SAMPLE FHT SPECIFICATION SECTION 15990 – FUME HOOD PERFORMANCE TESTING

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section. This section includes the performance testing of fume hoods.

1.2 DEFINITIONS

Definitions listed in Section 1, NEBB FHT Procedural Standard

1.3 FHT FIRM QUALIFICATIONS

The FHT Certified Firm (CF) shall be NEBB Certified in Fume Hood Performance Testing. The individual planning, supervising, and certifying the fume performance testing shall be a NEBB FHT Certified Professional (CP).

1.4 FHT FIRM SUBMITTALS

1.4.1 Qualification Data: When requested, submit two copies of evidence that CF and this project's FHT team members meet the qualifications specified in Sub-section 1.3 *FHT Firm Qualifications.*

1.4.2 FHT Agenda: When requested, submit two copies of the FHT agenda. Include a complete set of report forms intended for use on this project.

1.4.3 Certified FHT Reports: Submit a final FHT report in accordance with the current edition of the NEBB *Procedural Standard for Fume Hood Performance Testing.*

1.5 QUALITY ASSURANCE

1.5.1 The NEBB CF shall submit two copies of the firm's NEBB FHT Certification.

1.5.2 When requested, the NEBB CF shall provide the NEBB Certificate of Conformance Certification.

1.5.3 FHT Report Forms: Prepare report forms in accordance with the requirements from the current edition of the NEBB *Procedural Standard for Fume Hood Performance Testing.*

1.5.4 Instrumentation Calibration: Calibration of instruments shall be in accordance with the current edition of the NEBB *Procedural Standard for Fume Hood Performance Testing.*

1.6 CONSTRUCTION TEAM RESPONSIBILITY TO FHT AGENCY

1.6.1 Provide the NEBB CF with a conformed set of contract documents (drawings, specifications, and approved submittals), including all current approved change orders/ contract modifications.

1.6.2 Develop a project schedule with the input of the NEBB CF that coordinates the work of other

disciplines and provides adequate time in the construction process to allow successful completion of the FHT work.

1.6.3 Notify the NEBB CF of schedule changes.

1.6.4 Ensure that the building enclosure is complete, including but not limited to, all structural components, windows and doors installed, door hardware complete, ceilings complete, stair, elevator, and mechanical shafts complete, roof systems complete, all plenums sealed, etc.

1.6.5 Complete the installation of permanent electrical power systems serving the HVAC equipment and systems. Such systems shall be properly installed in accordance with all applicable codes to ensure the safety of all construction personnel.

1.6.6 Complete the installation of all HVAC equipment and systems to ensure safe operation.

1.6.7 Perform the startup of all HVAC equipment and systems in accordance with the manufacturer's recommendations.

1.6.8 Complete installation, programming (including design parameters and graphics), calibration, and startup of all building control systems.

1.6.9 Verify that the building control system provider has commissioned and documented their work before the FHT work begins.

1.6.10 Require that the building control system firm provide access to hardware and software, or onsite technical support required to assist the FHT effort. The hardware and software or the onsite technical support shall be provided at no cost to the NEBB CF.

1.6.11 Furnish and install all drive/motor changes as required.

1.6.12 Complete all TAB work prior to performing FHT work.

1.7 FHT INSTRUMENTATION AND EQUIPMENT

The FHT Firm shall provide all necessary instrumentation, equipment and appurtenances required to perform the fume hood performance testing. All instrumentation, equipment and appurtenances shall be as indicated *on the NEBB website. (www.nebb.org)*

PART 2 — PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

3.1 EXAMINATION

Examine the contract documents to become familiar with project requirements and to discover conditions in systems' designs that may preclude proper FHT of systems and equipment. *Contract Documents* are defined in the General and Supplementary Conditions of the Contract. Report deficiencies discovered.

The NEBB CF shall verify that the TAB work is complete and shall review the completed TAB Report prior to performing any fume hood tests.

3.2 GENERAL PROCEDURES FOR FUME HOOD PERFORMANCE TESTING

3.2.1 Perform testing on each fume hood indicated to be tested according to the procedures contained in the current edition of the NEBB *Procedural Standard for Fume Hood Performance Testing* and this section.

3.3 TEST SETUP MODE

All fume hoods shall be tested in one of the following modes: As-Manufactured (AM), As-Installed (AI), or As-Used (AU), as defined below:

As-Manufactured: The fume hood is tested at the manufacturer's facility. The fume hood and work surface shall be void of all process equipment, apparatus, and chemicals.

