

Standard Operating Procedure HEPA Filter Leak Test (Oil-Based Challenge)	SOP No. 8.059
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DCR No.: 03029
Revision No.: 0

Effective: 10-1-03
Supersedes: 10-1-03
Revision Date: 10-1-03
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1 Purpose

- 1.1 To establish a standard procedure to insure and confirm the integrity of high efficiency particulate air (HEPA) and/or ultra-low penetration air (ULPA) filter system installation by verifying the absence of bypass leakage in the physical installation and that the filters themselves are free of defects and pinhole leaks.

2 Scope

- 2.1 This procedure applies to leak testing of HEPA and ULPA filters utilizing an oil-based challenge.

3 Reference

- 3.1 National Environmental Balancing Bureau (NEBB) Procedural Standards for Certified Testing of Cleanrooms, 1996.
- 3.2 Institute of Environmental Sciences and Technology (IEST) IEST-RP-CC006.2, Testing Cleanrooms.

4 Definition

- 4.1 HEPA: High Efficiency Particulate Air
- 4.2 ULPA: Ultra-Low Penetration Air
- 4.3 CFM: Cubic Feet per Minute
- 4.4 PSIG: Pounds per Square Inch Gauge

5 Responsibility

- 5.1 Test and Balance (TAB) technicians shall record all test readings on Form FN 8.059.1 (Filter Leak Scan).
- 5.2 All test reports shall be saved in files, located in the TAB department of Therma.

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- 5.3 All test equipment utilized shall be in calibration in accordance with National Environmental Balancing Bureau (NEBB) Standards and traceable to the National Institute of Standards and Technology (NIST).
- 6 Materials Requirement
 - 6.1 Dioctylphthalate (DOP) or
 - 6.2 Poly-alpha olefin (Emery 3004)
 - 6.3 Ringstand and Clamp
- 7 Test Equipment
 - 7.1 Source of air-generated aerosol using equipment indicated in NEBB Procedural Standards for Certified Testing of Cleanrooms, 1996, Section 14.6 (Aerosol Generation).
 - 7.2 Aerosol Photometer and Hand Held Probe that meet the criteria in NEBB Procedural Standards for Certified Testing of Cleanrooms, 1996, Chapter 6, Section 6.2, Subsection 6.2.1, Paragraph 6.2.1.2.
- 8 Procedures
 - 8.1 Produce a sketch or drawing indicating the relative location of each filter that is to be tested.
 - 8.2 Record the clients identification number on the Form FN 8.059.1 (Filter Leak Scan).
 - 8.3 Record the filter serial number on the Form FN 8.059.1 (Filter Leak Scan).
 - 8.4 Introduce the challenge aerosol into the airstream upstream of the filters to be challenged in a manner, which will produce a uniform challenge concentration at each of the HEPA filters being exposed at the same time. Follow the procedure found in NEBB Procedural Standards for Certified Testing of Cleanrooms, 1996, Chapter 6, Section 6.2, Subsection 6.2.2, Paragraph 6.2.2.1.
 - 8.5 Measure the concentration of aerosol in micrograms per liter ($\mu\text{g/l}$) upstream of the filters to be challenged. Follow the procedure found in NEBB Procedural Standards for Certified Testing of Cleanrooms, 1996, Chapter 6, Section 6.2, Subsection 6.2.2, Paragraph 6.2.2.2.
 - 8.6 If the upstream challenge cannot be measured and a Laskin Nozzle generator is used, the upstream concentration can be calculated.

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Concentration of the challenge, when 20 PSIG is available at the Laskin Nozzle Generator using DOP, can be calculated by using the following formula:

Concentration in $\mu\text{g/l}$ = $13,500(\# \text{Laskin Nozzles} \div \text{CFM})$

- 8.7 Record upstream filter challenge concentration on the Form FN 8.059.1 (Filter Leak Scan).
 - 8.8 Perform filter leak scanning using the procedures listed in NEBB Procedural Standards for Certified Testing of Cleanrooms, 1996, Chapter 6, Section 6.2, Subsection 6.2.2, Paragraph 6.2.2.3 and 6.2.2.4.
 - 8.9 Analyze the results using the acceptance standard found in NEBB Procedural Standards for Certified Testing of Cleanrooms, 1996, Chapter 6, Section 6.2, Subsection 6.2.4, Paragraph 6.2.4.1 for filters that can be directly scanned, or a reading greater than 0.005% of the upstream challenge aerosol concentration for filters that are scanned indirectly.
 - 8.10 Record filter leak test results, Pass or Fail, on the Form FN 8.059.1 (Filter Leak Scan).
 - 8.11 If authorized by the customer, filter repair following the guidelines in NEBB Procedural Standards for Certified Testing of Cleanrooms, 1996, Chapter 6, Section 6.2, Subsection 6.2.4, Paragraph 6.2.4.2 and/or Subsection 6.2.5, "Repairs".
 - 8.12 After repairs are completed, retest filters utilizing steps 8.4-8.10.
- 9 Review and Approval
- 9.1 TAB technicians shall return the Filter Leak Scan form, FN 8.059.1 to the TAB Department for review and approval.

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Document Approval



 Test & Balance Supervisor

10/01/03
 Date



 Engineering Manager

10/01/03
 Date



 Quality Assurance Manager

10/1/03
 Date

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