

**NATIONAL
STANDARD
OF CANADA**

**CAN/ULC-S646:2010-R2016
(Reaffirmed 2016)**

**STANDARD FOR EXHAUST HOODS AND RELATED
CONTROLS FOR COMMERCIAL AND INSTITUTIONAL
COOKING EQUIPMENT**

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Approved by:



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CORPORATE HEADQUARTERS

Underwriters Laboratories of Canada
7 Underwriters Road
Toronto, Ontario M1R 3A9
Telephone: (416) 757-3611
Fax: (416) 757-9540

REGIONAL OFFICES

PACIFIC OFFICE

13775 Commerce Parkway, Suite 130
Richmond, British Columbia V6V 2V4
Telephone: (604) 214-9555
Fax: (604) 214-9550

EASTERN OFFICE

6505, Rte Transcanadienne, Suite 330
St-Laurent, Québec H4T 1S3
Telephone: (514) 363-5941
Fax: (514) 363-7014

For further information on ULC standards, please contact:

ULC STANDARDS

171 Nepean Street, Suite 400
Ottawa, Ontario K2P 0B4
Telephone: (613) 755-2729
Fax: (613) 231-5977
E-mail: customerservice@ulc.ca
Web site: www.ulc.ca

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STANDARD FOR EXHAUST HOODS AND RELATED CONTROLS FOR
COMMERCIAL AND INSTITUTIONAL COOKING EQUIPMENT

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ULC STANDARDS COMMITTEE ON KITCHEN EXHAUST EQUIPMENT AND SYSTEMS

NAME	AFFILIATION	REGION	CATEGORY
C. Dineley (Chair)	Anjinov Management, Inc.	Ontario	User
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STANDARD FOR EXHAUST HOODS AND RELATED CONTROLS FOR COMMERCIAL AND INSTITUTIONAL COOKING EQUIPMENT

PREFACE

This is the Reaffirmation of the First Edition of the Standard for Exhaust Hoods and Related Controls for Commercial and Institutional Cooking Equipment, CAN/ULC-S646.

This Edition of the Standard has been formally approved by the ULC Standards Committee on Kitchen Exhaust Equipment and Systems.

This Standard has been developed in compliance with the requirements of SCC for accreditation of a Standards Development Organization.

Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

This Third Edition National Standard of Canada has been reaffirmed.

Attention is drawn to the possibility that some of the elements of this Canadian standard may be the subject of patent rights. ULC Standards shall not be held responsible for identifying any or all such patent rights.

Requests for interpretation of this Standard should be sent to ULC Standards. The requests should be worded in such a manner as to permit a “yes” or “no” answer based on the literal text of the requirement concerned.

The review and action to revise or reaffirm this Standard will not exceed 5 years from the date of publication, unless the Standard is identified as fitting within a stabilized category, whereby the review will commence within the appropriate time frame set out by ULC Standards.

This Standard is intended to be used for conformity assessment.

1 SCOPE

1.1 These requirements cover *exhaust hoods* for commercial and institutional kitchens and are intended for placement over restaurant type cooking equipment, such as ranges, broilers, deep fat fryers, grills, etc., during normal cooking operations. They may be of the shelf, canopy, island, double island or equipment mounted styles and may be known as *grease extractor type hood*, or *filter type hoods*. They may include provisions for the introduction of *make-up air* to the kitchen. They may include provisions to limit exhaust temperatures to 190 °C.

1.2 *Exhaust hoods* covered by these requirements are intended for installation in accordance with ULC-S650, Standard for the Installation and Performance of Ventilation and Fire Suppression Systems for Commercial and Institutional Cooking Equipment.

NOTE: ULC-S650 was withdrawn in February, 2016. Refer to the Authority Having Jurisdiction for requirements on installation of commercial cooking equipment.

1.3 *Exhaust hoods* covered by these requirements are intended for placement over electric, gaseous-fuel or solid-fuel burning appliances. These requirements cover equipment rated not over 600 V and intended for installation under the requirements of CAN/CSA-C22.1, Canadian Electrical Code, Part I.