As-Installed: The fume hood is tested in its installed, operating condition. The fume hood and work surface shall be void of all process equipment, and chemicals.

As-Used: The fume hood is tested in its installed operating condition. The fume hood is being utilized for actual process work. Experiments, equipment, chemicals, and processes are being carried out inside the fume hood while the testing is being performed. This means that normal operating equipment within the fume hood shall be activated and operational including items such as all heat and vapor producing appliances, physical obstructions, etc.

3.4 DESIGN SASH OPENING

The design professional must select the appropriate Operating Sash Position for each hood and each type of hood i.e., horizontal sash, vertical sash, or combination sash. If the design professional is unsure about selecting the appropriate Operating Sash Position, the Owner should be consulted. It is imperative to specify the Operating Sash Position, as the fume hood performance tests are based on this sash position.

The Operating Sash Position shall be _____" above the work surface for vertical sash fume hoods; or

The Operating Sash Position shall be _____" open for horizontal sash fume hoods; or

The Operating Sash Position shall be _____ " above the work surface when in the vertical combination configuration; and _____" open when in the horizontal combination configuration.

3.5 AIRFLOW VELOCITY TESTS: Constant Air Volume (CAV) Fume Hood

3.5.1 Test Procedures: Airflow Face Velocity Tests

3.5.1.1 Set hood to the Operating Sash Position or as agreed to by the Owner/ Buyer. Measure the area of the opening. The area shall be determined as follows:

Height: Height shall be based on the dimension from the bottom most part of the sash to the work surface located in a straight plane directly beneath the sash for vertical sashes or the opening between the horizontal tracks on horizontal sashes.

Width: Width shall be based on the interior dimensions of the design sash opening for vertical sashes or the opening of the horizontal sashes.

3.5.1.2 Determine a grid pattern of equal areas by dividing the opening into horizontal and

vertical dimensions. Each equal area grid location shall be a maximum of one (1) square foot (0.093 m²) with no dimension larger than 13" (330 mm).

3.5.1.3 Place the instrument probe in the equipment stand and locate the probe sensor in the center of each grid location in the plane of the sash opening and perpendicular to the sash. All personnel shall stand clear so as not to affect the airflow.

3.5.1.4 Measure and record the airflow face velocities at the center of each grid location. Each grid location shall have a minimum of 20 samples taken at one second intervals. Average the 20 samples at each location to determine the airflow face velocity at each grid location.

3.5.1.5 The airflow face velocity is determined by averaging the airflow face velocity from each grid location.

3.5.1.6 If the actual average airflow face velocity as determined above does not meet the acceptance criteria as Section 3.5.2, remedial work, if required, is NOT part of the fume hood testing scope of work. If authorized, the remedial work could be performed by the NEBB CF as an additional service.

3.5.1.7 It should be noted that the total fume hood exhaust volume is NOT equal to the average airflow face velocity being captured through the sash opening.

3.5.2 Acceptance Criteria

The acceptance criteria for CAV airflow face velocity shall be:

_____ ft/min at _____ " sash height OR _____ " opening width.

This acceptance Criteria shall be defined by Owner/Buyer, Fume hood manufacturer, or Authority Having Jurisdiction (AHJ).

3.5.3 Reporting Requirements

The following shall be included in the final report:

a) Technician Name
b) Date of Test
c) Test Setup Mode
d) Sash Configuration
e) Operating Sash Position (Height and Width)
f) Design Airflow Face Velocity (fpm) (m/s)
g) Average Airflow Face Velocity at each grid location (fpm) (m/s)
h) Average Airflow Face Velocity (fpm) (m/s)
i) Minimum Airflow Face Velocity (fpm) (m/s)
j) Maximum Airflow Face Velocity (fpm) (m/s)
k) Test instrumentation
l) Acceptance Criteria

3.6 AIRFLOW VELOCITY TESTS: Variable Air Volume (VAV) Fume Hood

3.6.1 Test Procedures: Airflow Face Velocity Tests

3.6.1.1 Set hood to the Operating Sash Position or as agreed to by the Owner/ Buyer. Measure the area of the opening. The area shall be determined as follows:

Height: Height shall be based on the dimension from the bottom most part of the sash to the work surface located in a straight plane directly beneath the sash for vertical sashes or the opening between the horizontal tracks on horizontal sashes.

Width: Width shall be based on the interior dimensions of the design sash opening for vertical sashes or the opening of the horizontal sashes.

