

Method of Test

The support assembly is to be installed as described in the manufacturer's installation instructions and in a framework simulating a typical installation. The venting, and if provided, air intake system is to be placed on the support(s), and loaded by means of weights or by a machine. The maximum static load applied is to be equal to four times the load imposed by the heaviest assembly that the support will be required to sustain in service. The load is to be applied for a minimum of 60 minutes.

2.33.12

Wind Load Test

A roof assembly shall withstand, without damage or opening of joints, a load equivalent to 30 lb/ft² (146 kg/m²) of exposed area applied to any surface extending above the roof, when tested as described below.

Method of Test

The test is to be conducted on the tallest roof assembly representative of each style furnished by the manufacturer. The assembly is to be installed in a flat roof deck as described in the manufacturer's installation instructions.

The projected area of the largest surface of the load assembly exposed to wind is to be computed by multiplying the diameter or the widest average dimension of the roof assembly, whichever is greater, by the greatest height of the assembly measured from the roof to the top of the vent.

A load equivalent to the product of the projected area, expressed in square feet (m²) multiplied by an assumed wind pressure of 30 lb/ft² (146 kg/m²) is to be applied to the surface of the assembly in a horizontal direction. If a uniform surface load cannot be applied, the load is to be applied at the middle of the height used to calculate the projected area so that the load is evenly distributed over as much of the surface as practical. (See Figure 21, Wind Load Test on Roof Assembly.) The load is to be sustained for 60 minutes.

2.33.13

Torsion Test for Corrugated or Flexible Vent/Air Intake Terminals

A corrugated or flexible vent/air intake terminal shall not break open, split, change shape, crease or otherwise be deformed when tested as described below.

Method of Test

A single length of flexible vent, and if provided, air intake piping shall be attached to rigid end fittings as supplied by or in accordance with the manufacturer's instructions. If the piping does not incorporate rigid end fittings, it is to be connected to the appliance collar(s) at one end and the terminal collar(s) at the other end in accordance with the manufacturer's instructions. One end is to be attached to the test structure in a manner that prevents rotation at the point of attachment. The other end is to be rotated 180 degrees clockwise, or subjected to a clockwise torque of 25.8 ft lb (35 N-m) whichever occurs first as shown by Figure 22, Torsion Test for Corrugated or Flexible Vent/Air Intake Terminals, and then rotated to its original position. The pipe is then to be rotated 180 degrees counterclockwise, or subjected to a clockwise torque of 25.8 ft lb (35 N-m), whichever occurs first, and then rotated to its original position. This procedure is to be repeated five times on both the flexible vent, and if provided, air intake pipes.

2.34 Joints In Direct Vent Systems

Joints in direct vent systems shall be tight. This provision shall be deemed met if leakage from the system is not in excess of the limits specified in the following Method of Test. After completion of 2.13, Delayed Ignition and Integrity Tests for Direct Vent Gas Fireplace Heaters, the manufacturer can provide another unit that has passed one delayed ignition test before commencing the following test.

Method of Test

The vent-air intake terminal(s) shall be removed and the entrance of the air intake system at the point it enters the combustion chamber sealed. The entire system, including the combustion air and flue gas connections between the appliance and the vent-air intake terminal(s), shall be installed and sealed in accordance with the manufacturer's instructions.

Both ends of the flue outlet and the air inlet system shall then be sealed. The sealing means shall include fittings for supplying air to both the air inlet and combustion chamber sections of the system and provisions for measuring the internal pressure in each section of the system.

The internal pressure in the system shall be determined by connecting the means for determining internal pressure to a water-filled manometer which may be read directly to 0.01 in wc (2.5 Pa).

A suitable supply of clean air shall be permitted to flow through a wet test meter and into the section of the direct vent system being pressurized through the air supply fitting. The air supply fitting to the section of the system not being pressurized shall be open.

The internal air pressure in the section of the system being pressurized shall be adjusted to:

1. 0.1 in wc (24.9 Pa) above the normal operating system pressure for forced draft systems operating at positive combustion chamber pressures; and
2. 0.1 in wc (24.9 Pa) for all other systems.

