Test Report

ASHRAE 110-2016
METHODS OF TESTING PERFORMANCE OF LABORATORY FUME HOODS
AS INSTALLED (AI)

Project Name

SAMPLE

SUMMARY OF RESULTS: PASS

Signed by

_____

Alex Albright
General Manager

This report is for customer use only and only the customer is authorized to permit copying or distribution of this report and is limited to the entire contents of this report.

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

Contents

SUMMARY OF RESULTS 3
PHOTO OF HOOD 4
HOOD PERFORMANCE METHODOLOGY 6
INSTRUMENTATION AND EQUIPMENT 7
TEST CONDITIONS 8
RECOMMENDED PERFORMANCE CRITERIA 9
- Face Velocity Test 9
- Smoke Visualization Test 9
- Tracer Gas Tests 10
- Periphery Scan Test 10
- Sash Movement Containment Test 11
- Tri-Color Testing 12

TEST RESULTS 13
- Face Velocity Measurements 13
- Airflow Visualization Tests 14
- Tri-Color Results 15
- Tracer Gas Tests 16-20
- Appendix A - References Photos 21
- Appendix B Calibration and Tester Certification 24

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

SUMMARY OF RESULTS

Hood Identification Number	xx x99 x99
Hood Manufacturer	LabConco
Model Number	Classmate Protector
Manufacturer Serial #	########
Hood Width	60”
Hood Style	Bench
Sash Type	Combination Sash
Hood Type	VAV
Sash Opening (Height/Width)	14 in / 67 in

Testing was performed in accordance with guidelines provided in the ANSI/ASHRAE 110-2016: "Method of Testing Performance of Laboratory Fume Hoods". The criteria for performance were adopted from recommendations by, SEFA and ANSI/AIHA/ASSE Z9.5-2012 – Laboratory Ventilation along with relevant industry standards on laboratory ventilation. The hood was tested AS INSTALLED (AI)

Results of tests revealed that the fume hood meets acceptance criteria as described herein, with successful containment during smoke visualization tests, Tri-Color Containment Tests, face velocity profile and tracer gas average concentrations less than or equal to the industry standard maximum average of 0.10 parts per million (ppm). The hood was tested at the inflow face velocity average of 90 fpm(0.45 m/s) at the sash opening height of 14 inch.

Refer to the “Test Results” section for details of tests.

Testing and evaluation were performed by:

Signature:

Tester: Alex Albright

Signed Date: 8/11/25

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

HOOD PHOTOS



If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com



If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

HOOD PERFORMANCE METHODOLOGY

Testing was performed in accordance with guidelines provided in the ANSI/ASHRAE 110-2016 "Method of Testing Performance of Laboratory Fume Hoods".

The ASHRAE 110 -2016 Testing Protocol permits modification for different styles and sizes of fume hoods, and other conditions and user requirements. As such we have included the usage of Tri-Color dynamic containment testing to certify these hoods.

The ANSI/ASHRAE 110-2016 fume hood performance AI tests included:

- Face Velocity Profile Test
- Visualization of Airflow Patterns
- Measurement of Tracer Gas Containment
- Periphery Scan Test
- Sash Movement Effect (SME) Tests
- Tri-Color Dynamic Containment Challenges (modified large volume)
  - Walk By
  - Rapid Sash Movement
  - Material Exiting Hood

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

INSTRUMENTATION AND EQUIPMENT

Tracer Gas	99%+ Sulfur Hexafluoride.
Ejector	Tracer Gas Diffuser with a 4LPM Critical Orifice at an upstream pressure of 30 psi utilizing a digital pressure gauge and mass flow calibrated diffuser.
SF6 Analyzer	D-INDUSTRIAL Q200, SN: XXXXXXX, Range of detection 0.00 to 18.00 ppm. (Calibration Date 21.July. 2025)
Recorder	Readings are recorded with a MicroDaq data logger with an accuracy of ±0.092% of full scale.
Mannequin	Of size and placement as specified in the ASHRAE 110-2016 guideline.
Velocity Transducers	Three (3) TSI Model 8455-03 Air Flow Transducers, Serial Number: XXXXXXXX, XXXXXXXX, XXXXXXXX. Range of detection 25 to 200 fpm. (Calibration Date 22.December.2024)
Smoke Generator	Local volume testing performed with a Fume Hood Certified Hazer Professional handheld with zero velocity attachment.
Tri-Color Visualizer	Fume Hood Certified Tri-Color Visualizer consisting of a fume simulator and an array of lasers used to create a light curtain at the sash plane to visualize loss of containment during dynamic testing.

