

CAN/ULC-S674:2015

**STANDARD FOR UNVENTED ALCOHOL FUEL BURNING
DECORATIVE APPLIANCES**

Prepared and Published by:



Approved by:



Standards Council of Canada
Conseil canadien des normes

Underwriters Laboratories of Canada (ULC) was established in 1920 by letters patent issued by the Canadian Government. It maintains and operates laboratories and certification services for the examination, testing and certification of appliances, equipment, materials, constructions and systems to determine their relation to life, fire and property hazards as well providing inspection services.

Underwriters Laboratories of Canada is accredited by the Standards Council of Canada as a Certification Organization, a Testing Organization, and an Inspection Body under the National Standards System of Canada.

ULC Standards develops and publishes standards and other related publications for building construction, security and burglar protection, environmental safety, electrical equipment, fire protection equipment, gas and oil equipment, thermal insulation products, materials and systems, energy use in the built environment and electrical utility safety.

ULC Standards is a not-for-profit organization and is accredited by the Standards Council of Canada as a Standards Development Organization.

National Standards of Canada developed by ULC Standards conform to the criteria and procedures established by the Standards Council of Canada. Such standards are prepared using the consensus principle by individuals who provide a balanced representation of interests relevant to the subject area on a national basis.

ULC is represented across Canada as well as many countries worldwide. For further information on ULC services, please contact:

Customer Service: 1-866-937-3852

National Standard of Canada

A National Standard of Canada is a standard developed by an SCC-accredited Standards Development Organization (SDO), and approved by the Standards Council of Canada (SCC), in accordance with SCC's: *Requirements and Guidance-Accreditation for Standards Development Organizations*, and *Requirements and Guidance-Approval of National Standards of Canada Designation*. More information on National Standard requirements can be found at www.scc.ca.

An SCC-approved standard reflects the consensus of a number of experts whose collective interests provide, to the greatest practicable extent, a balance of representation of affected stakeholders. National Standards of Canada are intended to make a significant and timely contribution to the Canadian interest.

SCC is a Crown corporation within the portfolio of Industry Canada. With the goal of enhancing Canada's economic competitiveness and social well-being, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts. Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organizations. A list of SCC programs and accredited bodies is publicly available at www.scc.ca.

Users should always obtain the latest edition of a National Standard of Canada from the standards development organization responsible for its publication, as these documents are subject to periodic review.

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

The intended primary application of this standard is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for this particular application.

Copies of this National Standard of Canada may be ordered from ULC Standards.

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE

STANDARD FOR UNVENTED ALCOHOL FUEL BURNING
DECORATIVE APPLIANCES

ICS 97.100.99

Prepared and Published by



Approved by



FIRST EDITION NOVEMBER 2015

Copyright © 2015

ULC Standards

All rights reserved. No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without prior permission.

AVADOCUMENTS

TABLE OF CONTENTS

ULC STANDARDS COMMITTEE ON FACTORY-BUILT FIREPLACES, CHIMNEYS AND VENTS	..I
PREFACE	..III
1. SCOPE	..1
2. REFERENCE PUBLICATIONS	..1
3. GLOSSARY	..2
4. CONSTRUCTION	..3
4.1 ASSEMBLY	..3
4.2 INSTALLATION OF APPLIANCE	..3
4.3 MATERIALS	..3
4.4 PIPING, TUBING AND FITTINGS	..4
4.5 CONTROLS	..5
5. PERFORMANCE	..5
5.1 GENERAL	..5
5.2 TEMPERATURE MEASUREMENT	..6
5.3 PRODUCTS OF COMBUSTION ANALYSIS	..7
5.4 TEST INSTALLATION	..7
5.5 COMBUSTION CHAMBER FUEL RESERVOIR CAPACITY	..9
5.6 COMBUSTION TEST	..9
5.7 OPERATION TESTS	..10
5.7.1 Test No. 1	..10
5.7.2 Test No. 2	..11
5.7.3 Test No. 3	..11
5.7.4 Test No. 4	..12
5.7.5 Test No. 5	..12
5.7.6 Test No. 6	..13
5.8 TEMPERATURE TEST	..13
5.9 STABILITY TEST	..13
5.10 MOIST AMMONIA AIR STRESS CRACKING TEST	..14
5.11 GASKET TEST	..14
6. MANUFACTURING AND PRODUCTION TESTS	..15
7. MARKING	..15
7.1 GENERAL	..15
7.2 CAUTIONARY MARKINGS	..16
8. INSTALLATION AND OPERATING INSTRUCTIONS	..17
8.1 GENERAL	..17
8.2 INSTALLATION INSTRUCTIONS	..17

