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ULC/ORD-C2728-13

PELLET FUEL BURNING COOKING APPLIANCES



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FOREWORD

Certification organizations are periodically requested to promptly provide certification services for devices, constructions, materials and systems where Canadian recognized Standards do not currently exist or are not entirely applicable. Accordingly, the certification organization utilizes its experience, existing specifications and requirements in related areas, together with assistance from its advisory councils to develop and prepare Other Recognized Documents (ORDs) for use in conducting the necessary tests and evaluation investigation.

Underwriters Laboratories of Canada has prepared many ORDs in response to requests from, and in conjunction with, industry, code writing bodies, regulatory agencies and others prior to promulgating a certification program. In many instances such documents have become published ULC Standards and subsequently National Standards of Canada. It is the intention of Underwriters Laboratories of Canada to continue this practice, as appropriate.

Comments on the content of this ORD should be directed to the Head Office of Underwriters Laboratories of Canada, 7 Underwriters Road, Toronto, Ontario, CANADA, M1R 3A9.

NOTE: These Other Recognized Documents are accepted under the National Standards System of Canada. Reference may be made to the Document CAN-P-3, "General Requirements for Bodies Operating Product Certification Systems"; and CAN-P-1500, "Additional Requirements for Accreditation of Certification Bodies", published by the Standards Council of Canada located at 270 Albert Street, Suite 200, Ottawa, Ontario, CANADA, K1P 6N7.

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PELLET FUEL BURNING COOKING APPLIANCES

PREFACE

This is the First Edition of the Other Recognized Document ULC/ORD-C2728, Pellet Fuel Burning Cooking Appliances.

Only metric SI units of measurement are used in this ORD. 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.

Attention is drawn to the possibility that some of the elements of this ORD 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 ORD should be sent to the ULC Mark Program Owner of Underwriters Laboratories of Canada. 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.

This ORD is intended to be used for conformity assessment.

ULC/ORD-C2728-13

1 SCOPE

1.1 These requirements apply to forced or natural draft, automatic feed, pellet fuel-burning cooking appliances for outdoor residential or for indoor-outdoor commercial use.

1.2 Electrical supply source connections are intended to be in accordance with the CSA C22.1, Canadian Electrical Code, Part I Safety Standards for Electrical Installations.

1.3 These appliances are intended to be permanently installed in accordance with the applicable requirements of CAN/CSA-B365, Installation Code for Solid-Fuel-Burning Appliance and Equipment, and in accordance with the National Building Code of Canada and the National Fire Code of Canada.

1.4 The appliances are not intended for space heating or residential indoor-use for cooking.

1.5 These requirements do not apply to appliances that employ the following fuels: coal, charcoal, corn pellets, solid wood, gaseous fuels, natural gas, propane or fuel oil.

2 REFERENCE PUBLICATIONS

The documents shown below are referenced in the text of this ULC Other Recognized Document (ORD). Unless otherwise stated elsewhere in this ORD, such reference shall be considered to indicate the edition and/or revisions of the documents available at the date on which this ULC ORD is published.

Documents Published by the ASM International
9639 Kinsman Road, Materials Park, OH 44073
Telephone: (440) 338-5151
<http://asmcommunity.asminternational.org/portal/site/www/>

- AISI C1010-1970, Low Carbon Steel

Documents Published by the American Society of Mechanical Engineers (ASME International)
Three Park Avenue, M/S 10E, New York, NY 10016–5990 U.S.A
Telephone: 1-800-843-2763
www.asme.org

- ASME B94.11 (1993), Twist Drills
- ASME B1.20.1 (1983) (R1992), Pipe Threads, General Purpose (Inch)

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 E28-99 (R2009), Standard Test Methods for Softening Point of Resins Derived from Naval Stores by Ring-and-Ball Apparatus
- ASTM A90/A90M-11, Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
- ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

- ASTM E1509-04, Standard Specification for Room Heaters, Pellet Fuel-Burning Type

Documents Published by the Canadian Standards Association (CSA)
178 Rexdale Boulevard, Toronto, ON, Canada, M9W 1R3
Telephone: (416) 747-4000
www.csa.ca

- CSA C22.1-12, Canadian Electrical Code, Part I Safety Standards for Electrical Installations
- CSA C22.2 No.3-M1988 (R2004), Electrical Features of Fuel-Burning Equipment – Environmental Products
- CAN/CSA-B365-10, Installation Code for Solid-Fuel-Burning Appliances and Equipment
- CAN/CSA-E730-2-12-94 (R2008), Automatic Electrical Controls for Household and Similar Use - Part 2: Particular Requirements for Electrically Operated Door Locks
- CAN/CSA-E730-2-12A-94 (R2006), Amendment 1:2001 to CAN/CSA-E730-2-12-94, Automatic Electrical Controls for Household and Similar Use - Part 2: Particular Requirements for Electrically Operated Door Locks

Documents Published by the National Research Council of Canada (NRC)
Canadian Commission on Building and Fire Codes
1200 Montreal Road, Building M-58, Ottawa, ON K1A 0R6 Canada
Telephone: (613) 993-9101 or 1-877-672-2672
www.nrc-cnrc.gc.ca

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

Documents Published by Underwriters Laboratories of Canada (ULC)
7 Underwriters Road, Toronto, ON M1R 3B4 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-S114-05, Standard Method for Test for Determination of Noncombustibility in Building Materials

3 GLOSSARY

3.1 For the purpose of this ORD, the following definitions apply.

COMBUSTIBLE MATERIAL — A material that fails to meet the acceptance criteria of CAN/ULC-S114, Standard Method of Test for Determination of Noncombustibility in Building Materials.