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

TEST CONDITIONS

Room Ventilation: At full normal operation according to the **AI** criteria.

Room Description: The test was conducted at **Project Name** on the **Floor** of the **Building**. See Layout of lab for complete mechanical details. The room has several doors all of the same style, size and opening outward away from the lab interior with mechanisms to close the door in a slow steady motion after being opened.

Room pressurization: Lab maintained a negative pressurization compared to outside corridors.

Lab Temperature: The temperature of the lab was 70F +/- 2 degrees.

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

RECOMMENDED PERFORMANCE CRITERIA

The following criteria are assembled from industry consensus standards and are provided as an aid in the evaluation of performance data. The criteria are based on ASHRAE, SEFA, ANSI Z9.5, and other related laboratory ventilation standards and specifications. The criteria apply to the following tests:

Face Velocity Test

Form an imaginary grid pattern by equally dividing the design hood opening into vertical and horizontal dimensions. The grid spaces shall be less than 1 ft^2 (0.09 m^2), and the larger side of the grid rectangle shall not exceed 13 in. (330 mm). Velocity readings were recorded with a three (3) calibrated anemometer array fixed at the center of each grid rectangle. Air velocities were recorded at one-second intervals for 20 seconds at each grid location. The mean of the grid velocities was averaged for the opening to determine the overall average face velocity.

Smoke Visualization Test

This test is a visualization of a hood's ability to contain vapors. It consists of a small local challenge. The intent of this test is to access the performance of the hood as it is typically used. Because the investigator is often at the face of the hood while performing the tests, care shall be exercised to ensure that the body of the investigator does not influence the smoke visualization. Under ideal conditions, the smoke will flow smoothly, drawn from the point of release toward the slots in the rear baffle. Results are reported as a qualitative judgment of airflow distribution according to the following rating guide:

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

Rating	Description
Fail	• Smoke was visually observed escaping from the hood
Low Pass (Poor)	• Reverse flow of smoke is evident near opening • Lazy flow into hood along openings • Slow capture and clearance • Observed potential for escape
Pass (Fair)	• Some Reverse flow in hood not necessarily at opening • Limited turbulent vortex flow inside hood • Smoke is captured and clears readily • No visible escape
High Pass (Good)	• Good capture and quick clearance • Limited vortex flow inside hood • No reverse flow regions • No visible escape

Tracer Gas Tests

The tracer gas containment tests were conducted to evaluate and quantify the potential for contaminant escape in the presence of a mannequin. A mannequin was used to simulate the presence of a hood user. The mannequin was positioned at the left, center and right of the hood opening with the nose approximately 3 inches in front of the plane of the sash. This test was conducted twice, once utilizing the vertical sash at design opening and a second time utilizing the horizontal openings of 16" at left, center and right positions.

A tracer gas, 99%+ Sulfur Hexafluoride, was released from an ASHRAE 110 ejector at 4 liters per minute (LPM) 6 inches behind the plane of the sash directly in front of the mannequin. Breathing zone concentrations were measured every second for 5 minutes in each test location using a calibrated Trace Gas Leak Detector. The leak detector was calibrated against a calibration gas standard immediately prior to the start of tests and validated after tests were conducted. Average, minimum and maximum breathing zone concentrations were determined from the data. Refer to Fig.1 for a diagram of test locations.

Hood should provide containment of tracer gas below an average of 0.10 ppm in the breathing zone of a stationary mannequin positioned directly in front of the ejector location.

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

Periphery Scan Test

The Periphery Scan Test was conducted by configuring the sash to the design opening of **14"** and positioning the SF6 ejector at the center of the hood opening as described above for the Tracer Gas Test. The periphery of the hood's opening was then scanned with the Tracer Gas Leak Detector's probe to determine areas of possible containment loss. While standing away from the face of the hood, the probe was held 1 inch (25 mm) away from the edge of the hood opening and moved slowly around the opening at a rate of approximately 3 inches (75 mm) per second to identify any potential leakage points. The area beneath the airfoil was also scanned for potential leakage points.

Hood should provide containment of tracer gas below an average of 0.10 ppm measured for the period of time while scan is conducted.

Sash Movement Containment Test

The Sash Movement Effect Test consisted of recording tracer gas escape data while raising and lowering the sash at a rate of approximately 1.5 ft/s (0.5 m/s). And concentrations were measured every second for 60 seconds with sash opening and closing. Repeat opening and closing the sash three times. Calculate the 45-second rolling average for the test, record the maximum rolling average.

