



CAN/ULC-S610:2018

STANDARD FOR FACTORY-BUILT FIREPLACE SYSTEMS



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STANDARD FOR FACTORY-BUILT FIREPLACE SYSTEMS

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STANDARD FOR FACTORY-BUILT FIREPLACE SYSTEMS

PREFACE

This is the Second Edition of the Standard for Factory-Built Fireplace Systems, CAN/ULC-S610.

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.

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.

The Second Edition National Standard of Canada is based on, and supersedes, the First Edition.

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.

This CAN/ULC-S610 Standard is under continuous maintenance, whereby each revision is approved in compliance with the requirements of SCC for accreditation of a Standards Development Organization. In the event that no revisions are issued for a period of four years from the date of publication, action to revise, reaffirm, or withdraw the standard shall be initiated.

Comments or proposals for revisions on any part of the Standard may be submitted at any time. Proposals should be submitted via a Proposal Request in the On-Line Collaborative Standards Development System (CSDS) at <https://csds.ul.com/canada>.

This Standard is intended to be used for conformity assessment.

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1 SCOPE

1.1 These requirements cover factory-built fireplace systems capable of utilizing solid fuels, as specified by the manufacturer, and intended for provision of supplementary heating in buildings. These fireplace systems include a fire chamber assembly, chimney sections, a roof assembly, and other associated parts.

1.2 These factory-built fireplace systems are not for use with masonry chimneys.

1.3 Factory-built fireplace systems, as covered by this Standard, are intended for installation in accordance with the National Building Code of Canada, the Installation Code for Solid-Fuel Burning Appliances and Equipment, CSA B365, or the acts or regulations of the authority having jurisdiction.

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 Gas Association (AGA)
400 North Capitol Street N.W., Suite 450, Washington D.C. 20001 U.S.A
Telephone: (202) 824-7000
www.aga.org

- AGA Z223.1-15, National Fuel Gas Code

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 A653/A653M-15 (E 2016), Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

Documents Published by CSA Group
178 Rexdale Boulevard, Toronto, Ontario M9W 1R3 Canada
Telephone: 1-800-463-6727
www.csagroup.org

- CSA B365-17, Installation Code for Solid-Fuel Burning Appliances and Equipment
- CSA B366.1-11 (R2015), Solid-Fuel-Fired Central Heating Appliances
- CAN/CSA C22.2 No. 60335-2-102:16, Household and similar electrical appliances – Safety – Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections
- CSA C22.2 No. 0.15-15, Adhesive Labels

Documents published by the National Research Council of Canada
Institute for Research in Construction, Ottawa, ON K1A 0R6
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- National Building Code of Canada, 2015

Documents Published by ULC Standards (prior to May, 2010, identified as Underwriters Laboratories of Canada)

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www.ulc.ca/ulcstandards

- CAN/ULC-S110-13, Standard Methods of Test for Air Ducts
- ANSI/CAN/UL/ULC 2115:2017, Processed Solid Fuel Firelogs and Firestarters

Documents published by Underwriters Laboratories Inc. (UL)

333 Pfingsten Road, Northbrook, IL 60062-2096, U.S.A.

Telephone: (888) 853-3503

www.ul.com

- UL 969-17, Marking and Labelling Systems

3 GLOSSARY

3.1 *ALUMINUM-COATED STEEL* — An aluminum-coated steel in which the bond between the steel and the aluminum is an iron-aluminum alloy.

3.2 *BUILDING* — A structure used or intended for supporting or sheltering any use or occupancy.

3.3 *CHIMNEY ASSEMBLY* — Includes the chimney and other components such as firestops, radiation shield, supports, cap, etc.

3.4 *MANUAL DAMPER* — An adjustable damper, manually set and locked in the desired position.

3.5 *FACTORY-BUILT FIREPLACE SYSTEM* — A fire chamber and its chimney, consisting entirely of factory-made parts designed for unit assembly without requiring field fabrication. A factory-built fireplace system may also include combustion air and warm air ducts, grilles and accessories.

3.6 *FIRE CHAMBER* — The section of a fireplace in which fuel is burned including the entire volume bounded by the hearth, chamber walls or screens and the chamber ceiling.

3.7 *FIREPLACE* — A fireplace is a device for burning solid fuels, as specified by the manufacturer, having the major portion of one or more essentially vertical sides open or openable for refuelling and intended to permit visual observation of the flames while the fuel is burning.

3.8 *FIREPLACE FLUE DAMPER* — A valve or plate for regulating draft or flow of flue gases. A damper is generally considered as being located on the down-stream side of the fire chamber, usually near the entrance to the chimney.

3.9 *FORCED AIR HEATING SYSTEM* — An air heating system equipped with a blower which provides the primary means for circulation of air.

3.10 *GLASS* — Any transparent or translucent material employed in the construction of a heat producing appliance or intended as an accessory for such an appliance.

3.11 **GRAVITY SYSTEM** — An air heating system in which the circulation of air is primarily by convection.

3.12 **HEARTH** — The floor area within the fire chamber of a fireplace.

3.13 **HEARTH EXTENSION** — The surfacing applied to the floor area extending in front of and at the sides of a fireplace hearth; also that to be applied to the floor area beneath all portions of a hearth that is elevated above a floor.

3.14 **TRANSPORTABLE BUILDING** — A type of building constructed on a chassis.

3.15 **WARM AIR CIRCULATING TYPE FIREPLACE** — A fireplace incorporating a gravity system or forced air heating duct system attached to the air circulating chamber surrounding the fire chamber directing heated air to areas or locations other than directly in front of and directly above the fire chamber opening.

4 COMPLIANCE

4.1 Factory-built fireplace systems intended for use in transportable buildings shall meet the requirements of Subsection 7.9, Test No. 6 - Rough Usage.

4.2 Any electrical features of factory-built fireplace systems shall comply with CSA C22.2 No. 60335-2-102, Household and similar electrical appliances - Safety - Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections.

5 INSTRUCTIONS

5.1 INSTALLATION INSTRUCTIONS

5.1.1 Installation instructions shall be provided by the manufacturer. Instructions shall be illustrated and shall include directions and information adequate for attaining proper and safe installation of the factory-built fireplace system, including the chimney assembly, and related parts.