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.

NONCOMBUSTIBLE MATERIAL — A material that meets the acceptance criteria of CAN/ULC-S114, Standard Method of Test for Determination of Noncombustibility in Building Materials.

PELLET FUEL — A densified particulate biomass product made of renewable wood substances such as sawdust or wood waste, having a maximum particle volume of 16.39 cm³ (1 in.³). The fuel dimensions make it capable of being fed to the appliance *combustion* system at a controlled rate.

READILY ACCESSIBLE — Accessible without the need to open an access door or cover using tools.

4 CONSTRUCTION

4.1 General

4.1.1 The frame and enclosure of an appliance shall be strong and rigid to resist the abuses to be encountered during intended use. The degree of resistance inherent in the product shall preclude total and partial collapse with the attendant reduction of spacings, loosening or displacement of parts, and other defects which alone or in combination constitute an increase in the risk of fire, electric shock, or injury to persons.

4.2 Materials

4.2.1 An appliance shall be constructed of materials having the necessary strength and durability to provide intended service of the parts and the assembly. Parts shall not sag, distort, melt, oxidize, or show leakage of fuel ash or cinders during any of the tests specified herein.

4.2.2 The minimum thickness of sheet metal including any coatings and of other materials shall comply with Table 1.

4.2.3 Aluminum alloys containing more than 1 % magnesium shall not be used when the reflectivity of the material is used to reduce the risk of fire.

4.2.4 An outer casing, base or other structural part exposed to the weather shall be made of material having durability and resistance to corrosion, fire, and heat equivalent to that of galvanized steel, 0.46 mm (0.018 in) thick, and have a coating of zinc conforming with the coating Designation G90 in Table I of the Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, ASTM A653/A653M, with not less than 40 percent of the zinc on any side, based on the minimum single spot test requirement in this ASTM Designation. The weight of zinc coating may, in case of question, be established in accordance with the Standard Test Method for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles, ANSI/ASTM A90.

4.2.5 The fire chamber of the appliance, and other parts that are visible after installation and in contact with flue gases, shall be of material having the durability and resistance to fire and heat equivalent to fireclay tile, Series 300 or 400 stainless steel, aluminum-coated steel, cast iron, or 1.07 mm (0.042 in) thick unprotected or painted steel.

4.2.6 Parts that are in contact with flue gases and that are not visible after installation shall be of a material having the durability and resistance to corrosion, fire, and heat equivalent to fireclay tile or Series 300 or 400 stainless steel.

4.2.7 Thermal insulation material shall be of metal or of a mineral base.

4.2.8 Thermal insulation shall comply with the following conditions when the appliance is tested in accordance with these requirements:

- A The insulation shall not show evidence of softening, melting, or deterioration.
- B Except for binder materials, thermal insulation material shall be noncombustible.
- C Thermal insulation shall not come into contact with the products of *combustion*.
- D Thermal insulation that is not self-supporting shall be applied to solid surfaces so that the insulation does not sag. An adhesive or cement used to attach such material shall retain its adhesive qualities at any temperature the adhesive may attain when tested in accordance with these requirements and at -18 °C (0 °F).
- E Adhesives or cements used in the installation of insulating materials shall have a flame spread rating of 25 or less when tested in accordance with CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- F A water-absorbing insulating material shall not be subject to wetting by condensation or rain when installed as intended. Asbestos material shall not be used.

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

4.3 Assembly

4.3.1 Each product shall include all the essential components necessary for its intended function when installed or placed in the intended operating position as intended.

4.3.2 The various parts of a product shall be constructed and assembled in accordance with these requirements to provide the strength, rigidity, and durability required. Glass viewing ports/windows are not acceptable.

4.3.3 The various parts of a product shall be assembled or jointed as intended. Soft-soldered joints, where acceptable, shall be made mechanically secure before soldering.

4.3.4 The product shall be completely assembled by the manufacturer before shipment from the factory.

Exception 1: Supporting structures, such as a base for portable products, may be shipped with the base uninstalled.

Exception 2: A *combustion* chamber and pellet container may be furnished without being assembled on the cooking chamber.

4.4 Radiation Shields or Liners

4.4.1 A radiation shield or liner shall be so constructed, formed, and supported as to ensure proper positioning and to prevent distortion or sagging in service. A shield or liner shall be protected against corrosion if its deterioration may cause excessive temperature when the appliance is tested in accordance with these requirements. Any finish to obtain the required resistance to corrosion shall not be damaged by heat when the appliance is tested under these requirements.

