



**NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF QUALITY ASSURANCE
ENVIRONMENTAL LABORATORY CERTIFICATION PROGRAM
ON-SITE LABORATORY EVALUATION
ASBESTOS PROCEDURES**

Asbestos Fibers Analysis -- Polarized Light Microscope (PLM)

- Method(s):** EPA 600/M4-82-020
 EPA 600/R-93/116
 NIOSH 9002

| | |
|-------------------------------|---|
| Laboratory ID | |
| Laboratory Name | |
| Address | |
| Phone | |
| Lab Manager/Supervisor | |
| QA Officer | |
| Analyst(s) | |
| Auditor | |
| Date(s) of Audit | |
| Type of Audit | <input type="checkbox"/> Initial <input type="checkbox"/> Biennial <input type="checkbox"/> Special <input type="checkbox"/> ELCP <input type="checkbox"/> TNI/NELAP |
| Notes: | |

| Question | Reference | Yes | No | N/A | Comments |
|--|-------------------------|-----|----|-----|----------|
| Analytical Method & SOP | | | | | |
| Does the laboratory maintain an SOP for this accredited analyte or method? | TNI V1M2 4.2.8.5(e) | | | | |
| Do the SOPs refer to the method as certified or applied? | TNI V1M2 4.2.8.5 | | | | |
| Is the SOP complete and acceptable? | TNI V1M2 4.2.8.5 | | | | |
| On the SOP, does it clearly indicate the effective date of the document, revision number, and signature(s) of approving authority? | TNI V1M2 4.2.8.5(c) | | | | |
| Are all relevant SOPs readily available to all personnel? | TNI V1M2 4.2.8.5(b) | | | | |
| Sample Control | | | | | |
| Is the laboratory involved in sampling? | | | | | |
| Does the laboratory provide necessary sampling equipment and/or supplies to its clients? | | | | | |
| Does the laboratory have a sampling plan and procedures for sampling? | TNI V1M2 5.7.1 | | | | |
| Does the laboratory have a procedure for chain of custody (COC) of samples? | TNI V1M2 5.8.6 | | | | |
| Does the laboratory maintain a COC form for each sample? | TNI V1M2 5.8.7.5 | | | | |
| Does the laboratory have a policy to not accept bulk samples when shipped with other types of samples (water or air)? | TNI V1M2 5.8.1 | | | | |
| Does the laboratory utilize a permanent chronological record to document receipt of all sample containers (e.g., LIMS database)? | TNI V1M2 5.8.7.3 | | | | |
| Does the laboratory assign a unique laboratory ID code to each sample, which is linked to its field ID code? | TNI V1M2 5.8.7.3(b)i | | | | |
| Does the laboratory assign unique ID extension to subsamples? (applies primarily to bulk samples) | | | | | |
| Standards and Reagents | | | | | |
| Are all reagents used analytical reagent grade or better? | TNI V1M3 1.7.6.1(d) | | | | |
| Are the containers marked with expiration date(s)? | TNI V1M2 5.6.4.2 | | | | |
| Does the laboratory have refractive index liquids, 1.490 - 1.720 in increments of less than or equal to 0.005? | TNI V1M3 1.7.1.3.2 | | | | |
| Equipment | | | | | |
| Does the laboratory have documentation for equipment maintenance and calibration? | TNI V1M2 5.5.5 | | | | |
| Does the facility have a HEPA-filtered, class-1 biohazard hood, or glove box | EPA 600/R-93/116 2.2.5 | | | | |

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|--|-------------------------|-----|----|-----|--------------------------|
| with continuous airflow (negative pressure) where all sample and slide preparations are performed? | | | | | |
| Does the laboratory have procedures to minimize cross-contamination? | TNI V1M3 1.7.8.2 | | | | |
| Does the laboratory have the following materials? a) Sampling utensils b) Sampling containers c) Microscope slides d) Cover slips (22- x 30-mm) e) Polarized light microscope (PLM) f) Stereomicroscope or lower power binocular (10x - 40x, with light source) g) Mortar and pestel h) Thermometer i) Refract-o-meter (optional) | | | | | |
| Are micropipettes and pipette tips for dispensation or staining available? | | | | | |
| Are the micropipettes calibrated quarterly? | TNI V1M2 5.5.13.1(e) | | | | |
| Polarized Light Microscope | | | | | |
| Is the PLM in good working condition? | NIOSH 9002 | | | | Make/Model/Serial number |
| Does the PLM have the following? a) Binocular or monocular with cross hair reticule that locks b) Low, medium, and high objectives c) Light source d) 360° rotating stage e) Substage condenser with iris diaphragm f) Polarizer and analyzer that can be positioned so that their privileged directions are at 90° to each other g) Accessory slot at 45° to polarizers for compensators h) First-order (or λ) compensator i) Dispersion staining objective complete with accessories (optional) j) Test slide made of orthorhombic fibers | NIOSH 9002 | | | | |
| Does the laboratory have more than one PLM? | | | | | |
| Is PLM equipped with a camera? | | | | | Digital or film? |
| Is there a maintenance log book for equipment? | TNI V1M2 5.5.13.1a) | | | | |