Hood should provide containment of tracer gas below an average of 0.10 ppm for the period of time while sash movement containment test is conducted.

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

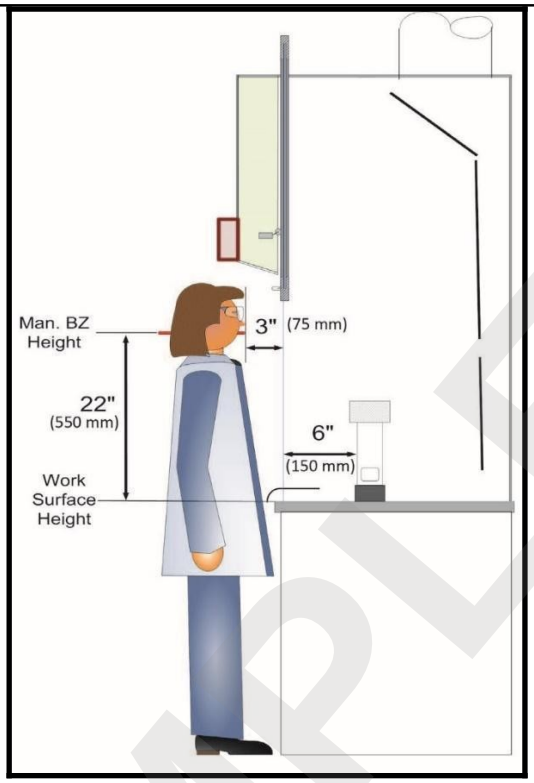


Fig.1

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

Tri-Color Dynamic Containment Tests

Taking into consideration ASHRAE110's foreword recommendation:

"**It is important to evaluate the performance of the laboratory hood under dynamic conditions. This performance test method may be modified to evaluate a dynamic challenge**."

Tri-Color modifies the large volume smoke testing to add realistic dynamic challenges to verify containment under normal lab usage. When loss of containment passes through the green laser light curtain, it is illuminated indicating loss of containment.

Given it is almost impossible for a fume hood to contain 100% in real world conditions, the Tri-Color Visualizer allows you to see the impact on containment of various actions in and around the hood.

These tests are graded based on analysis of the qualitative results and it is key to store these challenges as video recording on a secure cloud server for future reference.

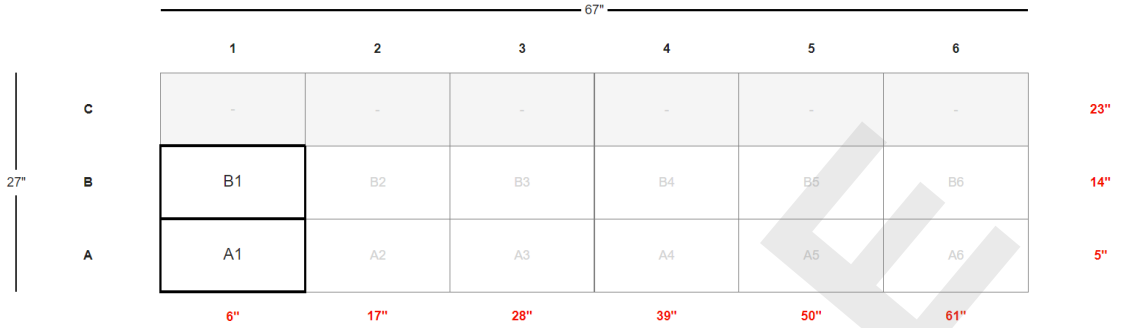
The challenges include: Design Height (Operating) Sash Position, Standing in front of the hood, Rapid Sash movement, Walk By, and Material Exiting Hood performed both on the vertical opening and horizontal openings of the combination sash configuration.

SAMPLE

-

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

TEST RESULTS



Face Velocity Measurements

Position No.	Reading of Velocity Avg.(fpm)	Reading of Velocity Avg.(fpm)
	Row B	**Row A**
1	89.6	84.3
2	92.3	89.3
3	90.1	87.2
4	94.7	82.5
5	95.8	87.2
6	96.6	91.3

Average Face Velocity in FPM	**90**
Highest Average Value in FPM	**96.6**
Lowest Average Value in FPM	**82.5**

Rating of Face Velocity: PASS

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

SAMPLE

Airflow Visualization Tests

Local Visualization Challenge

Smoke was applied to the following locations with the listed results.