NOTE : A copy of the certification label should be included in the installation instructions.

5.1.2 These instructions are to be used in the examination and test of the product.

5.1.3 The installation instructions shall, as appropriate, include particular details concerning:

- A The importance of use of all specified components and a warning on the use of other than specified components, and a caution regarding the consequences of using makeshift compromises during installation;
- B The parts and materials required and the step-by-step process for installing the factory-built fireplace system, including its chimney assembly, including methods of their support and securing of roof assemblies. For fireplace systems intended for installation in transportable buildings, the method of attachment of the fireplace to the transportable building shall be detailed. Nails, lag bolts, or other fastening means needed to secure parts are to be specified. Component part descriptions in illustrated and written form are to be provided including part identification such as chimney sections, firestop, roof cap, and the like;

- C Special instructions where chimney assembly offsets are permitted. These instructions shall include the maximum angle and length of offset, the maximum number of elbows, the method of attachment of elbows to straight sections, the means of supporting the inclined sections, the use of joint bands where required, and the need for supplementary support during installation to prevent undue stress on connected elbows;
- D For chimney assemblies intended for exterior installation, the special parts required, the minimum and maximum extension through combustible walls and the methods of support shall be detailed. Acceptable methods of enclosure shall be illustrated;
- E Termination of a chimney assembly above a roof and its proximity to adjacent walls or buildings;
- F The full enclosure of the factory-built fireplace system, including its chimney, up to the attic on any storey above that in which the fireplace is installed. The methods and precautions concerning the enclosure of the factory-built fireplace system, including its chimney assembly and its accessories by walls, partitions, and other structures, including the placement and maximum widths of mantels and framing of fireplace openings. If clearances (air spaces) are required, specifications and illustrations are to be included in the instructions describing the required clearances. Installation details shall be provided for inspection openings into enclosures surrounding a factory-built fireplace system intended for installation in a transportable building. Such openings to require a household tool for access;

NOTE : Access openings may be designed for borescope inspection.

- G The materials or parts to be employed for hearth extensions, and their elevation relative to the fire. The minimum areas to be covered and their relation to the fireplace. If the fireplace opening is 0.6 m² or larger, the hearth extension floor area shall be described to extend at least 500 mm in front of and at least 300 mm beyond each side of the fireplace opening. The corresponding dimensions for a fireplace opening of less than 0.6 m² are 400 and 200 mm respectively;
- H Statements concerning the need for sealing strips of non-combustible materials between the fireplace hearth and factory-built hearth extension or the use of a sand-cement grout between the hearth and an on-site constructed hearth extension;
- I An illustration of the vertical relationship between the fireplace, sealing strips, and the hearth extension and a warning statement to the effect that the hearth extension is to be installed only as illustrated;
- J The framing of openings in ceilings and floors to provide firestopping in joist areas and the installation of firestop-spacer assemblies;
- K The installation of radiation shields and attic insulation shields, including a statement that the vertical height of the attic insulation shield above attic construction material should accommodate the amount of insulation as required by the National Building Code. The proper installation of the attic insulation shield and firestop- spacers. Distinction shall be clearly made between the conditions under which:
 - (i) An attic insulation shield is to be used; and
 - (ii) The chimney is to be enclosed.

- L The methods and parts to be employed for maintaining ventilation and air circulation where required;
- M The methods and parts to be employed for preventing contact with building insulation, including a requirement for placement of the fire chamber only against surface finished walls, and a caution against placement of any insulation or other materials in required clearance spaces surrounding the fire chamber or chimney assembly, except where such insulation or materials form part of the tested assembly;
- N The means to provide continuity of building envelope elements at the chimney penetration (insulation, air barrier system, vapour barrier, and roofing) including the use of rain caps or roof housings, and the method and parts employed for flashing and storm collars. The method and materials required to seal at any penetration of the building envelope;
- O Any limitations with respect to installation and use, such as minimum and maximum heights, the joining of two or more parts to constitute a safe assembly; installation clearances, the use of a specific hearth extension if required for the continued safe use of the fireplace, etc;
- P The framing of openings in roofs to provide for support and attachment of roof assemblies;
- Q Detailed instructions for the installation of optional blowers and controller for use with the fireplace;
- R The methods and parts to be employed to connect the optional warm air duct system to the exterior of the fire chamber of a warm air circulating type fireplace, and a caution that ducts can only be closed at the fireplace. If the system is intended to be connected to furnace ducting, it shall be tested to CSA B366.1, Solid-Fuel-Fired Central Heating Appliances;

NOTE : If the system is intended to be connected to furnace ducting, it is the responsibility of the user to confirm with the Authority Having Jurisdiction that the installation is acceptable.

- S The methods and parts to be employed to connect the optional outside combustion air ducts to the exterior of the fire chamber of an outside aired type factory-built fireplace system, the minimum cross-sectional area and maximum length of the combustion-air inlet, and a warning that such ducts shall only take combustion air from outdoors;
- T Any limitations with respect to installation and use of the optional warm air or outside combustion air duct systems such as minimum or maximum height of air intakes or outlets above the floor, minimum cross-sectional area and maximum length, allowable grille locations, proximity to combustibles, and framing details for the air ducts where they penetrate adjacent walls or floors;
- U A statement to the effect that combustion air inlet ducts are not to terminate in attic spaces or crawl spaces;
- V A statement to the effect that a fireplace insert shall not be installed in a factory-built fireplace system; and
- W Areas of the fireplace that must not be in contact with combustible material and are to be fully exposed to the living space in which the fireplace is located, if they were exposed during the test described in Clause 7.2.17.

5.1.4 Where the factory-built fireplace system incorporates glass components, the instructions shall include directions and information adequate for attaining a proper and safe installation of the glass component or assembly. The instructions shall not require the cutting of glass or metal.

5.1.5 Where a factory-built fireplace system has provision for installation of a gas pipe, the installation instructions shall contain a statement that the provision is intended for connection to a decorative gas appliance (ie. gas log set) in accordance with the National Fuel Gas Code, AGA Z223.1. The instructions shall include the statement: "CAUTION" and the following or equivalent, "WHEN USING THE DECORATIVE APPLIANCE, THE FIREPLACE FLUE DAMPER MUST BE SET IN THE FULLY OPEN POSITION".