| Question | Reference | Yes | No | N/A | Comments |
|---|--|-----|----|-----|----------|
| PLM Calibration | | | | | |
| Are all calibrations performed under the same analytical conditions used for routine asbestos analysis and recorded including data and analyst's signature? | TNI V1M3 1.7.1.1.1 | | | | |
| Is the PLM aligned daily, or prior to each use? | TNI V1M3 1.7.1.3.1 | | | | |
| Are the refractive index liquids calibrated at first use and semiannually to an accuracy of 0.004, with a temperature accuracy of 2°C using a refractometer or RI glass beads? | TNI V1M3 1.7.1.3.2 | | | | |
| Is the illumination of the PLM satisfactory? | NIOSH 9002 | | | | |
| Is a logbook kept with the dates of microscope cleanings and major servicing? | TNI V1M2 5.5.13.1a) | | | | |
| Sample Analysis | | | | | |
| Are representative layers from the specimen sampled? | NIOSH 9002 | | | | |
| Is each slide labeled with lab sample ID number? | NIOSH 9002 | | | | |
| Were appropriate steps taken to homogenize samples prior to analysis, or were representative subsamples obtained for analysis? | EPA-600/R- 93/116 2.2.5.2.2 | | | | |
| If acid treatment and rinsing were used to prepare samples, was care taken to avoid losing particulates during decanting? | EPA- 600/M4-82- 020 1.7.2.2 | | | | |
| If ashing was used in sample preparation, did ashing temperatures not reach or exceed 550° C? | EPA- 600/M4-82- 020 1.7.2.2 | | | | |
| Does the laboratory have a definition of each asbestos type? | EPA-600/R- 93/116 Table 2-2 and 2-3 | | | | |
| Does positive identification of asbestos include the determination of the following optical properties? a) Morphology b) Color and pleochroism c) Refractive indices d) Birefringence e) Extinction characteristics f) Sign of elongation | EPA-600/R- 93/116 2.2.5.2.1 | | | | |
| Does the laboratory maintain a list of non-asbestos fibers that can be confused with asbestos and the specific optical properties for each for distinguishing between asbestos and non-asbestos? | EPA-600/R- 93/116 Table 2-4 and 2-5 | | | | |

| Question | Reference | Yes | No | N/A | Comments |
|---|-------------------------------|-----|----|-----|----------|
| Does the laboratory use the point-count technique, or a technique that has been demonstrated and documented to be equivalent? | EPA-600/R-93/116 2.2.5.2.2 | | | | |
| Does the laboratory have a working definition of trace asbestos and concentrations near 1%? | EPA-600/R-93/116 | | | | |
| Are only fibers with a length-to-width ratio $\geq 3:1$ counted? | EPA-600/M4-82-020 1.7.2.4 | | | | |
| Were a minimum of 400 counts (maximum = 8 slides with 50 counts each, minimum = 2 slides with 200 counts each) per sample counted? | EPA-600/R-93/116 2.2.5.2.2 | | | | |
| Is quantitation performed at 100x or the lowest effective magnification of the PLM? | EPA-600/M4-82-020 1.7.2.4 | | | | |
| Does the analyst use a data sheet to document the results? | | | | | |
| Demonstration of Capability (DOC) | | | | | |
| Has the laboratory conducted an initial DOC prior to using any method and at any time there is a change in instrument type, personnel, or method or any time it hasn't been performed in a 12 month period? | TNI V1M3 1.6.2 | | | | |
| Does the laboratory have a documented procedure for on-going DOC? | TNI V1M3 1.6.3 | | | | |
| Quality Control | | | | | |
| Is at least one blank slide prepared daily or with every 50 samples analyzed, whichever is less? | TNI V1M3 1.7.2.1.3(a) | | | | |
| Is the blank slide prepared by mounting a sub-sample of an isotropic verified non-asbestos-containing material (friable material) in a drop of immersion oils? | TNI V1M3 1.7.2.1.3(a) | | | | |
| Is a similar check made after every 20 uses of each piece of homogenization equipment? | TNI V1M3 1.7.2.1.3(a) | | | | |
| Is at least 1 non-ACM non-friable material prepared and analyzed every 20 samples analyzed? | TNI V1M3 1.7.2.1.3(b) | | | | |
| Does the laboratory participate in an approved PT program, such as NVLAP and ELAP, NY? | EPA-600/R-93/116 | | | | |
| Does the laboratory participate in round robin testing at least once four times a year? | TNI V1M3 1.7.3.2(b) | | | | |
| Proficiency Testing (PT) | | | | | |
| Does the laboratory participate in the appropriate field of proficiency testing | TNI V1M1 4.0 | | | | |