Locations	Results
Perimeter of Vertical Open Sash	Smoke is captured and clears readily Minor lazy flow at the side walls but no reverse No visible escape.
Perimeter of 16" Left/Right/Center Horizontal Openings	Good capture and quick clearance Minor lazy flow at the side walls on the left/right opening, but no reverse No visible escape
Along the work surface in the middle line	Minor lazy flow near sidewalls, none in the center. No visible escape.
Below the bypass opening with the sash closed	Good capture and quick clearance No visible escape.
At the top of the sash with the sash closed	Smoke is captured and clears readily No visible escape.

Rating of Flow Visualization: Pass

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

Tri-Color Containment Tests

Design Opening

The design opening is the working height that the system was designed for, in this case there are sash stops at ~14in, this should be the position the sash is open to when working vertically.

Rating of Challenge: Pass-Good

Vertical Rapid Sash movement

Opening and closing the sash can cause loss of containment especially at the edges of the sash.

Rating of Challenge: Pass-Good

Horizontal Rapid Sash movement

Combo sashes over unique challenges since they create vertical vortices. Combo sashes are prone to loss of containment along the vertical edges of the sash glass.

Rating of Challenge: Pass-Good

Vertical Walk By

Pedestrian traffic in front of the hood can draw chemicals out of the hood.

Rating of Challenge: Pass-Fair

Horizontal Walk By

Pedestrian traffic in front of the hood can draw chemicals out of the hood, tested with horizontal openings to show real world uses.

Rating of Challenge: Pass-Fair

Vertical Material Exiting Hood

Removing items from the hood can cause chemicals to follow the item out of the hood.

Rating of Challenge: Pass-Fair

Horizontal Material Exiting Hood

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

Removing items from the hood can cause chemicals to follow the item out of the hood, testing with horizontal openings to show real world uses.

Rating of Challenge: Pass-Fair

Tracer Gas Testing Results

Tracer Gas Test Report - Vertical Sash Orientation

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

Date: Wed Jul 30 2025

Fume Hood Specifications

ID	Width	Height
[redacted]	67	15

Tracer Gas Test (Containment Performance)

Position	Tracer Gas Avg.	Release Rate	Performance Rating (Peak Reading)
Left	0.008 ppm	4.0 Lpm	AI 0.023
Center	0.009 ppm	4.0 Lpm	AI 0.031
Right	0.007 ppm	4.0 Lpm	AI 0.042

Peripheral Scan Test

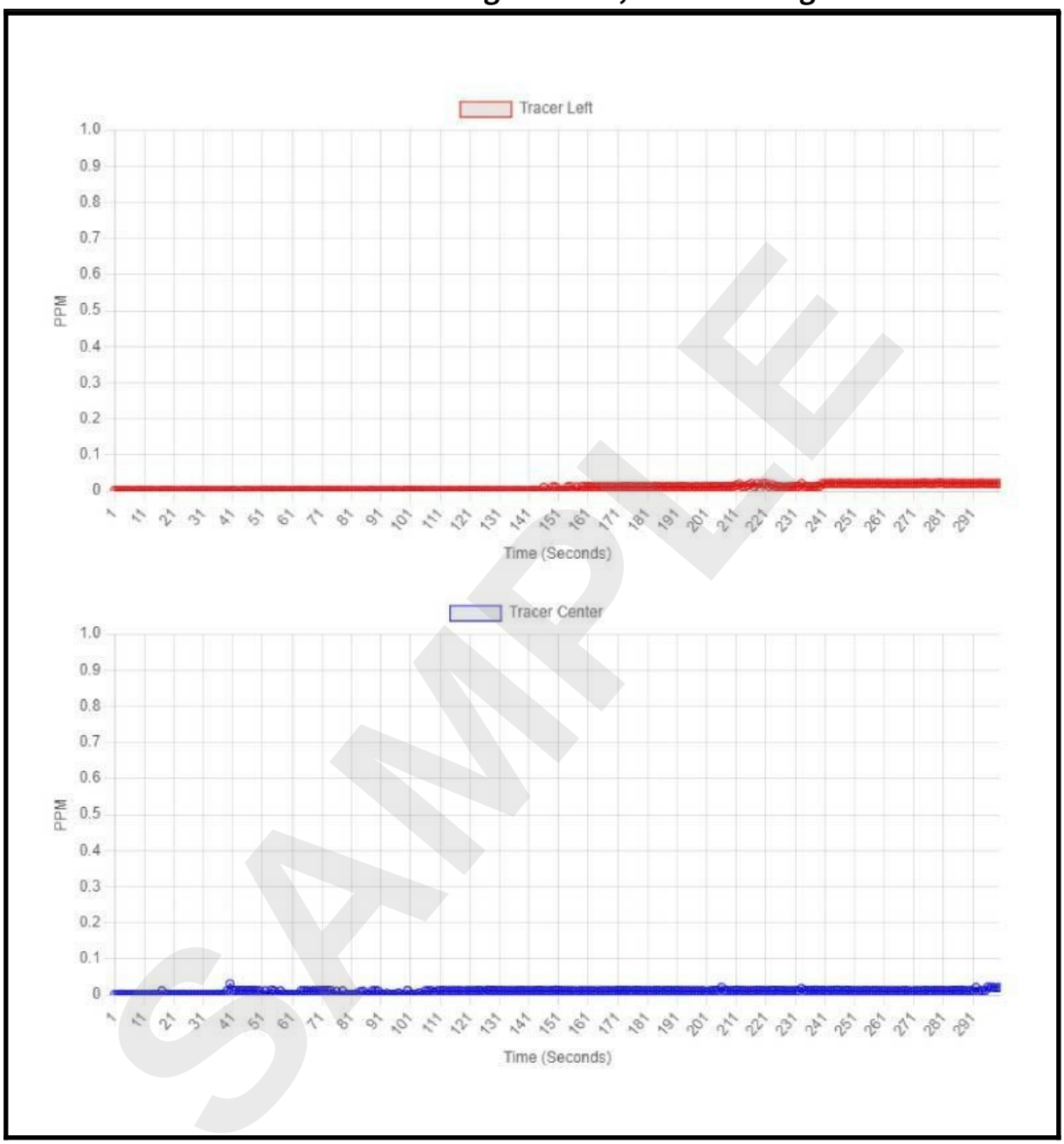
Test Methodology	Peak Reading
AI	0.06 ppm