5.1.6 The instructions shall make reference to the manufacturer's specific catalogue designations of the factory-built fireplace system covered and shall include the manufacturer's name and address.

5.1.7 A copy of the instructions shall be packed with the fire chamber of the fireplace.

5.1.8 The instructions shall include a statement to the effect that the authority having jurisdiction (such as municipal building department, fire department, fire prevention bureau, etc.) should be consulted before installation to determine the need to obtain a permit.

5.2 USE AND MAINTENANCE INSTRUCTIONS

5.2.1 The use and maintenance instructions shall be provided with each factory-built fireplace system.

5.2.2 The first page shall include the following statement:

"Keep these instructions for future use".

5.2.3 The use and maintenance instructions shall include particular details concerning:

- A Safe operation with doors, if these are normally provided, or with optional doors. If the factory-built fireplace system has been tested with doors, the instructions shall include the manufacturer's specific part numbers for doors that may be used. If the factory-built fireplace system has not been tested with doors, a warning statement as follows is to be included in the instructions:

"WARNING" and the following or equivalent: "THIS FIREPLACE HAS NOT BEEN TESTED FOR USE WITH DOORS. TO REDUCE THE RISK OF FIRE OR INJURY, DO NOT INSTALL DOORS";

- B Safe operation with bifold doors, to include a warning and diagram:

"WARNING - Fireplaces equipped with bifold doors should be operated only with doors fully open or doors fully closed. Bifold doors, if left partly open, may draw gas and flame out of the fireplace opening creating both heat and smoke hazards."

Exception: This warning may be omitted if tests show gas and flame are not drawn out of the fireplace doors in any possible opening position;

- C Inspection, (internal and external) maintenance and cleaning of the chimney including method of access through the top of the chimney assembly. (e.g. method of removing chimney cap);
- D Reference to the formation and removal of creosote build-up in the chimney as follows:

"Creosote - Formation and Need for Removal

When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow burning fire. As a result, creosote residue accumulates on the flue lining. When ignited this creosote makes an extremely hot fire.

The chimney should be inspected periodically during the heating season to determine if a creosote build-up has occurred. The presence in a chimney of soot or creosote in excess of 3mm thick will indicate the need for immediate cleaning, possible modification of burning procedures, and more frequent inspections.";

- E Recommendations on building the fire, maintaining the fire, and warnings against the possible consequences of overfiring;

- F Caution against the storage or use of flammable liquids, as follows:

"Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or 'freshen up' a fire in this fireplace. Keep all such liquids well away from the fireplace while it is in use";

- G Clearances from the front of the fireplace to combustible materials;

- H A caution regarding the need for an adequate supply of air for fireplace operation and the possible consequences of starving other fuel burning appliances of combustion, ventilation and dilution air as a result of fireplace operation;

- I Disposal of ashes, including the following statement:

"Disposal of Ashes

Ashes should be placed in a metal container with a tight-fitting lid, and taken outside and placed on the ground, well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled";

- J Reference to the use or non-use of grates, and irons, or other methods of supporting the fuel;

- K Operation and use of manual damper controls;

- L Operation and use of electrical assemblies;

- M A replacement parts list including illustration of parts and instructions for ordering replacement parts;

- N The manufacturer's name and address;

- O The use of fuels by including the following or equivalent statement:

"Use * fuel only."

*Solid wood, composite fire logs, or other specified type of fuel; and

- P A warning if composite fire logs are used: "Do not poke or stir the logs while they are burning. Use only composite fire logs meeting the requirements of ANSI/CAN/UL/ULC 2115, Processed Solid Fuel Firelogs and Firestarters. Refer to the fire log warnings and caution markings on packaging prior to use."

NOTE : The user should ensure smoke and carbon monoxide alarms are installed in the dwelling in accordance with the requirements of the authority having jurisdiction.

5.2.4 Where the factory-built fireplace system incorporates glass components, the instructions shall include:

- A Complete details for the removal of broken or damaged components;
- B The size, thickness, and specification of replacement glass components, including trade names and generic material;
- C Complete instructions on the reinstallation of the component including, where applicable, the use of gaskets, cushioning devices, and other accessories, and the need to maintain edge clearances;
- D A warning against the use of substitute materials;
- E A warning regarding abuse of glass doors such as slamming shut and the need to replace cracked or broken glass;
- F A caution against building the fire too close to the glass;
- G A warning against overfiring;
- H Directions and reasons for cleaning glass;
- I A warning against using abrasive cleaners; and
- J A warning against cleaning the glass when it is hot.

6 CONSTRUCTION

6.1 MATERIALS

6.1.1 A part of a factory-built fireplace systems, including its chimney assembly shall be made of non-combustible corrosion-resistant materials. Materials employed in the construction shall be of such quality and shall possess properties and characteristics which may be expected to provide the almost unlimited service life expected of a permanent portion of a building. Metals shall not be used in combinations such as to cause detrimental galvanic action which will adversely affect any part of the assembly.

6.1.2 The minimum thickness of sheet metal, including any coatings, shall, unless otherwise specified, be as follows:

Aluminum alloys (1100, 3003)	0.41 mm
Zinc-coated steel	0.46 mm
Aluminum-coated steel (122 g/m ²)	0.46 mm
Stainless steel, Series 300 and 400	0.31 mm
Unprotected steel sheets	1.07 mm
Painted steel sheets	0.46 mm

6.1.3 Aluminum alloys containing more than 1.0 % magnesium are not to be used if the reflectivity of the material is utilized to reduce fire hazard.

6.1.4 The inner liner of the chimney shall be of material having durability and resistance to fire, heat, and corrosion equivalent to or greater than that of a material specified in Column 1, Table 1. The lining of the combustion zone and other parts of the fire chamber in contact with the flue gases, shall be of material having durability and resistance to corrosion, fire, and heat at least equivalent to that of a material specified in Column 2, Table 1.

6.1.5 Cast refractory, clay tile, and porcelain-coated steel shall conform to the requirements of the applicable tests described for the material.

6.1.6 All portions of a chimney shall be fabricated from materials resistant to the corrosive effects of combustion products. An outer casing of the chimney shall be made of material having durability and resistance to physical damage, corrosion, and fire.