| Question | Reference | Yes | No | N/A | Comments |
|--|-----------------------|-----|----|-----|----------|
| (FoPT) for initial and continued accreditation? | | | | | |
| Is PT analyses <i>not</i> contracted out to another laboratory? | TNI V1M1 5.1.2 | | | | |
| Does the laboratory analyze PT sample in the same manner as used for routine environmental samples? | TNI V1M1 5.1.1 | | | | |
| Are there previously analyzed and statistically validated PT sample records available? | TNI V1M1 5.3 | | | | |
| Do all the analysts participate in all PT rounds? | TNI V1M1 5.1.1 | | | | |
| Who is the PT provider (PTP)? | | | | | |
| Does the laboratory report results for accreditation and experimental FoPTs to the PTP on or before the closing date of the study? | TNI V1M1 5.2.2 | | | | |
| Does the laboratory have plans for resolving analytical problems when it receives a "not acceptable" performance score from a PTP? | TNI V1M1 6.1 | | | | |
| Are PT results used to verify accuracy and precision for each analyst and to judge the analyst's overall performance? | EPA-600/R- 93/116 | | | | |
| Reports | | | | | |
| Are the reports complete and accurate? | TNI V1M2 5.10.2 | | | | |
| Are there any data qualifiers on reports? | TNI V1M2 5.10.2(g) | | | | |
| Does the report have authorized signatures? | TNI V1M2 5.10.2(j) | | | | |
| Does the laboratory record the following stereomicroscopic data? a) Homogeneity b) Texture c) Color d) Estimated concentration of asbestos | EPA-600/R- 93/116. | | | | |
| Does the laboratory record the following data for the asbestos type(s) identified by PLM examination? a) Morphology b) Color and pleochroism c) Indices of refraction (nD) parallel and perpendicular for each asbestiform d) Birefringence e) Extinction characteristics f) Sign of elongation g) Estimated concentration of asbestos h) Temperature at the workstation | EPA-600/R- 93/116 | | | | |

| Question | Reference | Yes | No | N/A | Comments |
|--|-------------------------------------|-----|----|-----|----------|
| at the time of analysis i) Result of the analysis | | | | | |
| Is the following information included in the report of bulk samples: a) Color b) Presence or absence of asbestos c) Type(s) of asbestos present d) Estimate of the percent for each type of asbestos present e) Identity of other fibrous materials f) Estimate of the percent for other fibrous materials present g) Identity of matrix materials h) Percent of asbestos as volume percent (rounded to the nearest percent) i) If the sample is inhomogeneous and if subsamples were analyzed j) Problems encountered k) Departures from the test method l) Sample ID number m) Analyst's name n) Date of analysis o) Comments | EPA-600/M4-82-020 1.7.2.4 | | | | |
| Is the model and manufacturer of the PLM system included in the report? | optional | | | | |
| Records | | | | | |
| Does the laboratory establish and maintain procedures for identification, collection, indexing, access, filing, storage, maintenance and disposal of quality and technical records? | TNI V1M2 4.13.1.1 | | | | |
| Do quality records include reports from internal audits and management reviews and records of corrective and preventive actions? | TNI V1M2 4.13.1.1 | | | | |
| Does the laboratory retain records concerning analyses including raw data records, quality control data records, chain-of-custody forms, and laboratory reports for at least five years? | N.J.A.C. 7:18-4.6, 5.6, 6.7, 8.5(a) | | | | |