potable / Non-Potable Water
Sample Collection:	Two (2)- 1 liter polyethylene (recommended) or amber glass containers. Containers are to be analyzed for background levels of asbestos or certified clean prior to sample collection. EMSL Product Number 8714233 . \$5.00 Each	
Ozone/UV treatment (limited labs):	Samples must be ozone treated and filtered within 48 hours of collection.	Samples must be filtered within 48 hours of collection. Ozone treatment may be performed on samples past the 48 hour hold and/or samples with organic particulate.
Preservative/ Ozone Treatment:	EMSL Analytical does not use mercuric chloride preservative. Samples free of organic material must be filtered within 48 hours of collection or ozone treatment is required. Samples must be received at a temperature of 4°±2°C or within 24 hours of collection on ice. Samples must not be frozen.	This method does not use mercuric chloride preservative. Samples free of organic material must be filtered within 48 hours of collection or ozone treatment is required. Samples must be received at a temperature of 4°±2°C or within 24 hours of collection on ice. Samples must not be frozen.
Filter:	Polycarbonate	Mixed Cellulose Ester or Polycarbonate
Filter Size:	25 mm or 47 mm	25 mm or 47 mm
Filter Pore Size:	0.1 µm	0.1 to 0.22 µm
Minimum fiber size counted	> 0.5 µm	Two options: > 10 µm ; >0.5µm
Minimum aspect ratio	3:1	3:1
Analysis Stopping Rules		
Minimum Grid Openings Counted	4	4
Number of Structures Counted	100	100
Analytical Sensitivity	not specified	0.2 MFL
Magnification	20,000 X	10,000- 20,000 X
Analytical Sensitivity	> 0.1 million fibers per liter (MFL)	0.2 million fibers per liter (MFL)
Sample Blanks	Not a requirement of either method.	





Frequently Asked Questions

Q. My sample arrived at the lab after the 48-Hour Hold Time, what happens now?

A. Three of our laboratories in the EMSL network (Our Corporate Laboratory in Cinnaminson, NJ; Minneapolis, MN; and our LA Testing laboratory in South Pasadena, California) have Ultra Violet (UV) Light / Ozone treatment capabilities. In order for analysis to be compliant with the EPA method, this treatment must be used when samples are not able to be filtered within (48 hours).

There is an additional preparation charge of \$90.00 per sample for UV / Ozone Treatment.

Q. My state / governing agency requires that all asbestos fiber >0.5µm be included in the count?

A. All of our laboratories can perform an EPA 100.2 analysis and include all fibers > 0.5µm. You will need to denote this when you submit the samples. Make this selection on EMSL's Chain of Custody Document:



EPA Method 100.2 (All fiber sizes $\geq 0.5\mu\text{m}$)

Q. My State/ Governing Agency requires that analysis be done using 100.1 method.

A. Due to the requirement for Ozone treatment for this method, only our Cinnaminson, NJ / Minneapolis, MN / and South Pasadena, CA locations can perform this method.

Q. I am submitting non-potable water for analysis. What analysis method should I choose and do I need Ozone treatment?

A. Both of the EPA water methods may be used for non-drinking (non-potable) water samples. The EPA 100.2 is the more widely recognized, and a lower cost. If your samples are groundwater or waste water, it is possible they will require Ozone/UV treatment prior to analysis to remove organic materials which can cause under reporting of asbestos.

Q. What type of water bottle should I utilize?

A. EMSL offers water bottles for both the EPA 100.1 and 100.2 methods. The EPA 100.2 method states that a 'fiber-free' bottle should be utilized in the collection of drinking- water samples. EMSL offers these 'fiber-free' bottles for \$5.00 each – EMSL Product ID: 8714233.

EPA 100.2 Method- Section 8.1:

8.0 SAMPLE COLLECTION, PRESERVATION AND STORAGE

- 8.1 The sample container will be an unused, pre-cleaned, screw-capped **bottle** of glass or low density (conventional) polyethylene of at least 1 liter capacity. It is recommended that the use of polypropylene bottles be avoided since problems of particulate being released into water samples have been observed. Before use, the bottles should be rinsed twice by filling approximately one-third full with fiber-free water and shaking vigorously for 30 seconds. After discarding the rinse water, the bottles should then be filled with fiber-free water and treated in an ultrasonic bath for 15 minutes, followed by several rinses with fiber-free water.





Frequently Asked Questions – Compliance Drinking Water Sampling

It is important to note that drinking water samples that are used for compliance to the safe drinking water act must comply with perfect adherence to the method. A water district will not accept a qualifier on the report. There are times where drinking water samples are used for home or building owners where it is acceptable to have a qualifier to the report while satisfying the intent of the results, for example the water arrived at the lab not on ice at a temperature of 7°C, a footnote must be issued in the report stating that the temperature at time of arrival was outside the acceptable limit (2°-6°C), while this would be turned away from a water district it may be completely acceptable result for the client. Below is a list of requirements and typical reports qualifiers we have run across.

Sampling	Discussion	Qualifier/resolution
Bottles – Both 100.2 and 100.1 require the use of two (2) 1L pre-cleaned bottles	Only one bottle submitted	Qualifier required – two precleaned bottles must be submitted
	Samples are not pre-cleaned	Qualifier required – pre-cleaned bottles are required
	Pre-cleaned from an outside source were used	Use EMSL Chain of Custody or clearly and mark that precleaned bottles have been used on your chain of custody. Please note you may be asked to show proof.
Temperature of samples are below 2 or above 6°C	Samples arrive within 24 hours of collection time on ice	Acceptable – no disclaimer required
	Samples arrive outside of required temperature	Qualifier required
Particulate Loading	At times particulate matter may affect the analytical sensitivity to a point where it is not possible to achieve without advanced analytical effort.	Qualifier required if analytical sensitivity cannot be reached. Note: the sample maybe able to reach the analytical sensitivity with an increased analytical effort (addition cost per grid opening). Unfortunately, this option is not always feasible- please contact the laboratory.
Collection Activities	It is imperative to have all required information available for data entry in the regulatory system.	Utilizing EMSL Analytical chain of custody. It is also recommended when sampling for the first time to check with the lab to see if they have an account with the state.
Ozone Treatment	EPA 100.2 samples beyond the 48-hour hold may be ozone treated	Report will have comment that ozone treatment was performed but it is part of the method and therefore not considered a qualifier and acceptable to report.