Sash Movement Containment Test

Highest Rolling Average	Rating
0.062 ppm	SME-AI 0.062

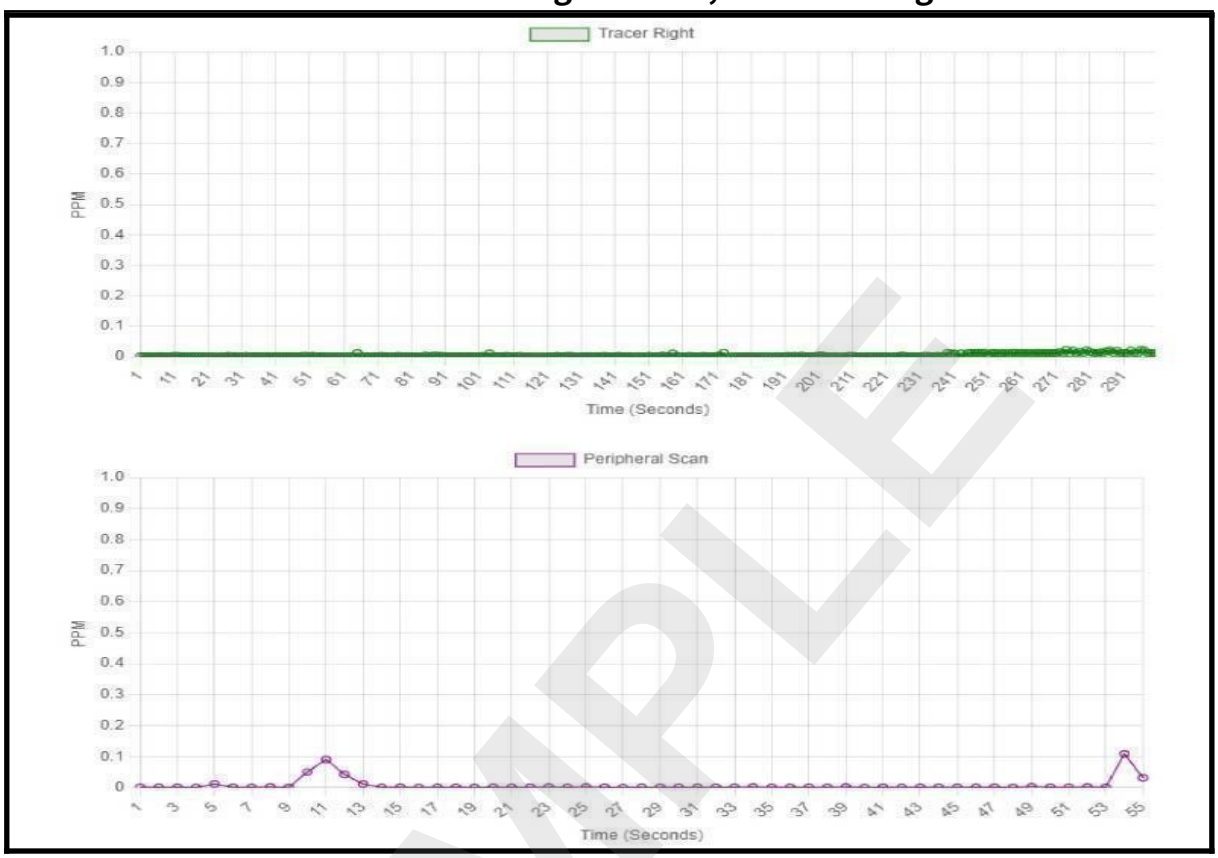
SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com



