UL 1805

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Laboratory Hoods and Cabinets

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UL Standard for Safety for Laboratory Hoods and Cabinets, UL 1805

First Edition, Dated June 7, 2002

Revisions: This Standard contains revisions through and including June 2, 2006.

Summary of Topics

Revisions are being issued to replace the term ″light fixture″ with the term ″luminaire.″

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Text that has been changed in any manner is marked with a vertical line in the margin. Changes in requirements are marked with a vertical line in the margin and are followed by an effective date note indicating the date of publication or the date on which the changed requirement becomes effective.

The revised requirements are substantially in accordance with UL's Bulletin(s) on this subject dated February 10, 2006. The bulletin(s) is now obsolete and may be discarded.

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New product submittals made prior to a specified future effective date will be judged under all of the requirements in this Standard including those requirements with a specified future effective date, unless the applicant specifically requests that the product be judged under the current requirements. However, if the applicant elects this option, it should be noted that compliance with all the requirements in this Standard will be required as a condition of continued Listing, Classification and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

This Standard consists of pages dated as shown in the following checklist:

Page	Date
1-3	June 2, 2006
4-5	June 7, 2002
6	June 2, 2006
7-11	June 7, 2002
12-12B	June 2, 2006
13-20	June 7, 2002

No Text on This Page

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1

UL 1805

Standard for Laboratory Hoods and Cabinets

First Edition

June 7, 2002

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements.

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CONTENTS

INTRODUCTION

CONSTRUCTION

PERFORMANCE

MARKING

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INTRODUCTION

1 Scope

1.1 These requirements apply to laboratory hoods and cabinets intended to provide an enclosed countertop work area with exhaust for containment and removal of vapors, mists, gases, and particulate matter from the work area.

1.2 These requirements do not cover ductless hoods (i.e., hoods that recirculate air back to room environment after filtering) or gloveboxes.

1.3 These products are investigated for fire, electrical and mechanical risk of injuries only. A limited number of tests are conducted for minimal air flow capability. It remains for the user to determine that the hood performance, as confirmed by the requirements in this standard, meets the needs of the user. These needs depend on several factors, including installation with proper exhaust equipment, location within the room, the type of material being handled and the method in which the material is being handled. Also, suitability for use with perchloric acid or radiological materials is not investigated.

1.4 Requirements for the installation of laboratory hoods are included in the Standard for Fire Protection for Laboratories Using Chemicals, NFPA 45 and in the Method of Testing Performance of Laboratory Fume Hoods, ASHRAE 110.

1.5 Requirements for the installation of piped gas systems are contained in the following standards:

a) National Fuel Gas Code, NFPA 54,

b) Liquefied Petroleum Gas Code, NFPA 58,

c) Gaseous Hydrogen Systems at Consumer Sites, NFPA 50A,

d) Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes, NFPA 51.

2 Glossary

2.1 For the purpose of this Standard, the following definitions apply:

2.2 AUXILIARY AIR – Supplemental air delivered to a laboratory hood to reduce room air consumption.

2.3 AUXILIARY AIR HOOD – A laboratory hood with an external air plenum at the top of the laboratory hood. The auxiliary air plenum provides a makeup air stream compromised of unconditioned or only minimally conditioned outside air to substantially reduce the amount of conditioned room air exhausted by the lab hood.

2.4 BAFFLE – A panel or panels located at the rear of the hood interior which aid in distributing the flow pattern of air moving into and through the hood.

2.5 BIOLOGICAL SAFETY CABINET – An enclosed countertop work area for handling and containment of biological materials. A cabinet also intended to serve as a laboratory hood shall meet the requirements for laboratory hoods.

2.6 BYPASS – An airflow-compensating opening that maintains a relatively constant volume exhaust through a laboratory hood regardless of sash position.

2.7 CAPTURE VELOCITY – The air velocity, at a point in space of sufficient magnitude to overcome room air current and draw the air and any contaminants at that point into the hood.