NOTE: Type 430 stainless steel ordinarily meets the requirements for the outer casing. Galvanized steel, zinc-aluminum coated steel, aluminized steel and aluminum have not been found to be equivalent for mass (solid) insulated chimneys. Other materials may be considered on the basis of an evaluation to determine equivalency.

6.1.7 Structural parts other than those noted in Clauses 6.1.4 and 6.1.6, whose failure would cause the factory-built fireplace system, including its chimney assembly to collapse or fail, shall be made of material having durability and resistance to physical damage, corrosion and fire.

NOTE 1: Plain galvanized steel having a coating of zinc conforming to ASTM A653/A653M, Standard Specification for Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated by the Hot-Dip Process, coating designation Z275, ordinarily meets the requirements of the foregoing.

NOTE 2: A painted part made of steel not less than 1.35 mm thick, or of cast iron not less than 3.18 mm thick, and for use only in the interior of buildings ordinarily meets the requirements of Clause 6.1.7.

6.1.8 Paint coatings on outer casings shall not ignite below the maximum temperature obtained on the outer case of the chimney during Test No. 2 - Creosote Burnout Test.

6.1.9 The materials referred to in Clauses 6.1.4 and 6.1.6 shall conform to the requirements contained in Test No. 16, Condensing Sulphur Dioxide, as described in Subsection 7.19.

6.1.10 Except for binder materials, thermal insulation material shall be noncombustible.

6.1.11 Thermal insulation shall comply with the following conditions when the factory-built fireplace system, including its chimney assembly are tested in accordance with the requirements of this standard:

- A The products resulting from the combustion or volatilization of any combustible binder shall be discharged to the chimney terminus outside of the building;
- B The insulating material shall retain sufficient strength to remain in its intended position;

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- C There shall be no evidence of an increase in the thermal conductivity; and
- D Thermal insulation shall not show evidence of softening, melting, change in physical structure, or other evidence of failure.

6.1.12 Thermal insulation shall be adequately protected against contact with products of combustion.

6.1.13 Thermal insulation which is not self-supporting shall be attached to solid surfaces in a manner to prevent sagging. An adhesive or cement for attaching 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.

6.1.14 The air duct system portion of a warm air circulating type fireplace shall be constructed entirely of corrosion-resistant sheet metal having a thickness as shown in Table 2.

Exception: Other materials classified as Class 1 air ducts as defined in CAN/ULC-S110, Standard Methods of Test for Air Ducts, may be used provided they have been investigated for the intended application.

6.1.15 A water-absorbing insulating material shall not become wetted by condensation or rain when installed as intended if such wetting will reduce its durability or insulating value.

6.1.16 Glass components shall be formed from fully tempered soda-lime glass, heat resistant glass, or other materials having heat resistant properties suitable for their application.

6.2 ASSEMBLY

6.2.1 A factory-built fireplace system shall consist of all the essential parts necessary for the proper installation of a complete fireplace system, including its chimney assembly. Each part or assembly shall be designed for ready attachment of one to the other without requiring alteration, cutting, threading, drilling, welding, or similar task by the installer; except that a special assembly or part designed to be cut to length or to fit by the installer may be provided if means are furnished for joining, such as by bolts or sheet-metal screws, any altered part to a companion part or assembly.

6.2.2 Two or more parts or subassemblies, which must bear a definite relationship to each other for proper and safe use, shall be arranged and constructed to permit them to be incorporated into the complete assembly, without need for alteration or alignment, only in the correct relationship with each other; or such parts or subassemblies shall be assembled and shipped from the factory as one unit.

6.2.3 A factory-built fireplace system intended for installation in a transportable building shall have means provided for the secure installation of the factory-built fireplace system to the floor of the transportable building.

6.2.4 Each part (such as a chimney section or length, a hood, fire screen, hearth extension, cap, firestop-spacer, support element, roof assembly or jack, etc. as applicable) shall be completely assembled by the manufacturer at the factory.

6.2.5 To be in conformance with the requirements of Clause 6.2.4, a chimney section comprised of a chimney liner, formed insulation or other intermediate assembly, and an outer jacket, which are separable, is to be pre-assembled and packaged as one unit. A firestop-spacer assembly may be constructed in two halves, but is to be packaged as one unit. In such cases, each separable part is to be completely formed, including the joining of all seams.

6.2.6 A factory-built fireplace system, when installed in accordance with the manufacturer's instructions, shall be positioned securely, resistant to damage from external forces, and stable. A hood, frame, or chimney assembly part, or any side, bottom, or other surface of a factory-built fireplace system located within the living space served by the fireplace and intended to be unenclosed, shall be strong enough to resist damage due to installation and operation in accordance with the manufacturer's installation instructions.

6.2.7 Means shall be provided for inspection and cleaning of all portions of the chimney.

6.2.8 The design of a fireplace shall not void the firestopping required between spaces of a building when the fireplace and its chimney assembly are installed in accordance with the manufacturer's instructions.

6.2.9 The design shall not permit the support of a combustible mantel projecting more than 40 mm within 300 mm of the top of a fireplace opening.

6.2.10 The fireplace shall have no exposed edges, corners or projections presenting a cut or puncture hazard.

6.2.11 Glass components shall not be rigidly mounted. Allowance for differential expansion and distortion shall be provided. The design of frames with not less than 3 mm total edge clearance or the use of heat resistant resilient mountings providing at least such clearances shall be considered as meeting this requirement.

6.3 JOINTS

6.3.1 Parts shall be joined and secured in a manner to prevent disengagement when tested in accordance with the requirements of this standard.

6.3.2 A joint in metal surfaces of a fire chamber shall be continuously welded, or of equivalent construction.

6.3.3 If screws are employed to field-join assemblies, the assemblies to be joined shall readily receive screws without being field-punched or field-drilled. Screws and instructions shall be furnished.

6.3.4 A joint shall not materially reduce the capacity of the chimney.

6.3.5 A joint shall not retain condensation nor permit condensation to flow from the interior to the exterior of the chimney.

6.3.6 The joints of chimney assemblies intended for exterior installation shall be designed to be resistant to the entry of rain.

