



Fisher American LLC
Fisheramerican.com
800-419-1900

Face Velocity / Airflow Tests

UL Test Report For:
Fisher American LLC



IN ACCORDANCE WITH UL 1805 or
AS TO FIRE, ELECTRICAL AND MECHANICAL
HAZARDS

CERTIFICATE OF COMPLIANCE

Certificate Number MH62660
Report Reference MH62660-20200728
Issue Date 2020-JULY-31

Issued to: National Laboratory Sales
2501 9th Street
Rockford IL 61107

**This certificate confirms that
representative samples of**

LABORATORY HOODS AND CABINETS

Laboratory Hood, Models w-dd-t-xxxx , where “w” can be 3, 4, 5, 6 or 8 in width in feet; “dd” can be 32, 38, 48 or 72 in depth in inches; where “t” can be E, S or W denoting the worksurface as Epoxy, Solid or Walk-in; where “xxxx” denote the valve types.

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 1805, LABORATORY HOODS AND CABINETS.
Additional Information: See the UL Online Certifications Directory at <https://iq.ulprospector.com> for additional information.

This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.



Bruce Mahrenholz, Director North American Certification Program
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>



(FILE IMMEDIATELY AFTER AUTHORIZATION PAGE)

CLASSIFICATION MARK

COMPOSITION AND ELEMENT:

The Classification Mark shall consist of the following and shall appear on the product container packaging or as indicated in the Guide Information for the CCN.

(APPROPRIATE PRODUCT IDENTITY)
IN ACCORDANCE WITH UL 1805 or
AS TO FIRE, ELECTRICAL AND MECHANICAL
HAZARDS ONLY
MH62660

MARKING:

The following symbol must be located adjacent to or in close proximity to the regular Classification Mark as shown above.



The minimum height of the registered trademark symbol ® shall be 3/64 of an inch. When the overall diameter of the UL Mark is less than 3/8 of an inch, the trademark symbol may be omitted if it is not legible to the naked eye.

PROCUREMENT:

The manufacturer may reproduce the mark or obtain it from a UL authorized supplier.

INDEX

| Product | USC | CNC | Section |
|--|-----|-----|---------|
| Models w-dd-t-xxxx , where "w" can be 3, 4, 5, 6 or 8 in width in feet; "dd" can be 32, 38, 48 or 72 in depth in inches; where "t" can be E, S or W denoting the worksurface as Epoxy, Solid or Walk-in; where "xxxx" denote the valve types | Yes | No | 1 |

Bench Top Fume Hoods

General - The general design, shape and arrangement of parts shall be as illustrated except where variations are specifically described. Refer to Ills. 1-4 for mechanical drawings.

1. Outer Hood Enclosure - 16 and 18 Ga. painted or galvanized steel. Refer to Ills. 1 - 4 for overall dimensions. Bypass vent openings are provided on the hood front top face as noted: 4 ft.: 6 columns of 10 slots where each slot measures 5 by 0.2 inches; 6 ft.: 10 columns of 10 slots where each slot measures 5 by 0.2 inches; 8 ft.: 10 columns of 10 slots where each slot measures 5 by 0.2 inches; 10 ft.: 2 sets of 7 columns of 10 slots where each slot measures 5 by 0.2 inches.
2. Liners/Baffles: R/C (QMFZ2.E31703) Type CR-900 manufactured by Polyply Composites LLC, 4.6-5.0 mm thick (Evaluated for flame spread, chemical resistance, flame impingement and impact resistance in accordance with UL1805. Refer to Illustrations 1 - 4 for baffle positions and dimensions and air gaps.
3. Exhaust Outlet - 4 ft. hoods: one 6 x 15 in. rectangular opening; 6 ft. hoods: one 6 x 23 in. rectangular opening; 8 ft. hoods: one 6 x 36 in. rectangular opening; 10 ft. hoods: two 6 x 19.5 in. rectangular opening where each opening is spaced 29.75 in. from each outer edge of hood.
4. Service Fixtures and Controls - (Optional) - Constructed of brass. May be provided for air, water, steam, vacuum, gas, etc. Nozzles are located at least 6 in. from face of hood. Handles, valves and copper tubing can be provided for installation on site. All controls are located on side posts, exterior to the hood. Handles are marked with color-coded plastic inserts identifying the particular service.
5. Duplex Receptacle - Listed/Certified, rated 120 or 240 V, 20 A. Mounted in Listed/Certified 2-1/2 in. deep switch box secured to enclosure with screws provided with Listed/Certified faceplate.
6. Light Switch - Listed/Certified, rated 120/277 V, 20 A. Mounted in Listed/Certified 2-1/2 in. deep switch box secured to enclosure with screws provided with Listed/Certified faceplate.
7. Informational Marking - For pre-wired units-Consists of the following: Company name, model number, date code, and electrical ratings including volts, duplex current or watts, and cabinet current or watts.