2.8 CFM – Cubic foot per minute.

2.9 COMBINATION SASH – A sash that has a protective shield that moves vertically, containing two or more transparent panels, which slide horizontally.

2.10 DUCTLESS HOOD – A lab hood that is not connected to an exhaust system which discharges the lab hoods exhaust outdoors. Rather, a ductless lab hood incorporates an exhaust fan and air as an integral part of the lab hood and discharges the exhaust directly into the room.

2.11 EXHAUST AIR – The air that is removed from an enclosed space and discharged to the atmosphere.

2.12 FACE (OF HOOD) – The hood opening or the plane of the inside surface of the sash.

2.13 FACE VELOCITY – The air velocity at the plane of and perpendicular to the opening of an exhaust hood.

2.14 FPM – Feet per minute.

2.15 GLOVEBOX – A controlled environment work enclosure providing a primary barrier from the work area. The operations are performed through sealed gloved openings, to protect the user, the environment and/or the product.

2.16 HORIZONTAL SASH – A moveable panel or panels set in the hood entrance used to form a protective shield that is only able to be moved from side to side.

2.17 HOOD INTERIOR – Includes the walls, ceiling, baffles, sash, and work surface.

2.18 LABORATORY HOOD – An enclosed countertop work area with a sash or sashes that move vertically and/or horizontally to close the opening. Laboratory hoods need to be provided with an exhaust to remove vapors, mists, gases, and particulate matter from the work area. Adjustable or fixed internal baffles may be provided to obtain proper airflow distribution across the open face. Laboratory hoods may also be equipped with utilities and lighting.

2.19 LAMINAR FLOW CABINET – A ventilated, partially enclosed cabinet using laminar air flow and intended to provide "clean" air flow over the work surface. A cabinet also intended to serve as a laboratory hood shall meet the requirements for laboratory hoods.

2.20 PERCHLORIC ACID HOOD – A lab hood constructed and specifically intended for use with perchloric acid or other reagents that may form flammable or explosive compounds with organic materials of construction.

2.21 SASH – A moveable panel or panels set in the hood entrance used to form a protective shield.

2.22 VARIABLE VOLUME HOOD – A hood designed so the exhaust volume is varied in proportion to the opening of the hood face by changing the speed of the exhaust blower or by operating a damper or control valve in the exhaust duct that controls the air volume.

2.23 VERTICAL SASH – A moveable panel or panels set in the hood entrance used to form a protective shield that is only able to be moved up and down.

2.24 WALK-IN HOOD (FLOOR MOUNTED HOOD) – A larger size lab hood with sash and/or door arrangement that enables access from the floor to the top of the hood interior. Walk-in lab hoods enable larger equipment and apparatus (e.g. equipment on carts, gas cylinders, etc.) to be more readily put in and set up within the lab hood.

2.25 WORK SURFACE – The area in a laboratory hood where test equipment is located and where test work is performed.

3 General

3.1 Units of measurement

3.1.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

3.2 Components

3.2.1 Except as indicated in 3.2.2, a component of a laboratory hood covered by this standard shall comply with the requirements for that component.

3.2.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

3.2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

3.2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

3.3 References

3.3.1 When a designation for a test method is followed by an alternate or equivalent designation, in parentheses, the latter method is considered technically equivalent, though not necessarily identical, and might yield somewhat different numerical test results than those obtained with the original test method.

3.3.2 The following publications are specified in this standard. Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

a) ANSI/AIHA Z9.5, Laboratory Ventilation

b) ASHRAE 110, Method of Testing Performance of Laboratory Fume Hoods

c) NFPA 45, Fire Protection for Laboratories Using Chemicals

d) NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials

e) NSF 29, Class II (Laminar Flow) Biohazard Cabinetry

f) SEFA 1.2, Laboratory Fume Hoods: Recommended Practices

4 Installation and Operating Instructions

4.1 A copy or draft of the operating and installation instructions intended to accompany each product as produced, is to be used as a guide in the examination and test of the product.