The leakage rate shall be noted for both the air inlet and combustion chamber sections of the direct vent system.

This provision shall be deemed met if the measured leakage rates for both the combustion chamber section and the air inlet section of the direct vent system do not exceed their respective allowable leakage rates as determined by the following appropriate formulae* listed below. This provision shall also be deemed met if the leakage from the unseparated combustion chamber and air inlet sections of the system does not exceed 4.0 percent of the products of combustion. These values shall be determined by the following appropriate formulae*:

$$L_{cf} = 0.04 \times V_f \times I_b$$

$$L_{af} = 0.08 \times V_f \times I_b$$

where:

$$L_{cf} = \text{allowable leakage rate from combustion chamber section of the direct vent system, ft}^3/\text{hr.}$$

* These formulae may be simplified to read: $L_{cf} = 0.6 I_b$ and $L_{af} = 1.2 I_b$
 $L_{cm} = 0.029 I_w$ and $L_{am} = 0.116 I_w$

- L_{af} = allowable leakage rate from air inlet section of direct vent system, ft³/hr.
- V_f = 15 ft³ of flue products based on the formation of approximately 10 cu ft of wet flue products, plus 5 ft³ of excess air, when 1000 Btu of fuel gas is burned.
- I_b = appliance input rate, in thousands of Btu.

or

- L_{cm} = $0.04 \times V_m \times I_w$
- L_{am} = $0.08 \times V_m \times I_w$

where:

- L_{cm} = allowable leakage rate from combustion chamber section of the direct vent system, m³/h.
- L_{am} = allowable leakage rate from air inlet section of direct vent system, m³/h.
- V_m = 1.45 m³ of flue products based on formation of approximately 0.967 m³ of wet flue products, plus 0.483 m³ of excess air, when 3.6 MJ of fuel was burned.

2.35 Allowable Vent Pipe, Heating Element And Load-Bearing Flue Gas Baffle Temperatures

- a. All parts of the heating element, including the vent pipe, (if the appliance employs a direct vent system), which may be subject to corrosion and are in contact with the flue gases shall attain a temperature, from a cold start within the period of time indicated in Table X, Time Required to Attain Minimum Temperature, of not less than 200°F (94°C) for the vent pipe, and 150°F (66°C) for the heating element.

Appliances complying with the provisions for heating elements located downstream from refrigeration coils, see 1.33, Heating Elements Located Downstream from the Refrigeration Coils, and 2.38, Heating Elements Located Downstream from Refrigeration Coils, need not comply with this provision.

For appliances equipped with multi-rate or modulating controls and having carbon dioxide concentrations below 7 percent in flue gas samples secured as specified under 2.4.2, when operating at the minimum test rate, the minimum allowable heating element temperature, including vent pipe if the appliance employs a direct vent system, shall be that corresponding to the carbon dioxide concentration as shown in Figure 16, Chart for Determination of Minimum Allowable Heating Element Temperatures on Appliances Equipped for Modulated Operation. If the fireplace is equipped with a circulating air blower/fan, it shall be in operation during the conduct of this test.

- b. No external surface of the heating element, including the vent pipe, (if the appliance employs a direct vent system) or load bearing flue gas baffle, shall exceed the temperature indicated in Table XI, Maximum Heating Element and Load-Bearing Flue Gas Baffle Temperatures, when tested under continued operation. Air ducts and vent pipes fabricated from aluminum shall not attain temperatures in excess of 630°F (350°C) above room temperature.

Method of Test

For the purpose of this test, the appliance shall be installed as specified in 2.23, Wall, Floor and Ceiling Temperatures, and operated at normal test pressure.

With the appliance in normal operation, the heating element and the vent pipe surfaces shall be explored to determine approximately the regions of maximum and minimum temperatures. In the case of a fan type gas fireplace heater, the fan shall become operative immediately and shall remain in continuous operation. When these locations have been determined, the gas supply shall be shut off and the appliance allowed to cool to room temperature. At least five No. 24 AWG (0.21 mm²) bead-type thermocouples for both hot and cold locations shall then be silver-soldered to the surface of sheet-metal heating elements, or peened into holes drilled in cast-iron elements, adjacent to the hottest and coldest locations, as previously determined.

