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ULC/ORD-C1378:2020

GAS-FIRED COMBINED HEAT AND POWER APPLIANCES (mCHP)

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FOREWARD

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 (ORD's) for use in conducting the necessary tests and evaluation investigation.

Underwriters Laboratories of Canada has prepared many ORD's 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.

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GAS-FIRED COMBINED HEAT AND POWER APPLIANCES (mCHP)

PREFACE

This is the First Edition of the Other Recognized Document ULC/ORD-C1378, Gas-Fired Combined Heat and Power Appliances (mCHP).

Only metric SI units of measurement are used in this ORD. If a value for measurement is followed by a value other units in parentheses, the second 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 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.

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1 SCOPE

1.1 These requirements apply to factory-built micro Combined Heat and Power (mCHP) gas-fired appliances which are intended primarily for residential and commercial installation. All appliances/equipment are intended to be constructed completely of new, unused parts and materials.

1.2 These appliances are for use with natural gas, liquefied petroleum gases, mixed gas and LP gas-air mixtures.

1.3 On the hot side, heat transfer can be direct from combustion gas to working fluid, or indirect from combustion gas to intermediate fluid. On the cold side, heat transfer will typically be from working fluid to air, water or some other fluid (eg. glycol, brine, oil, etc.).

1.4 The vapour expansion cycle may have indirect heat transfer through an intermediate pressurized water/saturated steam loop between the combustion gas and working fluid. The vapour expansion cycle may have direct heat transfer between the combustion gas and working fluid. Maximum operating conditions of the intermediate fluid shall be 200°C and 1000kPa absolute. Maximum operating conditions of the working fluid shall be 200°C and 2000kPa absolute.

1.5 For the hydronic supply loop of gas-fired boiler-type mCHP appliances, operation is intended according to the following:

Hot water heating boiler-type CHP appliances: Up to 1.10 MPa (160 psi) water pressure; 121 °C (250 °F) water temperature.

Hot water supply boiler-type CHP appliances: Up to 1.10 MPa (160 psi) water pressure; 121 °C (250 °F) water temperature.

The hot water heating boiler-type CHP appliances described herein are intended to produce hot water either by instantaneous or storage means.

The hot water heating boiler-type CHP appliances described herein are intended for combination space heating/potable water applications.

For the steam supply loop of gas-fired boiler-type mCHP appliances, operation is intended according to the following: 103.42 kPa (15 psi) steam pressure.

1.6 The requirements of Sections 1.4 and 1.5 apply to gas-fired mCHP appliances intended for maximum input rates not exceeding 3,663.389 kW (12,500,000 Btu/hr).

1.7 For vent systems other than direct vent type, flue temperature and vent pressure are considered as either Category III or Category IV, encompassing appliances for either indoor or outdoor installation. This ORD applies, as well, to direct vent type venting systems, also known as balanced flue venting systems, consisting of an air intake and vent termination.

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1.8 Power generation capacity of the appliances described herein is intended not to exceed 50kW gross power at the prime mover, before internal power consumption, before any power conversion (i.e. AC or DC).

1.9 Power generation technology types are intended to include vapour expansion cycle (Rankine), Stirling engine, micro-combustion turbine, thermoelectric module, thermoacoustic engine, fuel cell and internal combustion engine.

1.10 These appliances may be provided with construction provisions, or suitable listed kits, to permit conversion from one gas to another.

1.11 A gas-fired mCHP appliance, not specifically identified in the scope of this ORD, may be evaluated as necessary and to the discretion of the certifying agency.

1.12 This ORD encompasses gas-fired mCHP appliances described within that may incorporate grid-tied, micro-grid capability and hybrid (grid-tie / micro-grid combined) capability.

1.13 The intent of this ORD is to cover gas-fired mCHP appliances producing electrical energy by utilizing thermal energy.

2 REFERENCE PUBLICATIONS

The documents shown below are referenced in this 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.

Canadian

Documents published by the Canadian Standards Association (CSA), 178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3
Telephone: (416) 747-4000

B149.1-20 - Natural gas and propane installation code

B149.3-20 - Code for the field approval of fuel-related components on appliances and equipment

ANSI Z21.13-2017/CSA 4.9-2017 - Gas-fired low pressure steam and hot water boilers

ANSI/CSA FC 1-2014 (R2018) - Fuel cell technologies — Part 3-100: Stationary fuel cell power systems — Safety

CSA C22.1-18 - Canadian Electrical Code, Part 1

CSA-2.17-2017 - Gas-Fired Appliances for Use at High Altitude

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