1.4 These requirements do not cover fire-extinguishing systems.

2 REFERENCE PUBLICATIONS

2.1 The documents shown below are referenced in the text of this Standard. Unless otherwise stated elsewhere in this Standard such reference shall be considered to indicate the edition and/or revisions of the document available at the date on which the Committee approved this ULC Standard.

Documents Published by the American Society for Testing and Materials (ASTM)
100 Barr Harbour Drive, PO Box C700, West Conshohocken, PA 19428-2959 U.S.A.
Telephone: (610) 832-9585
www.astm.org

- ASTM A 313 / A 313M-03, Specification for Stainless Steel Spring Wire
- ASTM D 412-06 REV A, Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers Tension
- ASTM D 573-04, Test Method for Rubber Deterioration in an Air Oven
- ASTM D 3183-02, Practice for Rubber - Preparation of Pieces for Test Purposes from Products
- ASTM D 3767-03, Practice for Rubber Measurement of Dimensions

Documents Published by the Canadian Standards Association (CSA)
5060 Spectrum Way, Suite 100, Mississauga, ON L4W 5N6 Canada
Telephone: (416) 747-4077 or 1-800-463-6727
www.csa.ca

- CAN/CSA-C22.1-06, Canadian Electrical Code, Part I

- CAN/CSA-C22.2 No. 0-M91 (R2001), General Requirements Canadian Electrical Code, Part II
-

Document Published by IIT Research Institute
10 W. 35th Street, Chicago, IL 60016 U.S.A
Telephone: (312) 467-4000

- Cat. No. RDH-376, Reliability Design Handbook (March 1976)
-

Documents Published by Underwriters Laboratories of Canada (ULC)
7 Underwriters Road, Toronto, ON M1R 3A9 Canada
Telephone: (416) 757-3611 or 1-866-9373-ULC
www.ulc.ca

- CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
 - CAN/ULC-S102.2-10, Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies
 - CAN/ULC-S112-10, Standard Method of Fire Test of Fire-Damper Assemblies
 - CAN/ULC-S527-99, Standard for Control Units for Fire Alarm Systems
 - ULC-S649-06, Grease Filter for Commercial and Institutional Kitchen Exhaust Systems
 - ULC-S650-01, Standard for the Installation and Performance of Ventilation and Fire Suppression Systems for Commercial and Institutional Cooking Equipment
-

Document Published by the U.S. Department of Defense (DoD)
Daps Philadelphia, 700 Robins Avenue, Building 4D, Philadelphia, PA 19111 U.S.A
Telephone: (215) 697-2179

- MIL-STD-282, Filter Units, Protective Clothing, Gas Mask Components and related products: Performance Test Method

3 GLOSSARY

Note: Terms used in this Standard that are in *italic* print are defined as follows:

AUTOMATIC — Capable of operation by its own mechanism when actuated by some non human influence, such as a change in the current, temperature, pressure, strength, mechanical configuration or shape.

CONTINUOUSLY WELDED — A method of joining the metal by melting without interruption, in such a manner as to be liquid-tight.

DUCT(S) — A continuous passageway for the transmission of air and vapours.

EXHAUST HOOD(S) (Ventilator) — A device provided for a cooking appliance to capture and direct grease laden vapours and exhaust gases.

A **GREASE EXTRACTOR TYPE HOOD** — An *exhaust hood* provided with an integral non-removable *grease* extraction system and an *automatic* hot water and detergent wash system .

B **FILTER TYPE HOOD** — An *exhaust hood* with grease filters.

FIRE DAMPER — A device designed to permit air movement under normal conditions and to automatically arrest such movement and prevent the passage of flame in the event of a fire.

FUSIBLE LINK — A form of fixed temperature heat detecting device which releases at a fixed temperature.

GREASE — Rendered animal fat, vegetable shortening and other such oily matter used for the purpose of and resulting from the activity of cooking and or preparing foods. *Grease* may be liberated and entrained with exhaust air, or may be visible as liquid or solid.

LIQUID-TIGHT — Constructed and performing in such a manner so as not to permit the passage of any liquid at any temperature.

MAKE-UP AIR — Air specifically introduced to replace the air being exhausted.

4 CONSTRUCTION

4.1 ASSEMBLY

4.1.1 The hood or that portion of a primary collection means designed for collecting cooking vapours and residues shall be of *liquid-tight continuously welded* construction and be fabricated and supported by materials as indicated in Clause 4.2.1.