For units not prewired, units consists of the following: company name, model number, date code and "All Hoods not Prewired at National Laboratories are to be wired at site in accordance with all applicable NEC and local codes."
8. Cabinet (Optional) - May or may not be provided with painted steel cabinet construction. Refer to Ills. 1 - 4 for dimensions when provided.
9. Sash - The hood sash glazing material is of laminated safety glass or tempered type, complying with ANSI Z97.1. It is free-moving, and counterbalanced to remain stationery at any position.

Walk-In Fume Hoods

General - Walk-In Fume Hoods are constructed identically as noted for Bench Top Fume Hoods except where explicitly noted below. Refer to Ills. 5 - 7 for mechanical drawings.

1. Outer Hood Enclosure - 16 and 18 Ga. painted or galvanized steel. Refer to Ills. 5 - 7 for overall dimensions. Bypass vent openings are provided on the hood front top face with 14 columns of 9 slots where each slot measures 5 by 0.2 inches.
2. Liners/Baffles: R/C (QMFZ2.E31703) Type CR-900 manufactured by Polyply Composites LLC, 4.6-5.0 mm thick (Evaluated for flame spread, chemical resistance, flame impingement and impact resistance in accordance with UL1805. Refer to Illustrations 5 - 7 for baffle positions and dimensions and air gaps.
3. Exhaust Outlet - 6 ft. hoods: one 6 x 23 in. rectangular opening; 8 ft. hoods: two 6 x 19.5 in. rectangular opening where each opening is spaced 24.625 in. from each outer edge of hood; 10 ft. hoods: two 6 x 23 in. rectangular opening where each opening is spaced 36 in. from each outer edge of hood.
4. Service Fixtures and Controls - (Optional) - Constructed of brass. May be provided for air, water, steam, vacuum, gas, etc. Nozzles are located at least 6 in. from face of hood. Handles, valves and copper tubing can be provided for installation on site. All controls are located on side posts, exterior to the hood. Handles are marked with color-coded plastic inserts identifying the particular service.
5. Duplex Receptacle - Listed/Certified, rated 120 or 240 V, 20 A. Mounted in Listed/Certified 2-1/2 in. deep switch box secured to enclosure with screws provided with Listed/Certified faceplate.
6. Light Switch - Listed/Certified, rated 120/277 V, 20 A. Mounted in Listed/Certified 2-1/2 in. deep switch box secured to enclosure with screws provided with Listed/Certified faceplate.
7. Informational Marking - For pre-wired units-Consists of the following: Company name, model number, date code, and electrical ratings including volts, duplex current or watts, and cabinet current or watts.

For units not prewired, units consists of the following: company name, model number, date code and "All Hoods not Prewired at National Laboratories are to be wired at site in accordance with all applicable NEC and local codes."

8. Cabinet (Optional) - Not provided.
9. Sash - The hood sash glazing material is of laminated safety glass or tempered type, complying with ANSI Z97.1. It is free-moving, and counterbalanced to remain stationery at any position.

SERVICE CONTROL CENTER

1. Duplex Receptacles (Optional) - Listed/Certified, rated 125 or 250 V, 20 A. Secured with screws, located external to the hood.

Alternate - GFCI Receptacles- Listed/Certified rated 125 or 250 V 20 Amps. Located internal to the hood.
3. Receptacle - Listed/Certified, rated 125 or 250 V, 20 A. Secured with screws, located external to the hood.
4. LED Light Fixture - Listed (QOVZ) micro LED Light rated 120 Vac, 60 Hz, 4 W.
5. Light Cover - The light cover is of laminated safety glass or tempered type, complying with ANSI Z97.1. Secured via R/C (QOQW2) silicone RTV adhesive rated 80 deg. C min.
6. Internal Wiring - R/C (AVLV2)/Certified AWM rated 300 V min, 16 Ga., 90 deg. C min.
7. Junction Box - Listed/Certified 4 in. square box, 2-1/8 in. deep junction box. Provided with a Listed cover.