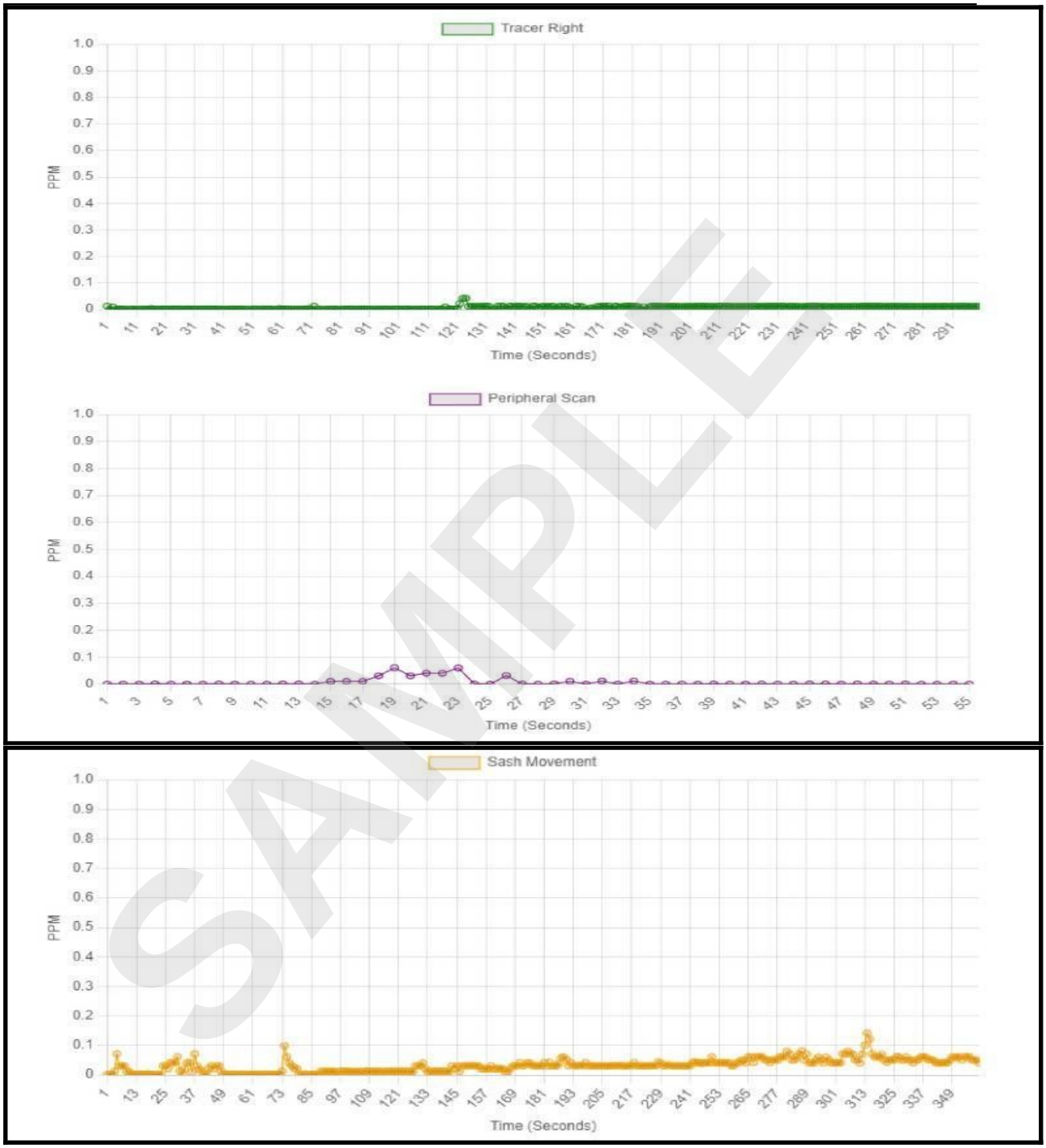
SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com



SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com



SAMPLE

Rating of Tracer Gas: Pass
Rating of Periphery Scan: Pass
Rating of Sash Movement: Pass

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

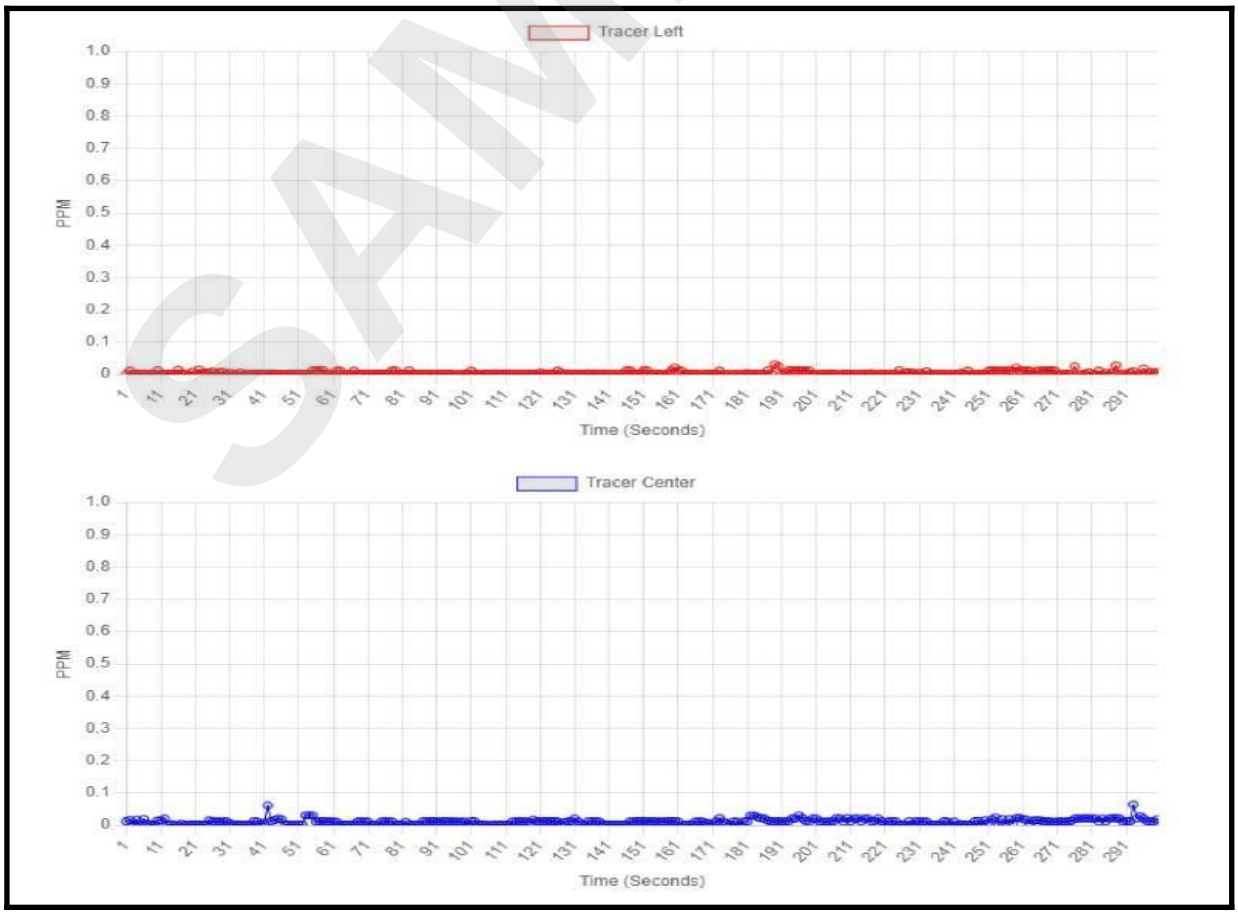
Tracer Gas Test Report - Horizontal Sash Orientation