6.3.7 A screw shall not extend into a flue-gas passage.

6.4 FIRESTOP-SPACERS

6.4.1 A chimney assembly intended to pass through a floor or ceiling of a building shall be provided with an assembly designed to provide firestopping at the framed joist opening and to establish and maintain required minimum clearances between chimney sections and combustible construction in this area. Spacers shall have sufficient strength and bearing surface to maintain the required clearance from chimney sections to the inner surface of joists and ceiling and floor material. Firestops may be placed above or below the joist.

6.4.2 To conform to the requirements contained in Clause 6.4.1, the size of a firestop shall be at least 25 mm greater on each side than the nominal joist opening for which the assembly is designed. A spacer shall provide for substantial continuous interference with the framed joist opening for a height or depth of not less than 25 mm. A joint between factory-made parts which provide for firestopping is not to have a through opening greater than 3 mm wide.

6.5 SUPPORTS

6.5.1 Chimney assemblies designed for joist support shall be provided with a support assembly.

6.5.2 A support assembly shall be designed to conform to the requirements for firestop-spacers and shall locate at a safe distance the point at which a flue pipe may be connected as determined by testing in accordance with the requirements of this standard.

6.5.3 Chimney assemblies designed for exterior installation shall be provided with both vertical and lateral support assemblies.

6.5.4 A support assembly shall be designed to sustain, without failure, a load equivalent to four times the mass imposed upon it by all chimney assembly parts it is intended to support, including the maximum permitted lengths of inclined chimney.

6.5.5 Inclined chimney sections shall be supported through each vertical return elbow at the first floor or roof above the inclined section.

6.5.6 The fireplace and elbows shall be designed to sustain without failure, a bending moment developed by a load equivalent to one and one half times the mass of the maximum unsupported length of chimney permitted by the manufacturer's installation instructions acting through the centre of gravity of the unsupported length.

6.5.7 Where inclined chimney assemblies are used, the method of joining sections shall be sufficiently strong to sustain a load equivalent to four times the vertical component of the mass of angled chimney length between supports applied transversely at the joint between two sections.

6.5.8 Supports for inclined chimney sections shall be capable of carrying four times the mass of the longest inclined chimney section between adjacent supports.

6.5.9 A support assembly intended to be secured by nails or screws shall be arranged so that such holding means will be loaded primarily in shear.

6.5.10 A lateral support assembly shall be designed so that a supported chimney assembly is able to resist a horizontal force of 1.44 kN/m² of projected area applied in any direction, without separation, sagging or other displacement or damage, and without distortion or dislodgement of the supports.

6.5.11 Exterior vertical and lateral support assemblies shall be designed to maintain specified clearances to adjacent combustible constructions.

6.6 RADIATION SHIELDS

6.6.1 A radiation shield, if provided to obtain safe temperatures on floor or ceiling structures, shall be an integral part of a firestop-spacer or support assembly and shall provide a continuous barrier for a vertical distance referenced to the ceiling or floor level of not less than 250 mm. The assembly shall fit into a framed joist area dimensioned not larger than 12 mm greater than the outside diameter of the chimney

plus twice the dimension to be specified for clearance between chimney sections and combustible enclosures. A radiation shield intended to penetrate an attic area shall fully enclose the chimney section for a depth of not less than 250 mm (See Figure 1).

6.6.2 Parts of a firestop-spacer or support assembly which provide incidental shielding from radiation to combustible construction shall not be considered radiation shields.

6.6.3 A radiation shield shall not be provided to obtain safe temperatures on roof structures if employed in a roof or other terminating assembly intended to be altered in the field if such alteration would require the shifting or relocation of the shield.

6.7 ATTIC INSULATION SHIELDS

6.7.1 An attic insulation shield shall be provided to restrict loose fill or other insulation from contacting the chimney section. The attic insulation shield assembly shall maintain a minimum air space clearance to combustible construction not less than the minimum air space clearance to combustible construction marked on the chimney sections. For the test installation, the vertical height of the shield above attic construction material shall be not less than 250 mm (see Figure 1).

6.7.2 The attic insulation shield shall be separate from the firestop-spacer when the shield is intended to be removed. Also, the removal of the shield, or any part of the shield, shall not affect the firestop-spacer assembly. When the shield is not intended to be removed, the attic insulation shield is integral with the firestop-spacer. The spacer assembly includes the attic insulation shield above the attic floor and the firestop-spacer below the attic joist.

6.7.3 An attic insulation shield shall be provided with a permanent marking, visible after installation, as specified in Clause 8.5, when the shield is:

- A Intended for installation in an unoccupied attic space;
- B Specified in the installation instructions in accordance with Clause 5.1.3 K; and
- C Tested in accordance with Clause 7.2.19.

6.7.4 When openings for ventilation in an attic insulation shield intended for installation in an unoccupied attic space are provided, the opening shall not be located less than 250 mm above the attic construction material and shall be constructed to prevent:

- A Entrance of insulation into the area between the chimney and the shield; and
- B Accumulation of the insulation near the openings, as determined by Test No. 20 – Attic Insulation Shield Ventilation Opening.

6.8 FIREPLACE FLUE DAMPERS

6.8.1 A fireplace flue damper mechanism, if furnished, shall :

- A Be so arranged that breakage of a part will not cause the damper to close; and
- B Have an operating mechanism to prevent accidental closure, and to enable the operator to open the damper without being exposed to excessive temperatures from the hearth.

6.8.2 Where the factory-built fireplace system is intended for installation in a transportable building, the fireplace flue damper shall be interlocked with the combustion air damper, where provided, such that opening the flue damper causes opening of the combustion air damper.

6.8.3 A fireplace flue damper setting mechanism shall be designed to provide a fully open and fully closed position of the flue damper and may provide for intermediate settings.

6.8.4 A fireplace flue damper setting mechanism providing for intermediate settings shall be so designed that when adjusted to its minimum opening position, other than the closed position, spillage of combustion products into the living space will not occur when the fireplace is fired in accordance with Subsections 7.6 and 7.7 with the front doors fully open. Damper/door interlocks, if provided, shall be disconnected in determining this condition.

6.9 CAPS

6.9.1 A cap shall be provided to prevent the entrance of debris or rain into the chimney liner and into any cooling-air passage terminating exterior to the building if such may cause the chimney assembly to become unsafe for use or cause damage to the factory-built fireplace system and its parts.