Listed/Certified cut out boxes (use to enclose control circuit components).
8. Conduit - Listed/Certified Type MC armored cable rated 600 V, 90 deg. C provided with 12 AWG
9. Conduit Fittings - Listed/Certified types suitable for knockout trade sizes of junction box.

Number of pages in this package 13
 (Fill in when using printed copy as record)

| CLIENT INFORMATION | |
|--------------------|--|
| Company Name | National Laboratory Sales |
| Address | 2501 9 th St. Rockford, IL 61107 USA |

| AUDIT INFORMATION: | | | |
|--|------------------|---|--|
| Description of Tests | Per Standard No. | <input checked="" type="checkbox"/> UL 1805 <input type="checkbox"/> CSA Z316.5 | Edition / Revision / Date First Third |
| <input checked="" type="checkbox"/> Tests Conducted by + | David Hart | | David Hart |
| | Printed Name | | Signature |
| <input type="checkbox"/> UL Staff witnessing testing (WTDP only) | | | |
| <input type="checkbox"/> Authorized Signatory (CTDP, TPTDP, TCP) | Printed Name | | Signature, and include date for CTDP, TPTDP, TCP |
| Reviewed and accepted by qualified Project Handler | David Hart | | David Hart |
| | Printed Name | | Signature |

| <input checked="" type="checkbox"/> TESTS TO BE CONDUCTED: | | | |
|--|------------|---|--|
| Test No. | Done | Test Name | <input type="checkbox"/> Comments/Parameters <input type="checkbox"/> Tests Conducted by ++ |
| 1 | 2019-06-20 | Resistance To Impact - Sash Frame And Track | |
| 2 | 2019-06-20 | Face Velocity Profile | |
| 3 | 2019-06-20 | Air Flow Direction | |

~~Tests conducted in accordance with _____ that were considered representative of the same tests required by _____ are identified with dual paragraph/clause references in the title of each test on the individual datasheets. Where test names differ or additional tests were conducted in accordance with _____, they are identified by the standard and paragraph/clause information enclosed by parenthesis.~~

Test Equipment- See "TEST EQUIPMENT INFORMATION"
 Samples - See "TEST SAMPLE IDENTIFICATION"

Instructions -

+ - When all tests are conducted by one person, printed name and signature can be inserted here instead of including printed name and signature on each page containing data. Must indicate number of pages in the data package.
++ - When a test conducted by more than one person, printed name and signature of person conducting the test can be inserted next to the test name instead of including printed name and signature on each page containing data. Must indicate number of pages in the data package.

Special Instructions -

[X] Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be recorded at the time the test is conducted.

Ambient Temperature, C 15-35 Relative Humidity, % ≤75 % Barometric Pressure, mBar ±

~~[] No general environmental conditions are specified in the Standard(s) or have been identified that could affect the test results or measurements.~~

RISK ANALYSIS RELATED TO TESTING PERFORMANCE:

The following types of risks have been identified. Take necessary precautions. This list is not all inclusive.

| | |
|---|---|
| <input type="checkbox"/> Electric shock | <input type="checkbox"/> Radiation |
| <input type="checkbox"/> Energy related hazards | <input type="checkbox"/> Chemical hazards |
| <input type="checkbox"/> Fire | <input type="checkbox"/> Noise |
| <input type="checkbox"/> Heat related hazards | <input type="checkbox"/> Vibration |
| <input type="checkbox"/> Mechanical | <input type="checkbox"/> Other (Specify)___ |

CONSTRUCTION COMPLIANCE REVIEW:

The sample was reviewed for compliance with the construction requirements in the following Standard and compliance with applicable construction requirements is noted below.

Standard UL 1805 Edition 1

| Clause/Par. Reference and Construction Requirement | Comply | | | COMMENTS |
|--|--------|----|-----|----------|
| | Yes | No | N/A | |
| [X] The sash moved freely and was counterbalanced so as to remain stationary when stopped at any position. | X | | | |
| [X] The sash glazing material conforms to the performance specifications noted in the Standard for Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test, ANSI Z97.1. | X | | | |
| [X] The bypass opening was shielded to impede or deflect flying glass or flaming debris. | X | | | |
| [X] The work surface was constructed to contain low volume spillage and prevent it from flowing over the front and from seeping between the work surface and hood walls. | X | | | |
| [X] Hood blower is not integral to the hood. | X | | | |
| [X] Service fixture controls are located external to the hood and within easy reach. The fixtures were solvent and corrosion resistant. | X | | | |
| | | | | |

RESISTANCE TO IMPACT - SASH FRAME AND TRACK:

UL 1805, Cl. 16.2

METHOD

Samples of the sash frame and track were installed on the hood in the normally closed position and subjected to this test. When a frameless sash is used, the load is to be applied directly to the sash glazing material. The force is to be applied from the exterior of the hood. The samples were subjected to a static load of 25 lb (111.2 N).