4.2 Instructions shall be provided with each hood and shall include directions and information adequate for attaining proper and safe installation.

4.3 The instructions shall include particular details concerning:

a) The parts received and the steps for installing the hood, including methods of support and recommended practices of sealing, butting and mating joints to prevent seepage of liquid spilled on the work surface. Bolts, screws, cements or other fastening means needed to secure parts are to be specified.

b) Recommended practices for installing and maintaining the hood and related components such as ducting, dampers, blowers and exhaust stacks.

4.4 The instructions shall make reference to the manufacturer's catalog or model designations of the hood(s) covered and shall include the manufacturer's name and address.

CONSTRUCTION

5 General

5.1 Flammability

5.1.1 The hood interior, and the exhaust system or ducting integral to the hood shall be constructed of nonflammable materials or materials having a flame spread index of 25 or less when tested in accordance with the Standard Method of Test of Surface Burning Characteristics of Building Materials, NFPA 255. The materials shall be tested in the same form and thickness as used in the hood.

Exception: Hood interiors are not prohibited from being constructed of materials having a flame spread index greater than 25, when the interior of the hood is provided with automatic fire protection in accordance with the Standard on Fire Protection for Laboratories Using Chemicals, NFPA 45, paragraph 6.10.2.

5.1.2 The materials used in the hood interior shall also comply with the requirements described in the Small-Flame Impingement Test, Section 14.

5.2 Corrosion protection

5.2.1 Materials used to construct the hood interior, structural components, components of the sash support system, and the exhaust system or ducting integral to the hood or cabinet shall be protected against corrosion or inherently corrosion resistant.

5.3 Chemical resistance

5.3.1 Polymeric materials used to construct the hood interior and the exhaust system or ducting integral to the hood shall be resistant to chemical attack, as specified in the Chemical Resistance Test, Section 15.

6 Sash

6.1 The sash shall move freely and shall be counterbalanced so as to remain stationary when stopped at any position from fully opened to fully closed.

6.2 Hood sash glazing materials shall conform to one of the following:

a) Shall be of a nonshattering or tempered type that, when broken, shall conform to the performance specifications noted in the Standard for Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test, ANSI Z97.1; or

b) Shall withstand the resistance to the Impact Tests specified in 16.1.1 and 16.1.2.

7 Bypass

7.1 The bypass opening, when present, shall be shielded by a grille or solid panel to impede or deflect flying glass or flaming debris in case of a runaway reaction within the hood. The grille or solid panel shall withstand the resistance to the impact test specified in 16.3.1 and 16.3.2.

8 Work Surface

8.1 The work surface shall be constructed to contain low volume liquid spillage and prevent it from flowing over the front edge of the work surface and from seeping between the work surface and hood walls. See 4.3(a). The Standard on Fire Protection for Laboratories Using Chemicals, NFPA 45, provides an example of a work surface that is in compliance with this requirement.

8.2 The work surface shall withstand the resistance to impact test specified in 16.4.1 – 16.4.3.

9 Baffles

9.1 Baffles shall be constructed so that adjustments cannot be made to restrict the volume of air exhausted through the hood by more than 20 percent as recommended in the Standard on Fire Protection for Laboratories Using Chemicals, NFPA 45. Baffle restriction shall be determined as specified in 17.6.1.

10 Hood Exhaust

10.1 The exhaust system or ducting integral to the hood shall be constructed so as to minimize accumulation of conveyed materials. The interior shall be reasonably smooth and free of obstructions.

10.2 There shall be no recirculation of air exhausted from laboratory hoods.

11 Hood Blower

11.1 Blowers integral to the hood shall have a rotating element of nonferrous or nonsparking material, or the casing shall consist of or be lined with such materials.

12 Electrical Devices

12.1 Fixed electrical services and their controls shall be located external to the hood and within easy reach.

Exception: GFCI receptacles are not prohibited from being installed in the interior of the hood.