6.9.2 A cap shall be designed so that leaves and debris falling or blown onto it are not likely to be retained so as to obstruct flue-gas or cooling-air passages. A cap shall be designed to avoid accumulation of soot likely to obstruct flue-gas or cooling-air passages.

6.9.3 A cap shall be designed so that the angle of emission of the flue gases is above the horizontal.

6.9.4 A cap shall be removable to allow for chimney inspection and cleaning.

6.10 ROOF ASSEMBLIES

6.10.1 A roof assembly shall be capable of resisting, without damage or giving way, a load equivalent to 1.44 kN/m² of exposed area applied to any surface extending above the roof in accordance with the test method described in Subsection 7.12, Wind Load. The height of a roof assembly shall be such that the flue-gas exit will be not less than 900 mm above the roof flashing.

6.10.2 A roof assembly shall be resistant to weather and condensation. A roof assembly, when installed as specified by the manufacturer, shall prevent the entrance of water and debris into the building where the chimney assembly passes through the roof.

6.10.3 A roof assembly shall be designed so that debris is not likely to accumulate therein when such accumulation may obstruct flue-gas or cooling-air passages or remain in contact with chimney assembly parts having temperatures exceeding the requirements for zero clearance identified in Clauses 7.5.4, and 7.8.5.

6.11 CHIMNEY ASSEMBLY TERMINATION

6.11.1 The chimney assembly above the roof line shall be capable of readily being removed and reinstalled without special tools or instructions.

6.11.2 The chimney assembly termination above the roof line shall be such that the chimney can readily be added to or extended to increase the height above the roof.

6.12 FIRE SCREENS

6.12.1 A fire screen or screens, with a mesh having a maximum opening size of 6.4 mm and capable of covering all fire chamber openings, shall be furnished by the manufacturer as part of the fireplace, even when doors are provided.

6.13 HEARTH

6.13.1 Where the hearth consists essentially of refractory materials, such materials shall be backed with a continuous steel sheet.

6.14 OUTDOOR COMBUSTION AIR INLET

6.14.1 Where a factory-built fireplace system is provided with combustion air inlets, the inlets shall:

- A Provide combustion air directly from outdoors; and
- B Include dampers that allow complete closure.

6.14.2 The ducting system to the fireplace shall be supplied by the manufacturer.

6.15 DOORS

6.15.1 A fireplace may be equipped with integral door(s) or shutter(s) designed to close off the fire chamber from the living space.

6.15.2 Those portions of a handle or knob that are subjected to contact on a fireplace shall be smooth and rounded.

6.15.3 All doors or removable screens incorporating glass components shall be provided with means to positively secure the door or screen in the closed position.

7 PERFORMANCE

7.1 GENERAL

7.1.1 When a factory-built fireplace system is tested in accordance with these requirements, safe temperatures to combustible construction adjoining the factory-built fireplace system including its chimney assembly, and in the hearth extension floor area, shall be maintained; resistance to damage by wind, rain, and handling shall be demonstrated; and the creation of draft by normal thermal effects shall prevent the spillage of products of combustion from the fireplace opening.

7.1.2 Criteria for the successful completion of Test Nos 1 through 5 include:

- A No part of the factory-built fireplace system, including its chimney assembly shall be damaged or permanently distorted to an extent that it or the chimney assembly will not continue to function as intended; inner chimney liners shall not show any noticeable distortion (loss of roundness equivalent to 5% of the diameter shall not constitute noticeable distortion);
- B The effectiveness of any required protective coating or finish on metal parts shall not be impaired;
- C A ceramic material shall not show evidence of cracking, disintegration, nor spalling to an extent that the serviceability of the part of an assembly is impaired;

- D Cracks shall not be observable in porcelain enamel used as a required protective coating when the surface is examined under a microscope of 60 X magnification;
- E The reflectivity of a surface shall not be impaired if the reflectivity of such surface is utilized to reduce fire hazard;
- F Burning or scaling of metal parts shall not be evident by visual observation;
- G The k factor of the insulation shall not have changed by more than 20%; and;
- H The security of inter-sectional joints of chimney sections shall not have been impaired.

7.1.3 Insulated chimney sections shall be resistant to the corrosive effects of the insulation material(s) when tested in accordance with Test No. 19, Accelerated Corrosion.

7.1.4 When a forced air heating system is an integral part of the fireplace, the fireplace is to be tested with the motor de-energized.

7.1.5 The temperature of the outer surface of glass components shall not exceed the design limits for the material used.

7.2 TEST INSTALLATIONS

7.2.1 The test factory-built fireplace system, with a chimney assembly intended for inside installation, is to be installed in accordance with the manufacturer's installation instructions and erected in a structure similar to that illustrated in Figure 2, constructed to accommodate the fireplace as it is to be tested.

7.2.2 Factory-built fireplace systems are also to be tested in the installation shown in Figure 3 when the chimney assembly is intended for both interior and exterior installation.

7.2.3 Fireplaces equipped with door(s) shall be tested as described in Subsection 7.20, Test No. 17 — Impact of Glass Components, with the door(s) fully open and fully closed. During tests with the door(s) fully closed, the fireplace shall be operated with any draft control (inlet air) dampers fully opened until maximum temperatures have been obtained.

7.2.4 Tests are to be conducted as described by the following on each design of fireplace system. If the fireplace is manufactured in more than one size, tests are to be conducted on as many sizes as may be deemed necessary to determine conformance with these requirements. A fireplace chimney assembly is to be tested on the following basis:

- A Height of chimney; and
- B Minimum clearance of chimney sections to combustible construction.

7.2.5 If the use of elbows is recommended by the manufacturer, factory-built fireplace systems are to be tested as described in Subsections 7.6 through 7.8 and erected as shown in Figure 4.

7.2.6 Factory-built fireplace systems are ordinarily to be tested using the shortest chimney height recommended by the manufacturer. If the design indicates that higher temperatures would be developed with a taller chimney, tests are to be conducted with a height producing the most severe temperature condition, but not employing a height greater than that recommended by the manufacturer in the installation instructions. Where the testing of chimneys of the greatest height is impracticable, acceptance may be based on the extrapolation of results developed on not less than three shorter heights, one of which shall be at the 10.5 m level.