RESULTS

The sash retaining system ~~was~~ [was not] disengaged from its support system.

Conducted on Samples 1, 2 and 3.

FACE VELOCITY PROFILE:

UL 1805, Cl. 17.4

FACE VELOCITY TEST:

CSA Z316.5, Cl. 9.4.1

METHOD

The face velocity profile shall be determined for hoods and cabinets as noted below. The face velocity profile shall be used to characterize the performance of the device as manufactured.

The test facility exhaust system shall be adjusted to provide the minimum average face velocity or volumetric flow rate recommended by the installation and operating instructions. Any baffles shall be adjusted to give maximum airflow.

The hood or cabinet shall be tested with the sash in the full open position. When a combination sash is provided, the hood shall also be tested with horizontal panels adjusted to provide maximum opening.

Exception: Hoods or cabinets intended for use only with the sash partially opened, and equipped with an audible alarm to indicate when the sash is not in the correct position, shall be tested with the sash positioned for the maximum normal opening.

Face velocity readings shall be taken with a calibrated thermo-anemometer on the centers of a grid of no larger than 1 square foot (929 cm²). The individual air velocities, average face velocity and total volumetric flow rate shall be calculated and reported.

Note: When air is drawn through the hood or cabinet from other locations in addition to the face of the hood, the calculation for total volumetric flow rate shall include the additional air. When necessary, the total volumetric flow rate shall be determined based on the flow rate of the exhaust.

Measurements shall then be conducted in accordance with the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) standards for air velocity measurements in round or rectangular ducts.

FACE VELOCITY PROFILE (CONT'D):

UL 1805, Cl. 17.4

FACE VELOCITY TEST:

CSA Z316.5, Cl. 9.4.1

RESULTS

Background Crosscurrents: Crosscurrents in the area 5' in front of hood [are] ~~are not~~ below 30 fpm. Measured crosscurrent: 16 fpm.

| | | | | | | | | |
|--|------|------|------|------|------|-----|--|--|
| Model: 8 ft bench - Sample 1 | | | | | | | | |
| Specified Face Velocity: 100 ft/min. minimum | | | | | | | | |
| Sash Opening: 18 in. vertical | | | | | | | | |
| 12 in. | 119 | 123 | 117 | 110 | 109 | 106 | | |
| 6 in. | 119 | 113 | 113 | 104 | 106 | 101 | | |
| | 1 ft | 2 ft | 3 ft | 4 ft | 5 ft | 6ft | | |

Average: 104 ft/min

| | | | | | | | | |
|--|--------|--------|--------|--|--|--|--|--|
| Model: 4 ft bench - Sample 2 | | | | | | | | |
| Specified Face Velocity: 100 ft/min. minimum | | | | | | | | |
| Sash Opening: 18 in. vertical | | | | | | | | |
| 12 in. | 96 | 95 | 94 | | | | | |
| 6 in. | 93 | 91 | 89 | | | | | |
| | 10 in. | 20 in. | 30 in. | | | | | |

Average: 93 ft/min

| | | | | | | | | |
|--|-------|--------|--|--|--|--|--|--|
| Model: 8 ft walk in - Sample 3 | | | | | | | | |
| Specified Face Velocity: 100 ft/min. minimum | | | | | | | | |
| Sash Opening: 18 in. horizontal | | | | | | | | |
| 5 ft. | 100 | 102 | | | | | | |
| 4 ft. | 108 | 100 | | | | | | |
| 3 ft. | 105 | 102 | | | | | | |
| 2 ft. | 95 | 98 | | | | | | |
| 1 ft. | 95 | 94 | | | | | | |
| | 6 in. | 12 in. | | | | | | |

Average: 100 ft/min

Ambient Temp: 19.8 deg. C, Ambient Humidity : 65.0% Rh (NBK64523)

ULS-01805-OGOY-DataSheet-2001

Form Issued: 2002-12-16

Form Page 9

Form Revised: 2016-08-17

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DOWNFLOW VELOCITY PROFILE:

UL 1805

AIR FLOW DIRECTION: (LOCAL GENERATION)

UL 1805, Cl. 17

METHOD

A visible "smoke" shall be produced by smoke bottles, smoke tubes, smoke sticks or equivalent means. This smoke shall be able to show airflow patterns within the hood without generating such volume or momentum that affects the observations.