4.1.1.1 Internal welding for seams, joints, and penetrations of the hood is permitted, provided that the weld is formed smooth or ground smooth, as to not trap *grease*, and is cleanable.

NOTE: Materials and construction methods withstanding abnormal flare-up, fan failure, and fire tests with no significant distortion or evidence of the passage of smoke, flame, or vapour through the joint are considered to provide equivalent resistance to fire.

4.1.2 An *exhaust hood* shall include all the essential parts necessary for its normal function when installed as intended. The equipment may be shipped as subassemblies.

4.1.3 *Exhaust hood* equipment, if not assembled by the manufacturer as a unit, shall be arranged so that each subassembly is capable of being incorporated readily into the final assembly without requiring alteration by the installer, other than field adjustments of control valves to accommodate supply variations. Subassemblies, which must bear a definite relationship to each other for the proper and safe operation of the equipment, shall be arranged and constructed to permit them to be incorporated into the complete assembly only in the correct relationship with each other, without need for alteration or alignment.

4.1.4 Any part that may normally come in contact with the operator's hand during normal usage shall be free from sharp edges or projections and projecting sharp screw ends.

4.1.5 An adjustable part shall be provided with a locking device to prevent accidental shifting.

4.1.6 Screws or bolts used to attach parts which are detached for normal care or servicing shall be capable of holding following the application of the torques indicated in Table 1 and after removal and replacement.

4.1.7 All parts, controls, and safety devices requiring normal care shall be accessible. Parts in the assembly, which are intended to be removed for normal care, shall be of such design that their restoration, following removal, will not necessitate their realignment to secure their proper relationship with other parts of the assembly. Special tools or equipment required for normal maintenance by the operator shall accompany the equipment to the user.

4.1.8 An *exhaust hood* assembly shall incorporate provisions for support or attachment to the building structure.

4.1.9 Complete installation, operating and maintenance instructions, including those for fire suppression systems, where provided, shall accompany each *exhaust hood*.

4.2 MATERIALS

4.2.1 Parts of an *exhaust hood* which serve to confine or convey the exhaust products, exhaust *fire dampers*, and structural parts shall be made of materials equivalent in strength and fire resistance to at least stainless steel not less than 0.91 mm (20 gauge) thick. Acceptable stainless steel alloys shall be of the following types: 430, 301, 302, 304, 305, 308, 18-8 (18 % chromium - 8 % nickel).

4.2.2 Internal parts, except piping and associated fittings, subjected to washing agents shall be equivalent in corrosion resistance to Type 302 or 430 stainless steel, copper, or an alloy containing not less than 85 % copper. Other parts may be plain cold rolled steel not less than 1 mm thick. Joints between parts, which confine washing agents, shall be mechanically secured and sealed.

4.2.3 Metals used in the assembly of an *exhaust hood* and/or *fire damper* shall not be used in combination such as to cause galvanic action, which may adversely affect the function of any part of the assembly formed from such material.

4.3 PROVISIONS FOR CLEANING AND GREASE REMOVAL

4.3.1 A *grease extractor type hood* may include means for removal of accumulation of *grease* and other cooking process contaminants from the internal surfaces, parts, and controls with or without requiring hand cleaning or removal of filters, collectors, or other *exhaust hood* parts.

4.3.2 Access shall be provided to inspect and repair internal parts of the *exhaust hood* and shall be capable of being accomplished with the aid of ordinary tools.

4.3.3 *Grease* removal devices shall be provided with all *exhaust hoods*. When *grease* filters are provided, the filters shall comply with ULC-S649, Standard for Grease Filters for Commercial and Institutional Kitchen Exhaust Systems.

4.3.4 All *grease* removal devices and assemblies, or other means of *grease* removal not evaluated in accordance with Clause 4.3.3 shall comply with Subsection 6.5, Grease Extraction Test.

4.3.5 *Grease* removal devices shall be arranged so that all exhaust air passes through them.

4.3.6 *Grease* filters shall be installed at an angle not less than 45° from the horizontal or in accordance with the manufacturer's installation instructions.