7.2.7 The test assembly is to be erected within a room which is reasonably free of drafts, and the chimney assembly is to exhaust into the same space or into a space freely communicating with that from which the combustion air is taken. The room is to be such that during any one test the room temperature does not increase more than 11 °C above the room temperature at the beginning of the test.

7.2.8 Cooling-air openings into the fireplace assembly are to be sealed unless:

- A The openings are more than 40 mm above the floor and are so arranged that accidental closure is unlikely;
- B The openings are unlikely to be blocked by the user to overcome a nuisance (such as downdrafts, a cold room or an overheated room); and
- C The cooling air is drawn from the room in which the fireplace is installed and is discharged into the same room or into the flue-gas passageway below the fireplace flue damper.

7.2.9 If a chimney assembly is designed for taking air from the interior of a building and exhausting such air to the outside of a building to cool the chimney assembly, all the openings in the parts as assembled, intended to provide such air flow and which would be within the building, are to be closed during the tests.

7.2.10 If a fireplace assembly is designed for taking air from the outside of a building to cool the assembly, the test arrangement is to provide means for maintaining the temperature of such air at $27 \pm 5^\circ\text{C}$.

7.2.11 The test chimney assembly of the fireplace system is to consist of a vertical assembly composed of standard chimney sections and other furnished parts erected according to the manufacturer's installation instructions. The configuration of the top of the test chimney is to be terminated by the roof assembly and cap — only if these are always provided as a functional part of the chimney assembly. Other parts constituting functional parts of the chimney assembly, such as a support, firestop-spacer, etc., are to be used in the test.

7.2.12 That part of the test structure representing the living-space area in which the fireplace is to be installed is to consist of a back wall, one side wall, a combustible floor, and a typical ceiling and floor construction above. (See Figures 2 and 5.)

7.2.13 The combustible floor below the fireplace is to consist of two layers of 18.5 mm thick fir plywood over 38 mm by 89 mm floor supports placed on 400 mm centres, with a layer of 9.5 mm thick plywood on the lower surface of the supports.

7.2.14 The side wall and back wall are each to consist of one thickness of 18.5 mm plywood, painted matte black.

7.2.15 The ceiling and floor construction immediately above the fireplace is to be constructed with 235 mm joists on 400 mm centres. Joists at intermediate floors and at the roof are to be as indicated in Figure 5. A ceiling is to consist of one thickness of 18.5 mm plywood painted matte black. Flooring over the joists is to consist of two layers of 18.5 mm plywood. Roofing is to consist of one layer of 18.5 mm plywood.

7.2.16 The floor under, and the ceiling over, the fireplace are to be 2400 mm apart and are to extend at least 1200 mm in front of the fireplace opening. The side wall is to be placed perpendicular to the back wall at the minimum distance specified by the manufacturer but not more than 1200 mm from the near side of the fireplace opening. The floor, ceiling, and back wall are to join the side wall. The floor, ceiling, and back wall are to extend at least 1200 mm beyond that side of the fireplace opening which is opposite the side wall. Fireplaces intended solely for corner installation shall be installed in accordance with the manufacturer's instructions.

7.2.17 The fireplace is to be placed on the floor and against the back wall of the test structure. Other areas of the fireplace likely to be in contact with combustible construction if the fireplace is recessed or enclosed, such as warm air outlet ducts, air inlet ducts and accessories, where provided, the sides, bottom and top are to be enclosed with one layer of 18.5 mm plywood. Areas of the fireplace which are not likely to be recessed, enclosed, or otherwise concealed with combustible material should be exposed during the test, refer to item 5.1.3 W. The face areas of a fireplace which are intended to be covered with decorative materials, such as slate, tile, marble, etc., are to be covered with such materials if provided with the fireplace, otherwise with 9.5 mm thick insulating board. Areas of the fireplace incorporating warm or cold air ducts shall be enclosed in accordance with the manufacturer's installation instructions.

7.2.18 Unless the manufacturer's installation instructions specify that any hood or chimney section above the fireplace and within the living space in which the fireplace is located are to be fully exposed, they are to be enclosed on the front and sides with (1) 9.5 mm thick plywood for the chimney section and (2) 18.5 mm thick plywood for the hood section carried to the back of the test structure. Plywood enclosure material for the chimney section is to be placed vertically and horizontally on the basis of clearance to the enclosure of 0, 25, or 50 mm as recommended by the manufacturer, measured between the outer surfaces of the chimney section and the interior surfaces of the enclosing material. For the hood section, the plywood enclosure material is to be placed vertically and horizontally against points of normal contact. The enclosure shall not be vented unless this is an integral part of the fireplace system.

7.2.19 The test chimney assembly of the factory-built fireplace system is to be totally encased for its full height within all storeys and attic space. Fireplace chimney assemblies are to be tested on the basis of clearance to the enclosure of 0, 25, or 50 mm, as recommended by the manufacturer, measured between the outer surface of the chimney-pipe sections and the interior surfaces of the enclosing material. Such clearance is designated by the dimension "X" in Figures 6 through 11. The test-enclosure casing material is to be 9.5 mm thick plywood and is to be closed at each joist level by the installation of a manufacturer's firestop or firestop-spacer assembly.

Exception: A chimney intended for installation in an unoccupied attic space as described in Clause 6.7.3, is to be tested as shown in Figure 11 (2) and (3), or (2) and (4), as applicable.

7.2.20 Outside combustion air and warm air circulation ducts are to be enclosed within a structure representative of the worst case diameter to length ratio field installations described in the manufacturer's installation instructions.

7.2.21 Where outside combustion air ducts are provided by the manufacturer, they shall be wrapped with non-combustible insulation having an insulating value of RSI 0.17. Alternatively, the ducts shall be enclosed with 18.5 mm plywood at zero clearance on four sides. (See Figure 12).

7.2.22 Where provided, combustion air ducts shall be installed to draw air from the highest elevation as specified in the manufacturer's installation instructions.

7.2.23 Where provided, the warm air ducts shall be installed with their outlets in the closest approach to the ceiling, as permitted by the manufacturer's installation instructions.

7.2.24 Where provided, combustion air ducts shall be installed in the configuration in which the highest temperatures were recorded during the radiant fire test.