The operation of the bottom bypass airfoil shall be tested by running the smoke under the airfoil. Smoke shall be exhausted smoothly and not be entrained in the vortex at the top of the hood.

A stream of smoke shall be discharged from the bottle along both walls and the floor of the hood in a line parallel to the hood face and 6 in. (150mm) behind the face of the hood and along the top of the face opening.

A stream of smoke shall be discharged from the bottle in an 8 in. (200mm) diameter circle on the back of the hood. Air movement toward the face of the hood shall be defined as reverse airflow, and lack of air movement shall be defined as dead air space. Smoke shall be generated at the worktop of the hood and along all equipment in the hood. All smoke shall be carried to the back of the hood and exhausted. Airflow patterns and time for hood clearance shall be observed and noted.

AIR FLOW DIRECTION (LOCAL GENERATION) (CONT'D):

UL 1805, Cl. 17

RESULTS

There ~~was~~ [was no] indication of reverse flow and/or backflow across the plane of the hood face. All smoke [was] ~~[was not]~~ carried to the back of the hood and exhausted. The smoke ~~was~~ [was not] entrained in the vortex at the top of the hood. There ~~was~~ [was not] any evidence of dead air space.

Sample 1

| Smoke Delivery Location | Airflow Pattern Observations | Hood Clearance (s) |
|---|---|--------------------|
| Under Airfoil | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 5 seconds |
| Along walls and floor of hood parallel to face of hood | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 3 seconds |
| Along walls and floor of hood 6 in. behind face of hood | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 3 seconds |
| Back of hood (8 in. diameter circle) | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 2 seconds |

Sample 2

| Smoke Delivery Location | Airflow Pattern Observations | Hood Clearance (s) |
|---|---|--------------------|
| Under Airfoil | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 6 seconds |
| Along walls and floor of hood parallel to face of hood | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 4 seconds |
| Along walls and floor of hood 6 in. behind face of hood | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 3 seconds |
| Back of hood (8 in. diameter circle) | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 2 seconds |

Sample 3

| Smoke Delivery Location | Airflow Pattern Observations | Hood Clearance (s) |
|---|---|--------------------|
| Under Airfoil | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 7 seconds |
| Along walls and floor of hood parallel to face of hood | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 4 seconds |
| Along walls and floor of hood 6 in. behind face of hood | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 6 seconds |
| Back of hood (8 in. diameter circle) | Smoke exhausted smoothly with no evidence of reverse flow or smoke entrained in a vortex. | 3 seconds |

Tested by: David Hart

David Hart

Date 2019-06-20

Printed Name

Signature

AIR FLOW DIRECTION (LARGE VOLUME GENERATION):

UL 1805, Cl. 17

METHOD

A suitable source of smoke or other visual challenge (e.g. theatrical smoke generator or 30 sec. smoke bombs) shall be used to release a large volume in the center of the sash opening on the work surface 6 in. (150 mm) inside the rear edge of the sash.

NOTE: Some smoke sources generate a jet of smoke that produces an unacceptably high directional component to the challenge to the hood. Care is required to ensure that the generator does not disrupt the hood performance, leading to erroneous conclusions.

RESULTS

There ~~was~~ [was not] a release of smoke from the hood that is steady and visible.

| Airflow Pattern Observations | Hood Clearance (s) |
|--|--------------------|
| 8 foot benchtop - Sample 1 Smoke flowed uniformly along sash face when closed and rolled to the top in a vortex at the top of the hood. While the sash was opened the smoke cleared in the open area (work area) immediately. | 8 sec. |
| 8 foot walk in - Sample 3 Smoke flowed uniformly along sash face when closed and rolled to the top in a vortex at the top of the hood. While the sash was opened the smoke cleared in the open area (work area) immediately. There was some smoke that can escape the face when the sash bottom is pushed in and out but the smoke was sucked back into the hood and exhausted normally. | 15 sec. |
| 4 foot benchtop - Sample 2 Smoke flowed uniformly along sash face when closed and rolled to the top in a vortex at the top of the hood. While the sash was opened the smoke cleared in the open area (work area) immediately. | 9 sec. |

Conducted on Samples 1, 2 and 3.

Project No. 4788211819

File MH62660

Page 13

Tested by: David Hart

David Hart

Date 2019-06-20

Printed Name

Signature

END OF DATASHEET PACKET