TABLES	.21
FIGURES	.25
APPENDIX A (NORMATIVE) – SAFETY RELATED MARKINGS AND WARNINGS	.29

ULC STANDARDS COMMITTEE ON FACTORY-BUILT FIREPLACES, CHIMNEYS AND VENTS

NAME	AFFILIATION	REGION	CATEGORY
M. Brunt	Flexmaster Canada Limited	Canada	Producer
M. Byle	Stove Parlour and Gallery Inc.	Ontario	User
Q. Choudry	Office of the Ontario Fire Marshal	Ontario	Regulator
L. Cleroux	ICC Industrial Chimney	Canada	Producer
E. Dufour	Security Chimneys International Ltd	Canada	Producer
G. Edgar	VenTech Consulting Ltd.	USA	General Interest
Z. Gadowski	Wood Energy Technicians of British Columbia (WETBC)	British Columbia	User
T. Gottschalk	Hearth, Patio and Barbecue Association of Canada (HPBAC)	Canada	Producer
A. Greenberg	Canadians for Properly Built Homes (CPBH)	Canada	User
M. Harwood	SCM Risk Management Services Inc.	Canada	General Interest
J. Herald	J & D Herald Consulting	Ontario	General Interest
M. Hladysh	Selkirk Canada Corp.	Canada	Producer
N. Khan	Technical Inspection Network	Canada	General Interest
M. Kulik	Technical Standards & Safety Authority (TSSA)	Canada	Regulator
L. Gill (Associate Member)	IPEX Inc.	Canada	Non-Voting
S. Scott (Associate Member)	Royal Pipe Systems	Canada	Non-Voting
B. Zeigler (Associate Member)	Intertek	USA	Non-Voting
G. Ottley (Project Manager)	ULC Standards	Canada	Non-Voting

This list represents the membership at the time the Committee balloted on the final text of this edition. Since that time, changes in the membership may have occurred.

ULC STANDARDS SUBCOMMITTEE ON UNVENTED ALCOHOL FUEL BURNING DECORATIVE APPLIANCES

<u>MEMBER</u>	<u>REPRESENTING</u>
S. Beecraft	Health Canada
R. Chomiuk	Decoflame
J. Goutier	Régie du bâtiment du Québec
Y. Imahori	Office of the Ontario Fire Marshal
B. Manalo	ECO Smart Fireplaces
J. Ranger	Service de sécurité incendie - Agglomération de Longueuil
R. Zimmerman	UL LLC
G. Ottley (Project Manager)	ULC Standards

STANDARD FOR UNVENTED ALCOHOL FUEL BURNING DECORATIVE APPLIANCES

PREFACE

This is the First Edition of the Standard for Unvented Alcohol Fuel Burning Decorative Appliances, CAN/ULC-S674.

This Edition of the Standard has been formally approved by the ULC Standards Committee on Factory-Built Fireplaces, Chimneys and Vents.

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.

Appendix A, identified as Normative, forms a mandatory part of this Standard.

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 markings and/or installation instructions to be in both official languages.

This First Edition National Standard of Canada is based on, and supersedes, the First Edition of ULC/ORD-C627.1.

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

Copyright Underwriters' Laboratories of Canada
Provided by IHS Markit under license with ULC
No reproduction or networking permitted without license from IHS

1. SCOPE

1.1 These requirements apply to Factory-Built *Unvented Decorative Appliances* that are intended to be fixed/non-movable and that use *ethyl alcohol (ethanol)* and *isopropyl alcohol (isopropanol)* in liquid or *gel* form as the fuel. These appliances are intended to be decorative in nature and limited to a maximum output of 3 kW (10,000 BTU/hour). Appliances that use fuel oils, kerosene, gasoline, and other non-alcohols are not covered by these requirements.

NOTE: In Canada, the *ethyl alcohol* and *isopropyl alcohol* fuels for use with these products are to meet the Health Canada Consumer Chemicals and Containers Regulations 2001.

1.2 These appliances consist of an overall enclosure, burning chamber, and provision for refueling. They are not intended for use in spaces in which flammable vapours or gases may be present. They are not intended to be used as cooking or heating appliances. These appliances are not intended to be used in conjunction with blower assemblies.

1.3 These products are not intended to be installed in a bathroom or a room where sleeping accommodation is provided.

1.4 The appliances as covered by these requirements are intended for installation in accordance with local regulations and in the absence of such regulations in accordance with the current editions of the National Building Code of Canada and the National Fire Code of Canada.