3.6.1.2 Determine a grid pattern of equal areas by dividing the opening into horizontal and vertical dimensions. Each equal area grid location shall be a maximum of one (1) square foot (0.093 m²) with no dimension larger than 13" (330 mm).

3.6.1.3 Place the instrument probe in the equipment stand and locate the probe sensor in the center of each grid location in the plane of the sash opening and perpendicular to the sash.

3.6.1.4 Measure and record the airflow face velocities at the center of each grid location. Each grid location shall have a minimum of 20 samples taken at one-second intervals. Average the 20 samples at each location to determine the airflow face velocity at each grid location.

3.6.1.5 The airflow face velocity is determined by averaging the airflow face velocity from each grid location.

3.6.1.6 If the actual average airflow face velocity as determined above does not meet the acceptance criteria as Section 3.4.2, remedial work, if required, is NOT part of the fume hood testing scope of work. If authorized, the remedial work could be performed by the NEBB CF as an additional service.

3.6.1.7 Reduce the sash position to 50 percent of the Operating Sash Position and repeat airflow face velocity measurements / calculations as described above.

3.6.1.8 Reduce the sash position to 25 percent of Operating Sash Position and repeat airflow face velocity measurements/calculations as described above.

3.6.1.9 It should be noted that the total fume hood exhaust volume is NOT equal to the average airflow face velocity being captured through the sash opening.

3.6.2 Test Procedures: Response Test

3.6.2.1 There are two acceptable methods to perform and measure response time: exhaust duct airflow velocity or hood plenum airflow velocity. Determine the baseline and response conditions by either of the following methods:

a. **Exhaust duct airflow velocity method**:
Place the instrument probe in a stable (non-turbulent airflow) location in the exhaust duct, or

b. **Fume hood plenum airflow velocity method**:
Place instrument probe in the fume hood plenum behind the baffle panel in a stable (non-turbulent airflow) location.

3.6.2.2 Place the instrument as described above. Set the Sash to the Operating Sash Position and measure the velocity to establish a baseline.

3.6.2.3 The Response Time Test involves three cycles of opening and closing the sash position from full-closed to the Operating Sash Position. When changing the sash position, use a smooth continuous motion and move the sash at a rate of approximately 1.5 feet per second (0.45 m/s).

3.6.2.4 Measure and record velocity readings at one-second intervals.

3.6.2.5 Close the sash and start velocity measurements recording for 30 seconds. Open the sash to the Operating Sash Position for 60 seconds. Close the sash for 30 seconds. Open the sash to the Operating Sash Position for 60 seconds. Close the sash for 30 seconds. Open the sash to the Operating Sash Position for 60 seconds and then stop velocity measurement recording.

3.6.2.6 Measure and record the time required to first obtain a velocity greater than or equal to 90 percent of baseline condition for each cycle.

3.6.2.7 Measure and record the time to maintain the velocity to within ±10 percent of baseline condition for each cycle.

3.6.2.8 Perform measurements for all three cycles. The procedure stated above applies to either vertical or horizontal sash configurations. For fume hoods with combination sash configurations, the procedure shall be performed once in the vertical and once in the horizontal sash opening positions.

3.6.2.9 The speed of response and time to steady state shall be reported for all three opening cycles.

3.6.3 Acceptance Criteria

3.6.3.1 The acceptance criteria for VAV airflow face velocity shall be:

_____ ft/min at _____ " sash height OR _____" opening width.

This acceptance Criteria shall be defined by Owner/Buyer, Fume hood manufacturer, or Authority Having Jurisdiction (AHJ).

3.6.3.2 The acceptance criteria for individual speed of responses and individual times to steady state shall be:

As directed by the Owner/Buyer or Authority Having Jurisdiction (AHJ)

3.6.4 Reporting Requirements

The following shall be included in the final report:

a) Technician Name
b) Date of Test
c) Test Setup Mode
d) Sash Configuration
e) Operating Sash Position (Height and Width)
f) Design Airflow Face Velocity (fpm) (m/s)
g) Average Airflow Face Velocity at each grid location (fpm) (m/s) – 3 sash positions
h) Average Airflow Face Velocity (fpm) (m/s) – 3 sash positions
i) Minimum Airflow Face Velocity (fpm) (m/s) – 3 sash positions
j) Maximum Airflow Face Velocity (fpm) (m/s) – 3 sash positions
k) Speed of Response (seconds) – 3 cycles

l) Time to Steady State (seconds) – 3 cycles
m) Speed of Response Test Method (exhaust airflow velocity method or fume hood plenum airflow velocity method)
n) Test instrumentation
o) Acceptance Criteria