With all parts at room temperature, the gas from the pilot(s), if provided, shall be ignited and allowed to operate for 1 hour. The appliance shall then be placed in operation and temperature readings obtained by means of the thermocouples individually connected to a temperature indicating device. The time required for the heating element to attain the required minimum temperature shall be recorded. Temperature readings shall then be recorded at 15 minute intervals until equilibrium conditions have been established, as indicated by temperature changes of not more than plus or minus 5°F (2.7°C) between readings. When equilibrium conditions have been attained, the maximum temperature recorded shall not exceed the temperature specified in Table XI, Maximum Heating Element and Load-Bearing Flue Gas Baffle Temperatures. If the fireplace heater can operate without a circulating air blower/fan in operation, this test shall be conducted without the blower/fan in operation.

2.36 Automatic Vent Damper Devices

Automatic vent damper devices shall comply with the applicable performance provisions of the Standard for *Vent Damper Devices*, ANSI Z21.66 • CGA 6.14.

2.37 Cooling Section Of Appliances With Cooling Units

When an electrically driven compression type refrigeration unit is combined with an appliance in a common casing, the unit shall comply with all performance tests outlined in the *Safety Standard for Heating and Cooling Equipment*, ANSI/UL 1995; or the *Safety Standard for Room Air Conditioners*, ANSI/UL 484, whichever is applicable; and with the *Standard Safety Code for Mechanical Refrigeration*, ANSI/ASHRAE 15; or the *Standard for Pipes, Ducts, and Fittings for Residential Type Air Conditioning Systems*, CSA B228.1; the *Standard for Room Air Conditioners*, C22.2 No. 117; the *Standard for Commercial and Residential Air Conditioning Equipment*, C22.2 No. 236; and the *Standard for Mechanical Refrigeration Code*, ANSI/ASME B52.

2.38 Heating Elements Located Downstream From Refrigeration Coils

Appliances having heating elements located downstream of cooling units which supply air at temperatures below the dew point of the ambient air shall be of such design that condensate from within the heating element(s) will not fall on any portion of the pilot(s), burner(s) or burner carry-over arms which will permit its entry to the inside of the pilot(s), burner(s) or burner carry-over arms.

Method of Test

The blower shall be operated to circulate air through the appliance. The burner(s) shall not be in operation.

Steam shall be directed into the heating element(s) through the flue outlet(s) for a sufficient length of time to determine the pattern of condensate flow within the heating element(s). Care shall be used in selecting the velocity and direction of steam flow to avoid an unnatural flow of condensate within the heating element(s).

Condensate shall not enter the inside of the pilot(s), burner(s) or burner carry-over arm.

2.39 Marking Material Adhesion And Legibility

Marking material recognized as complying with the Standard for *Adhesive Labels, CSA 2.22 No. 0.15*, or the Standard for *Marking and Labeling Systems, UL 969*, and determined to be suitable for the conditions of intended use by the testing agency, must comply with 2.39-a under the Method of Test.

The adhesive quality of Class IIA-3, IIA-4, IIIA-1 and IIIA-2 marking materials and the legibility of all Class II, IIIA and IIIB marking materials (see 1.35.1) shall not be adversely affected when the marking materials are exposed to heat and moisture as specified in the following Method of Test.

Method of Test

- a. Adhesive type marking materials shall be applied to a sample test panel having the particular type of finish used on the appliance in production. A sample metal panel of this finish shall be cleaned with a solvent and dried. Half of the panel shall be wiped with a clean cloth lightly oiled with SAE-30 medium machine oil. Two samples of marking material shall be applied to the panel, one on the dry area and one on the oiled area. Test samples shall be applied with firm pressure, unless the manufacturer's application instructions specify otherwise. Each sample shall be allowed to set for 24 hours at room temperature.