4.5 Combustion Chamber

4.5.1 The *combustion* chamber or fire box lining material, if used, shall be durable, adequately held in place, and accessible for replacement with equivalent lining material.

4.6 Baffles

4.6.1 A baffle in a flue-gas passage or otherwise exposed to *combustion* products shall be constructed and disposed in a manner to provide for reasonable life and shall be fixed in position. A flue baffle shall be made of material having resistance to corrosion equivalent to AISI C1010, Standard on Low Carbon Steel, hot-rolled sheet steel having a minimum thickness of 1.07 mm (0.042 in) (No. 18 MSG) unless its deterioration will not cause excessive temperatures or deleterious performance characteristics when the appliance is tested in accordance with these requirements.

4.6.2 A flue baffle shall be accessible for cleaning. A flue baffle which is removable for cleaning shall be such as to facilitate its removal and permit replacement only in a safe position.

4.7 Flue Collar

4.7.1 A flue collar, when provided, shall be constructed and arranged to permit the secure attachment of the grease duct/chimney to the appliance.

4.8 Moving Parts

4.8.1 Moving parts shall be enclosed or guarded in accordance with Clauses 4.8.2 and 4.8.3.

4.8.2 Moving parts involving a risk of injury to persons protected by a service or loading door, interlocked so that such parts are de-energized when the door is opened, are guarded as intended when one of the following conditions is met:

- A The moving parts stop within 5 seconds after the door is opened; or
- B The interlock prevents the door from being opened until the moving parts stop.

4.8.3 An interlock actuated by movement of a guard shall permit operation of the parts being guarded only when the guard is in place. With the guard removed, the interlock shall comply with the requirement in Clause 4.9.1.

4.9 Interlocks

4.9.1 The requirements in Clauses 4.9.2 and 4.9.4 apply to an interlock that is necessary to comply with Subsection 4.8, Moving Parts, and Subsection 4.10, Fuel Hopper.

4.9.2 The actuator of an interlock switch shall be located so that unintentional operation does not occur.

4.9.3 When unintentional operation of a switching device results in a risk of injury to persons, the actuator of the switch shall be located or guarded so that such unintentional operation does not occur.

4.9.4 With reference to the requirement in Clause 4.8.3, a switch that is located or guarded so that it cannot be turned on by moving a 50.8 mm (2 in) diameter sphere at any angle to the switch or actuator is capable of being used.

4.9.5 The actuator of a switch is allowed to be guarded by recessing, ribs, barriers, or similar means.

4.9.6 Operation of an interlock in normal use shall not inconvenience the operator so as to encourage deliberate defeat of an interlock.

4.9.7 An interlock shall not be defeated by food or cooking materials that could accumulate in normal use.

4.9.8 The interlock system shall be evaluated for 100,000 cycles in accordance with Subsection 5.16, Endurance Test for Interlock Switches.

4.9.9 An electronic interlock circuit shall comply with the requirements in the Standard for Automatic Electrical Controls for Household and Similar Use, Part 2: Particular Requirements for Electrically Operated Door Locks, CAN/CSA-E730-2-12, and Amendment 1:2001, Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Electrically Operated Door Locks, CAN/CSA-E730-2-12A.

4.10 Fuel Hopper

4.10.1 The fuel hopper shall be constructed such that fuel or fuel residue cannot enter areas within the appliance electrical enclosure or come into contact with exterior surfaces of the fire chamber. Fuel hopper sections shall be fastened together securely such that they do not rely solely on a sealing compound or tape for tightness.

4.10.2 The fuel hopper shall have a lid or door with a direct interlock to the fuel feed auger motor so that the auger is disabled when the hopper is opened.

4.10.3 If provided, the hopper lid/door seal gasketing shall be attached to the lid/door, or the design and construction shall be such that damage to the gasketing during normal operation and filling of the hopper is prevented.

4.10.4 Where special tools are required to remove carbon and slag buildup from the grate (burn pot), they shall be supplied with the appliance.

4.10.5 When components require removal, for example, during periodic maintenance, such removal shall not render the gasket or seal incapable of forming a suitable seal when the components are reassembled with a gasket or seal replacement.

5 PERFORMANCE

5.1 General

5.1.1 An appliance shall comply with the applicable requirements when tested as described herein in an ambient environment of 23.9 ± 5.0 °C (75.0 ± 9.0 °F) or as noted in the individual test. An appliance of a type not described specifically herein shall be tested in accordance with the intent of these requirements.

5.1.2 The performance of an appliance shall be evaluated upon the basis of operation tests conducted on the appliance. Appliances of each size and type, or a sufficient number of sizes and types to be representative of the entire range of sizes and types involved, shall be subjected to all or part of the tests prescribed herein. If optional features affecting performance are furnished, an appliance shall be tested with each such optional equipment.

5.1.3 An appliance, when tested in accordance with these requirements, shall operate free from excessive carbonization or other phenomena that may increase the risk of fire or explosion.