3.7 AIRFLOW VISUALIZATION TESTS: LOCAL CHALLENGE

The purpose of the Local Challenge Test is to provide a visual indication of the fume hood's capture performance when a small-scale challenge is introduced. Coordinate disabling of the local smoke and fire alarm system when performing this test. ***Care should be taken to compensate for smoke discharge velocity and exposure outside of the fume hood.***

3.7.1 Test Procedures

3.7.1.1 Set the sash position to the Operating Sash Position as determined by the Airflow Face Velocity Test.

3.7.1.2 Place the smoke source outside the fume hood and under the airfoil. Pass smoke source along the entire length of the opening. Verify that the smoke is drawn into the hood, properly exhausted.

3.7.1.3 Position the smoke source along the perimeter of the sash plane opening. Pass smoke source along the edge of all openings at the sash plane. Verify that the smoke is drawn into the hood and exhausted properly.

3.7.1.4 Place the smoke source 4" – 6" (100mm – 150mm) above the interior of the sash opening. Move along the entire length of the sash. Verify that the smoke is contained within the hood and properly exhausted.

3.7.1.5 Move the smoke source so that it traverses the entire work surface and around internal equipment when applicable. Verify that the smoke is contained within the hood and properly exhausted.

3.7.1.6 Place the smoke source outside the fume hood and determine effects of room and HVAC system conditions by observing the smoke patterns.

3.7.1.7 Place smoke source in cavity above the work surface and observe the smoke patterns inside the hood.

3.7.1.8 For VAV system fume hoods, close all sashes and traverse the smoke source around the sash perimeter, under the airfoil and at the bypass intake above the sash. Verify that air is not escaping the hood around the sash perimeter and all smoke is drawn into the hood under the airfoil and at the bypass intake.

Smoke shall be contained within the fume hood under all test procedures. If the smoke escapes the fume hood under any of the above test procedures, the NEBB CP shall immediately notify the Owner/Buyer in writing, and it shall be so noted in the report. Reporting Requirements

3.7.2 Reporting Requirements

The following shall be included in the final report:

a. Technician Name
b. Date of Test
c. Test Setup Mode
d. Sash Configuration
e. Operating Sash Position (Height and Width)
f. Challenge Medium Used
g. Narrative description of actual visual test results
h. Test instrumentation
i. Acceptance Criteria

3.8 AIRFLOW VISUALIZATION TESTS: LARGE VOLUME GENERATION

The Large Volume Challenge Test SHOULD NOT be performed if the hood failed the Local Challenge Test. The purpose of the Large Volume Challenge Test is to provide a visual indication of the fume hood's capture performance when a large-scale challenge is introduced. The test procedures for the Large Volume Challenge Test are similar to the Local Challenge Test. Coordinate disabling of the local smoke and fire alarm system when performing this test.

Care should be taken to compensate for smoke discharge velocity and exposure outside of the fume hood.

3.8.1 Test Procedures

3.8.1.1 Set the sash position to Operating Sash Position as determined by the Airflow Face Velocity Test.

3.8.1.2 Place the smoke source outside the fume hood and under the airfoil. Move smoke source along the entire length of the opening. Verify that the smoke is drawn into the hood, properly exhausted and not entrained in a vortex at the top of the hood.

3.8.1.3 Position the smoke source along the perimeter of the sash plane opening. For combination or horizontal sash fume hoods, pass smoke source along the inside edge of all openings at the sash plane. Verify that the smoke is drawn into the hood and exhausted properly.

3.8.1.4 Place the smoke source inside the hood 4" – 6" above the interior of the sash opening. Verify that the smoke is contained within the hood and properly exhausted.

3.8.1.5 Move the smoke source so that it traverses the entire work surface and around internal equipment when applicable. Verify that the smoke is contained within the hood and properly exhausted.

3.8.1.6 Place the smoke source outside the fume hood and determine effects of room and HVAC system conditions by observing the smoke patterns.

3.8.1.7 Place smoke source in cavity above the work surface and observe the smoke roll inside the hood.

3.8.1.8 For VAV system fume hoods, place the smoke source within the fume hood and close all sashes. Flood the interior of the fume hood with the smoke source and verify that the smoke is contained within the hood and exhausted properly.