7.2.25 Gaps or joints between a chimney section and firestop material, at any penetration of a building envelope, shall be sealed to prevent air and vapour leakage. In all other locations, gaps between chimney sections and firestop material shall not be sealed. Gaps or joints between firestops and combustible construction are to be sealed with tape. Joints between two or more factory-made parts, which in combination provide a firestop, are to be similarly sealed. Joints between one chimney section and another are not to be sealed.

7.2.26 The test-enclosure material at each floor joist level is to be of 38 mm by 235 mm, 184 mm, or 140 mm lumber, as the case may be, forming a box placed at zero clearance to the chimney sections or to a manufacturer's support or firestop-spacer assembly. The test-enclosure material at the roof joist level is to be of 38 mm by 140 mm lumber forming a box placed at the clearance specified by the manufacturer for enclosures or at the lesser clearance required to provide support means for a roof assembly. (See Figures 8, 9 and 10.) All ceiling, floor, and roof material is to be cut flush with the inside of all framed joist openings.

7.2.27 The hearth-extension floor area, for a factory-built fireplace system not provided with a factory-built hearth extension, is to be covered with 9.5 mm thick insulating board, painted matte black.

7.2.28 All joints and openings between spacers or supports and the test enclosure, and all joints in the test enclosure walls are to be sealed with tape.

7.2.29 An insulated chimney is to be preconditioned by the vibration test described under Test No. 18.

7.3 TEMPERATURE MEASUREMENT

7.3.1 The inlet flue-gas temperature to the chimney is to be determined during Test Nos. 1 and 2 by a 5-thermocouple grid located within the insulated outlet of the flue-gas generator (See Figure 13). The thermocouples are to be Type K (chromel-alumel) of 0.51 mm diameter with untwisted welded bead junctions of minimum size (not over 1.27 mm) enclosed in a suitable sealed tube of inside diameter of approximately 1.5 mm.

7.3.2 The temperature of glass components, at not less than five locations, shall be monitored throughout the firing tests using an infra-red radiation thermometer. The highest reading shall be recorded as the component temperature.

7.3.3 Temperatures other than flue-gas and glass temperatures are to be measured by Type J (iron-constantan) thermocouples not larger than 0.51 mm in diameter. For structural elements in contact with fireplace, external ducts and chimney assembly parts, junctions of thermocouples are to be placed on the fireplace, external ducts and chimney-part surfaces, except that where a point or line contact of a spacer not over 3 mm diameter or width is made, thermocouples are to be placed on the test structure at points 12 mm from the centre line of such point or line contact. For structural elements having a free surface adjacent to the fireplace and chimney assembly, and on walls, ceilings, or floor areas likely to be exposed to heat, the thermocouples are to have 12 mm of wire exposed and are to be secured by staples over the insulated portion of the wires. The junctions are to be depressed flush with the surface and held in thermal contact with the surface by matte black tape. For hearth extensions, the thermocouples are to be placed between the hearth extension, if supplied with the fireplace, or hearth extension material and the plywood flooring.

7.3.4 Temperatures attained by surfaces of parts of the factory-built fireplace system, including its chimney assembly are to be obtained by means of thermocouples applied to assure good thermal contact with the parts. Thermocouples to be attached to surfaces of metal parts are to have junctions silver-soldered to the surface. Thermocouples to be attached to surfaces of nonmetallic parts are to have junctions and at least 25 mm of the lead wires embedded flush with the surface of the material. Furnace cement is to be smoothed over such indentations to assure thermal contact. Such thermocouples are to be located at points attaining maximum temperatures. Additional thermocouples may be placed at other locations as deemed necessary.

7.3.5 Room or ambient temperatures are to be obtained by shielded thermocouples located centrally within a 150 mm length of aluminum-painted 50 mm steel pipe open at both ends. Ambient temperatures are to be determined by such shielded thermocouples located with suitable reference to the various parts of the fireplace, test structure and flue-gas generator, and by placing the shield in a manner to avoid direct radiation to the thermocouple.

7.3.6 In Zone A (Figure 2), the ambient temperature is to be determined by a thermocouple located 150 mm away from the side wall, 2100 mm from the back wall, and 1200 mm above the floor; except during Test No. 2 the ambient temperature for chimney assembly parts and enclosures in Zone A is to be the average determined by two such thermocouples located 300 mm down from the ceiling, 300 mm away from the back wall, and 600 mm away from the right- and left-hand sides of the chimney assembly enclosure.

7.3.7 For Zones B, C etc., above Zone A, the ambient temperature is to be determined by a thermocouple located 600 mm away from the front centre line of the enclosure and 1200 mm above the floor.

7.3.8 For the space above a roof line the ambient temperature is to be determined by a thermocouple located 600 mm away from the front centre line of the chimney assembly or roof assembly and 300 mm above the roof.

7.3.9 For purposes of determining temperature rise on parts of a factory-built fireplace system, including its chimney assembly, and on enclosures and structure, the temperatures of such are to be referenced to ambient temperatures determined as specified above. Temperatures of joists and rafters are to be referenced to the average of the ambient temperatures above and below the joist or rafter area. Temperatures of floor or roof material are to be referenced to the ambient temperatures above the floor or roof. Temperatures of ceiling material are to be referenced to the ambient temperature below the ceiling.

7.3.10 For fireplace assemblies designed for taking air from the outside of a building to cool the device, the ambient temperature of the space into which the chimney assembly exhausts is to be measured by a thermocouple located on a horizontal plane with the opening provided for the admission of outside air and 900 mm distant from such opening. This temperature is to be maintained at 27 ± 5 °C during all tests for temperature.

7.3.11 Combustion air ducts (where provided) shall be tested in each configuration illustrated in the manufacturer's installation instructions. Refer to Figure 12 for typical configurations and thermocouple locations.

7.3.12 During any of the tests, temperatures are to be determined with any fireplace screens removed or withdrawn.

7.3.13 Thermocouples are to be attached to the warm air duct portions of warm air circulating type fireplaces as shown in Figure 14 and as described below:

Air Duct

- A One on the top of each elbow;
- B One on the face of each grille.

7.3.14 The warm air outlet air temperature of a warm air circulating type fireplace is to be determined with parallel connected bead-type thermocouples, not heavier than 0.20 mm² located 25 mm from the outer face of the warm air grille or register.