2. REFERENCE PUBLICATIONS

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 Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959 U.S.A.
Telephone: (610) 832-9585
www.astm.org

- ASTM B858-06 (R 2012), Standard Test Method for Determining Susceptibility to Stress Corrosion Cracking in Copper Alloys

Documents Published by the CSA Group
5060 Spectrum Way, Suite 100, Mississauga, ON L4W 5N6 Canada
Telephone: (416) 747-4000
www.csa.ca

- CSA C22.2 No. 0.15-15, Adhesive Labels

Documents Published by Health Canada
Ottawa, ON
Telephone: (866) 662-0666
www.laws.justice.gc.ca

- Consumer Chemicals and Containers Regulation, 2001 (SOR/2001-269)
-

Documents Published by the National Research Council Canada
1200 Montreal Road, Bldg M-58, Ottawa, ON K1A 0R6 Canada
Telephone: (800) 672-2672
www.nrc.gc.ca

- National Building Code of Canada, 2010
- National Fire Code of Canada, 2010

Documents Published by Underwriters Laboratories Inc. (UL)
333 Pfingsten Road, Northbrook, IL 60062–2096 USA
Telephone: (888) 853-3503
www.ul.com

- UL 969-95, Standard for Marking and Labelling Systems

Documents Published by ULC Standards
171 Nepean Street, Suite 400, Ottawa ON, K2P 0B4 Canada
Telephone: (416) 757-3611 ext. 61744; Fax: (613) 231-5977. “ATTN: Publications”
E-mail: publications@ulc.ca
www.ulc.ca

- CAN/ULC-S114-05, Standard Method of Test for Determination of Non-Combustibility in Building Materials

3. GLOSSARY

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

3.1 **ALCOHOL** — Any of a series of hydroxyl (Hydroxyl [‘OH’] means a chemical group in which oxygen and hydrogen are bonded and acts as a single entity) compounds having the general formula $C_nH_{2n+1}OH$, including *ethanol*. The fuel may be provided in liquid or *gelled* form.

3.2 **COMBUSTIBLE MATERIAL** — Material that fails to meet the acceptance criteria of CAN/ULC-S114, Test for Determination of Non-Combustibility in Building Materials.

3.3 **COMBUSTION** — The rapid oxidation of fuel accompanied by the production of heat, or heat and light. Complete *combustion* of a fuel is possible only in the presence of an adequate oxygen supply.

3.4 **COMBUSTION CHAMBER** — An enclosure in which *combustion*, especially of a fuel or propellant, is initiated and controlled.

3.5 **ETHYL ALCOHOL (ETHANOL)** — A monohydric compound having the general formula of C_2H_5OH . The ethanol based fuel may be provided in liquid or *gelled* form.

3.6 **FUEL RESERVOIR** — A chamber or receptacle for holding fuel.

3.7 **GEL** — A continuous solid network enveloped in a continuous liquid phase, where the solid phase occupies less than 10 % (volume) of the material.

3.8 **ISOPROPYL ALCOHOL (ISOPROPANOL)** — A monohydric compound having the general formula of C_3H_7OH . The isopropyl alcohol based fuel may be provided in liquid or gelled form.

3.9 **NONCOMBUSTIBLE MATERIAL** — Material that meets the acceptance criteria of CAN/ULC-S114, Test for Determination of Non-Combustibility in Building Materials.

3.10 **READILY ACCESSIBLE** — Accessible without the need to open an access door or cover.

3.11 **UNVENTED DECORATIVE APPLIANCE** — A decorative grate or burner that is fixed for installation in existing masonry or factory-built zero clearance *non-combustible* fire box or built to manufacturers specifications. Constructed and installed in accordance with the applicable local code requirements as a stand alone floor mounted or as a self contained, wall mounted, appliance that is not intended for heating or cooking and is not intended for duct connection.

4. CONSTRUCTION

4.1 ASSEMBLY

4.1.1 Each *unvented decorative appliance* shall include all the essential components necessary for its intended function when installed in accordance with the manufacturer's installation instructions.

4.1.2 The various parts of an *unvented decorative appliance* shall be constructed and assembled in accordance with the requirements of this Standard to provide the strength, rigidity, and durability required.

4.1.3 The various parts of an *unvented decorative appliance* shall be assembled or jointed as intended. Soft solder shall not be used on any fuel-handling parts if melting of the solder may allow leakage of fuel. Soft-soldered joints, where acceptable, shall be made mechanically secure before soldering.

4.1.4 The *unvented decorative appliance* may be factory-assembled in its entirety by the manufacturer before shipment from the factory or may be site-assembled, in which case complete instructions must accompany the unassembled appliance.