3.8.2 Acceptance Criteria

Smoke shall be contained within the fume hood under all test procedures. If the smoke escapes the fume hood under any of the above test procedures, the NEBB CP shall immediately notify the Owner / Buyer in writing, and it shall be so noted in the report.

3.8.3 Reporting Requirements

The following shall be included in the final report:

a. Technician Name
b. Date of Test
c. Test Setup Mode
d. Sash Configuration
e. Operating Sash Position (Height and Width
f. Challenge Medium Used
g. Narrative description of actual visual test results
h. Test instrumentation
i. Acceptance Criteria

3.9 TRACER GAS CONTAINMENT TESTS: STATIC MODE

3.9.1 Test Procedures

3.9.1.1 Set the sash position to Operating Sash Position as determined by the Airflow Face Velocity Test

3.9.1.2 Perform a background measurement test of the room concentration levels at a representative location. If background levels are elevated, no testing shall be performed.

3.9.1.3 The ejector system shall be located 6” (152 mm) behind the sash measured from front edge of the ejector base for all test locations. This places the detection sensor / sensing tube 9” (229 mm) from the ejector. If this location cannot be accomplished due to equipment placement or other obstructions, move the ejector system, and move the detection sensor / sensing tube to a suitable location that will maintain the 9” (229 mm) spacing, or as close as possible to the 9” (229 mm) spacing. Use the following method to identify the ejector system locations.

3.9.1.4 Sash configurations

Vertical Sash:

- Two (2) locations are required for fume hoods less than 4’ (1.2 m): 12” (300 mm) from the left wall and 12” (300 mm) from the right wall.
- Three (3) locations are required for fume hoods 4’ (1.2m) to 8’ (2.4 m): 12” (300 mm) from the left wall, 12” (300 mm) from the right wall and in the center.
- Four (4) locations are required for fume hoods greater than 8’ (2.4 m): 12” (304 mm) from the left wall, 12” (300 mm) left of center line, 12” (300 mm) right of center line and 12” (300 mm) from the right wall.
- All dimensions identified above are from the centerline of the ejector system. The fume hood width above is defined as the outside dimensions (including casework), also referred to as nominal width.

Horizontal Sash:

- Centerline of each design and/or maximum opening space as previously determined in the Airflow Velocity Tests.

Combination Sash:

- Locations shall be determined by both the vertical and horizontal sash configurations described above.
- Place the ejector system inside the fume hood at the first location.

3.9.1.5 The mannequin shall be directly in front of the ejector system at each test location. The detector probe tip shall be extend 0.25" (6 mm) beyond the lips of the mannequin at a distance 3" (75 mm) from the face of the sash and 22" (560 mm) above the work surface.

3.9.1.6 Release the tracer gas at the rate as specified in the contract documents or as agreed to between the Owner and the NEBB CF. If a release rate has not been specified, then the release rate shall be 4 l/m. Wait 30 seconds before taking samples.

3.9.1.7 Record samples every second for a duration of five minutes.

3.9.1.8 Proceed to the next test location and repeat procedure.

3.9.1.9 Report all of the individual readings, the average and the peak concentration for each test location.

3.9.1.10 The performance rating is the highest average of the test locations. The Static Mode Performance Rating shall be reported as follows:

AM yyy
AI yyy
AU yyy

Where: y y y is the highest average concentration of the test locations in ppm.

3.9.2 Acceptance Criteria

Acceptance ratings for the Static Mode Tests shall be as directed by the Owner/Buyer. Where acceptance ratings have not been defined, the average concentration shall be no greater than those specified in ANSI Z9.5 and shall be as follows:

0.050 ppm for AM at a release rate of 4 l/m
0.100 ppm for AI at a release rate of 4 l/m
0.100 ppm for AU at a release rate of 4 l/m

Results will be evaluated by Owner's/Buyer's properly trained personnel for acceptable rating.

3.9.3 Reporting Requirements

The following shall be included in the final report:

a. Technician Name
b. Date of Test
c. Time of Test
d. Test Setup Mode
e. Sash Configuration

f. Operating Sash Position (Height and Width)
g. Detector Probe Tip Height
h. Room Layout Drawing
i. Graphical display of each test
j. Tracer Gas Release Rate
k. Test Instrumentation
l. All individual readings, the average and maximum at each sample location
m. Performance Rating
n. Acceptance Criteria

3.10 TRACER GAS CONTAINMENT TESTS: Sash Movement Effect

3.10.1 Test Procedures

3.10.1.1 The ejector system shall be located 6" (152 mm) behind the sash measured from the front edge of the ejector base and shall be located in the center of the fume hood. This places the detection sensor / sensing tube 9" (229 mm) from the ejector. If this location cannot be accomplished due to equipment placement or other obstructions, move the ejector system and move the detection sensor / sensing tube to a suitable location that will maintain the 9" (229 mm) spacing, or as close as possible to the 9" (229 mm) spacing.