Fume Hood Specifications

ID	Width	Height
[redacted]	16	24

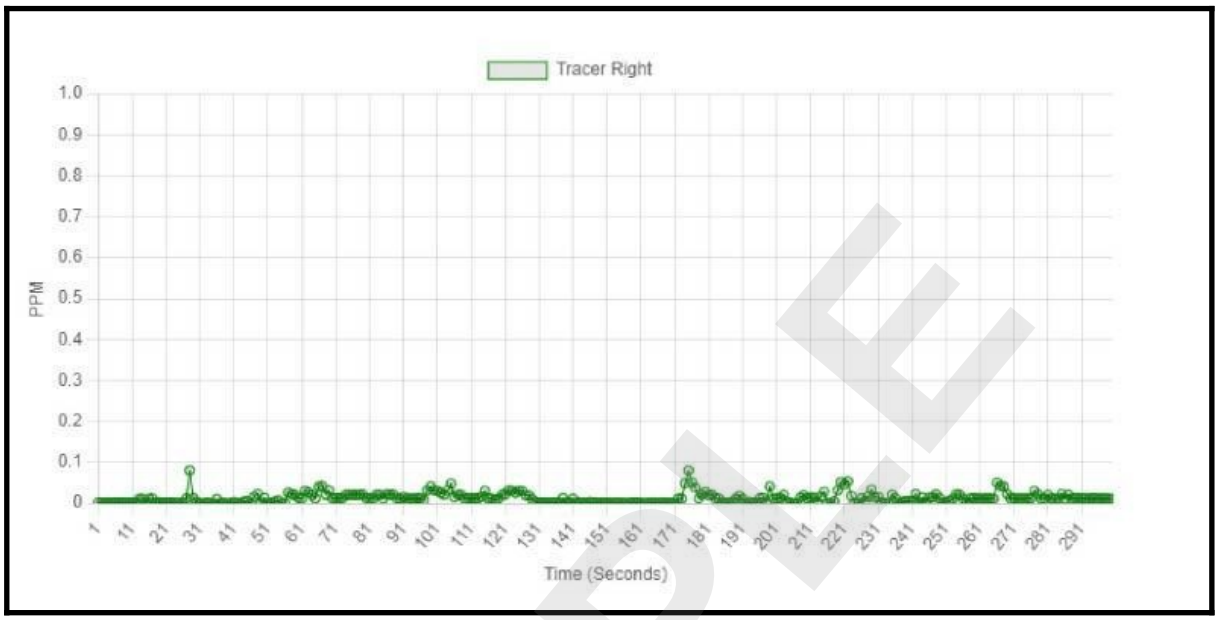
Tracer Gas Test (Containment Performance)

Position	Tracer Gas Avg.	Release Rate	Performance Rating (Peak Reading)
Left	0.004 ppm	4.0 Lpm	AI 0.031
Center	0.011 ppm	4.0 Lpm	AI 0.064
Right	0.012 ppm	4.0 Lpm	AI 0.080



SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com



Rating of Tracer Gas : Pass
Rating of Periphery Scan: N/A
Rating of Sash Movement: N/A

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

LABORATORY LAYOUT AND HOOD LOCATIONS

Put your mechanical drawings and lab layout here.

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

Appendix A Reference Photos



If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com



If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com



If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com

Appendix B Calibration and Certification Certificates



FUME HOOD CERTIFIED

CALIBRATION CERTIFICATE

Company: Fume Hood Certified

CERTIFICATE NUMBER:

Date: 20 July 2025 Date due: 20 July 2026

Instrument Type: Q200 SF6 Leak detector Serial No:

Calibrator Name: Alex Albright Signature

COMMENTS

This instrument was calibrated using 1PPM SF6 Calibration Gas

1) The argon and sample streams were adjusted to meet manufacturer specification.
2) The device frequency was confirmed within the manufacturer range.
3) The resulting calibration factor was **0.920**

The acceptable range is 0.75 to 1.25 with the target being 1.0



FUME HOOD CERTIFIED

CERTIFIED FUME HOOD TESTER

Alex Albright
Fume Hood Certified

Has Met All The Requirements for Certified Status In

Fume Hood Testing In Accordance with ASHRAE 110 – 2016

FUME HOOD CERTIFIED

SAMPLE

If there are questions about this report, please contact:
Alex Albright
Fume Hood Certified, LLC
Tel: (623) 226-8260 Email: alex@fumehoodcertified.com