Exception No. 1: An *unvented decorative appliance* that incorporates decorative logs may be shipped with the logs uninstalled.

Exception No. 2: A *combustion chamber / fuel reservoir* that complies with the requirements in Clause 4.3.8 may be furnished without being assembled on the *unvented decorative appliance* (Clause 8.2.3 A).

Exception No. 3: An *unvented decorative appliance* that incorporates a guard, grille or screen may be shipped with the guard, grille or screen unassembled, provided the *unvented decorative appliance* is marked in accordance with Clause 8.2.3 P.

4.2 INSTALLATION OF APPLIANCE

4.2.1 Installation instructions shall be provided with the *unvented decorative appliance* in accordance with Section 8, Installation and Operating Instructions.

4.3 MATERIALS

4.3.1 An *unvented decorative appliance* shall be constructed of *noncombustible materials*. Materials employed shall be of such quality and shall possess properties and characteristics which may be expected to provide the intended service of all the parts of the *unvented decorative appliance*. Parts shall not sag, distort, melt, oxidize, or show leakage of fuel during any of the tests specified under Section 5.

4.3.2 A fuel-confining part of an *unvented decorative appliance* or an operating part in contact with the fuel, whose malfunction would allow leakage of fuel, risk of fire, or prevent a safety device from functioning, shall be made of materials meeting the following criteria:

- A Parts formed from drawn- or machined-brass rod or bar stock shall comply with the requirements in Subsection 5.10, Moist Ammonia Air Stress Cracking Test;
- B A fuel confining part or a part that comes into contact with fuel shall be made of material having a melting point (solidus temperature) of not less than 510 °C (950 °F) and a tensile strength of not less than 68.9 MPa (10,000 psi) at 204.4 °C (400 °F); and
- C A material used for the gaskets and seals to confine alcohol based fuels shall be compatible with the intended fuel as determined by tests in Subsection 5.11, Gasket Test.

4.3.3 The base of an *unvented decorative appliance* shall be constructed of metal or fabricated of other *noncombustible material* in a manner that provides equivalent strength and durability.

4.3.4 All materials used in the base construction shall be provided with corrosion protection.

4.3.5 The enclosure shall be made of steel or material of equivalent strength and durability so that it is not likely to be damaged by handling in shipment, installation, and use.

4.3.6 Enclosures made of sheet metal shall have a minimum thickness of 0.635 mm (0.025 in).

4.3.7 The *combustion chamber* shall be made of material having a melting point (solidus temperature) of not less than 510 °C (950 °F) and a tensile strength of not less than 68.9 MPa (10,000 psi) at 204.4 °C (400 °F).

4.3.8 A *combustion chamber / fuel reservoir*, if furnished as a separate assembly, shall be arranged for attachment to the *unvented decorative appliance* in the intended position only and in a manner that will establish and maintain the intended position of the *combustion chamber / fuel reservoir* with respect to the *unvented decorative appliance*.

4.3.9 The *combustion chamber / fuel reservoir* shall be designed to limit the amount of fuel loaded into the *combustion chamber* and have provisions to prevent spillage of fuel, for example a pouring device and a level indicator. The maximum combined total fuel volume of all *fuel reservoirs* and the *combustion chamber* shall not exceed 5 L (1.3 gallons).

4.3.10 The thickness of uncoated sheet steel used in the *combustion chamber* construction and *fuel reservoir* shall not be less than 1.07 mm (0.042 in). A preservative shall be applied to uncoated surfaces to prevent rusting prior to use.

4.3.11 A joint of a *combustion chamber* and *fuel reservoir* shall be lock-seamed, brazed, welded, or otherwise made mechanically secure. A joint not continuously brazed or welded shall be thoroughly sweated with solder or the equivalent, see Clause 4.1.3. Brazing or welding of coated sheets less than 1.07 mm (0.042 in) thick shall not damage the coating of surfaces in contact with the fuel when the *combustion chamber / fuel reservoir* is full.

4.3.12 Safety measures shall be provided to prevent fuel filling while the flame is not fully extinguished.

4.4 PIPING, TUBING AND FITTINGS

4.4.1 Pipe and fittings shall be standard full-weight wrought iron or steel, or iron-pipe size brass or copper pipe. Unions, if used, shall be the ground-joint type or the equivalent.

4.4.2 Steel tubing of the seamless, brazed, or welded type shall be not less than 6.35 mm (1/4 in) outside diameter and shall have a wall thickness not less than that shown in Table 7.