3.10.1.2 The mannequin shall be directly in front of the ejector system. The detector probe tip shall be extend 0.25" (6 mm) beyond the lips of the mannequin at a distance 3" (75 mm) from the face of the sash and 22" (560 mm) above the work surface.

3.10.1.3 Release the tracer gas at the rate as specified in the contract documents or as agreed to between the Owner and the NEBB CF. If a release rate has not been specified, then the release rate shall be 4 l/m.

3.10.1.4 Start with the sash in the closed position for 60 seconds. Open the sash to the same Operating Sash Position utilized when performing the Static Test as described above. The sash shall remain open for 60 seconds. Close the sash for 60 seconds. Repeat the process for two additional cycles.

3.10.1.5 The sash should be opened and closed with a smooth motion at a rate of 1.5 feet per second (0.45 m/s).

3.10.1.6 For combination hoods, testing shall be performed once in the vertical and once in the horizontal positions.

3.10.1.7 Record samples every second continuously for all three cycles.

3.10.1.8 Calculate the 45 second moving average for each opening cycle. Record the maximum moving average of the opening cycles. The Sash Movement Effect Performance Rating shall be reported as follows:

SME-AM yyy
SME-AI yyy
SME-AU yyy

Where: y y y is the maximum moving average tracer gas concentration in ppm.

3.10.2 Acceptance Criteria

Acceptance ratings for the Sash Movement Effect (SME) shall be as directed by the Owner/Buyer. Report the performance rating as indicated above.

Results will be evaluated by Owner's/Buyer's properly trained personnel for acceptable ratings.

3.10.3 Reporting Requirements

The following shall be included in the final report:

a. Technician Name
b. Date of Test
c. Time of Test
d. Test Setup Mode
e. Sash Configuration
f. Operating Sash Position (Height and Width)
g. Detector Probe Tip Height
h. Room Layout Drawing
i. Graphical display of each test
j. Tracer Gas Release Rate
k. Test Instrumentation
l. All individual readings, the average and maximum at each sample location
m. 45-second moving average for each opening cycle
n. Performance Rating.
o. Acceptance Criteria

3.11 TRACER GAS CONTAINMENT TESTS: PERIMETER SCAN

3.11.1 Test Procedures

3.11.1.1 Open the sash to the same Operating Sash Position utilized when performing Static Test as described above.

3.11.1.2 The ejector system shall be located 6" (150 mm) behind the sash measured from the front edge of the ejector base and shall be located in the center of the fume hood.

3.11.1.3 Remove the mannequin from the front of the fume hood.

3.11.1.4 Remove the detection sensor / sensing tube from the mannequin.

3.11.1.5 Release the gas at the rate specified in the contract documents or agreed to between the Owner and the NEBB CF. If a release rate has not been specified, then the release rate shall be 4 l/m. Release the gas for 30 seconds prior to scanning.

3.11.1.6 While holding the detection sensor/sensing tube in your hand, scan the perimeter of the sash opening and below the airfoil at a rate of not more than 3"/sec (76 mm/sec). The detector probe tip shall be passed 1" (25 mm) from the outside surface of the fume hood.

3.11.1.7 Record any measurable leakage and report the location and magnitude.

3.11.2 Acceptance Criteria

Acceptance ratings for the Perimeter Scan shall be as directed by the Owner/Buyer. Report the results as indicated above.

Results will be evaluated by Owner's/Buyer's properly trained personnel for acceptable results.

3.11.3 Reporting Requirements

The following shall be included in the final report:

a. Technician Name
b. Date of Test
c. Time of Test
d. Test Setup Mode
e. Sash Configuration
f. Operating Sash Position (Height and Width)
g. Room Layout Drawing
h. Fume Hood Face Schematic
i. Measurable Leakage Detected for each occurrence.
j. Location and Magnitude of Leakage Detected for each occurrence.
k. Tracer Gas Release Rate
l. Test Instrumentation
m. Acceptance Criteria

3.12 FINAL REPORT

The final report shall be in accordance with the requirements of the current edition of the NEBB. *Procedural Standard for the Fume Hood Performance Testing.*