12.2 Luminaires shall be separated from the hood interior by a sealed, transparent, impact-resistant vapor shield; or shall meet the requirements of Article 501 of the National Electrical Code, NFPA 70.

12.2 revised June 2, 2006

12.3 Internal wiring and electrical devices integral with the hood shall comply with requirements in the National Electrical Code, NFPA 70.

13 Utilities

13.1 Service fixture controls and outlets

13.1.1 All service fixture controls (that is, gas, water, air) shall be located immediately external to the hood and within easy reach. All service lines or valves shall be installed so that service lines can be readily connected or disconnected either by design of the piping assembly or by an access panel.

13.1.2 All internal service fixture outlets shall have a solvent and corrosion resistant finish.

13.1.3 All service fixture controls shall be marked in accordance with 18.4.

13.1.4 For piped gas systems, valves and service fixtures of a hood shall be installed in compliance with the appropriate NFPA Standard as follows:

a) Fuel gases such as manufactured, natural, and LP-Gas – National Fuel Gas Code, NFPA 54, and the Liquefied Petroleum Gas Code, NFPA 58.

b) Hydrogen – Standard for Gaseous Hydrogen Systems at Consumer Sites, NFPA 50A.

c) Acetylene, oxygen systems – Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes, NFPA 51.

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13.1.5 For water and steam systems, all valves and service fixtures shall be suitable for the intended use.

PERFORMANCE

14 Small Flame Impingement Test

14.1 General

14.1.1 The materials used in the hood interior shall comply with the following when tested in accordance with 14.2.1 – 14.3.5 (also see 14.1.2):

a) Not burn with flaming or glowing combustion for more than 60 seconds after the fifth flame application,

b) Not drip any particles, and

c) Not result in a visible burn-through (hole).

14.1.2 If only one section from a set of three sections fails to comply with the requirements, another set of three sections shall be tested. All sections from this second set shall comply with the requirements in order for the material in that thickness to be considered acceptable.

14.2 Apparatus

14.2.1 The apparatus employed is to consist of the following:

a) Laboratory Burner – A Tirrill burner having a tube with a length of 4 inches (102 mm) and an inside diameter of 3/8 inch (9.5 mm). The tube shall not be equipped with end attachments such as a stabilizer.

b) Gas Supply – A supply of technical grade methane gas with suitable regulator and meter for uniform gas flow. Natural gas having a heat content of approximately 1000 Btu per cubic foot (37 MJ/m^3) has been found to provide similar results.

c) Mounting Block – A block capable of positioning the burner at an angle of 20 degrees from the vertical.

d) Stopwatch or other suitable timing device.

14.3 Test method

14.3.1 Three sections of the finished part shall be tested for each material.

14.3.2 The burner is to be placed remote from the part, ignited, and adjusted so that when the burner is in a vertical position, the overall height of the flame is 5 inches (127 mm), and the height of the inner blue core is 1-1/2 inches (38 mm).

14.3.3 The flame is then to be applied to the test section at an angle of 20 degrees from the vertical, so that the tip of the inner blue core touches the specimen.

14.3.4 The flame is to be applied for 5 seconds and removed for 5 seconds. This operation is to be repeated until the section has been subjected to five applications of the test flame.

14.3.5 After the fifth removal of the test flame, the following are to be observed and recorded:

a) Duration of flaming plus glowing.

b) Whether or not particles dripped from the part during the test.

c) The area of the part burned or affected.

d) Observations of deformation and physical strength immediately after burning and when cooled.

15 Chemical Resistance Test

15.1 General

15.1.1 The materials used to construct the hood interior and the exhaust system or ducting integral to the hood, when tested according to 15.2.1 – 15.4.1, shall not exhibit visual evidence of corrosion, including cracking, blistering or softening to a degree which would cause a significant loss of desired physical and flammability properties.

15.2 Test specimens

15.2.1 Test specimens of approximately 30 to 50 square inch (194 to 323 cm^2) surface area are to be tested in the minimum thickness of the part.