Each sample of marking material shall exhibit:

1. Good adhesion and no curling at edges;
 2. No illegible or defaced printing when rubbed with thumb or finger pressure; and
 3. Good adhesion when a dull metal blade (as the back of a pocketknife blade) is held at 90 degrees (1.57 rad) to the applied marking and scraped across the edges of the marking.
- b. Non-adhesive type marking materials shall exhibit no illegible or defaced printing when rubbed with thumb or finger pressure. Two samples of marking material shall be tested.
 - c. The sample marking materials tested in -a and -b above shall then be placed in an oven for a period of 2 weeks with the oven temperature maintained at:
 1. 350°F (176.5°C) for Class IIA-1, IIA-2, IIA-3, IIA-4 and IIIA-1 marking materials;or
 2. 250°F (121°C) for Class IIIA-2 and IIIB marking materials.

Following the oven test, adhesion and legibility of the samples shall be checked again as specified in "-a" or "-b" above.

The same samples shall then be immersed in water for a period of 24 hours, after which adhesion and legibility shall be rechecked as specified in "-a" or "-b" above.

Good adhesion and legibility qualities shall be obtained under all of the above test conditions.

Final acceptance of marking materials shall be based on the suitability of the marking material on the appliance.

***Tables Referenced In
Part I, Part II And Exhibits***

Table I**Minimum Thickness Of Sheet Metal And Materials*****

Metal Surfaces Exposed to Combustion Products*	Minimum Thickness, Inch (mm)	
Low-Carbon Steel	0.0304	(0.772)
Grey Cast Iron		
Chrome Alloy Cast Iron 0.5 to 1.0 percent Cr, 0.2 to 0.5 percent Cu or Ni	as	cast
Low-Carbon Steel Coated with A-19; Thickness of base metal	as	cast
Low-Carbon Steel Coated on both sides with Fused Porcelain Enamel; Thickness of base metal	0.0254*	(0.645)
Aluminum-Coated Steel in which the bond between the steel and the aluminum is an iron-aluminum alloy	0.0254*	(0.645)
Chromium-Coated Low Carbon Steel in which Chromium is diffused into the surface of the steel to form an iron-chromium alloy	0.0254	(0.645)
Chrome Steel (11 Chrome)	0.0225	(0.572)
AISI Type 410 (13 Chrome)	0.0225	(0.572)
AISI Type 430 (17 Chrome)	0.0225	(0.572)
AISI Type 321 (18-8 stabilized with Ti)	0.0195	(0.495)
AISI Type 347 (18-8 stabilized with Cb)	0.0195	(0.495)
AISI Type 309C (25-12 stabilized with Cb)	0.0195	(0.495)
Casings, Liners and Radiation Shields		
Inner Liners and Radiation Shields not Exposed to Combustion Products	0.0152	(0.386)
Exterior Casings**	0.0254	(0.645)
Metal Vent Tubes		
Aluminum-coated Steel in which the bond between the steel and the aluminum is an iron-aluminum alloy	0.254	(0.646)
Aluminum having corrosion resistance at least equivalent to Type 1100	0.020	(0.51)
Corrugated Type 3003 Aluminum (single ply) (complying with 1.24.10)	0.016	(0.406)
Corrugated Type 3003 Aluminum (doubleply) (complying with 1.24.10)	0.005	(0.127)
AISI Type 430 (17Chrome) Stainless Steel	each layer 0.012	each layer (0.30)

* Detachable draft hoods exempted

** Based on C1010 roll sheet steel

*** The minimum thickness of material not shown shall be the thickness shown in Table XI, Maximum Heating Element and Load-Bearing Baffle Temperatures, for a material having an equal or nearest lower maximum usage temperature.

Table II**Minimum Acceptable Wall Thickness For
Non-Ferrous Semi-Rigid Tubing**

Outside Diameter		Minimum Acceptable Wall thickness	
Inch	(mm)	Inch	(mm)
1/8	(3.2)	0.020	(0.51)
3/16	(4.8)	0.025	(0.64)
1/4	(6.4)	0.029	(0.74)
5/16	(7.9)	0.029	(0.74)
3/8	(9.5)	0.032	(0.81)
7/16	(11.1)	0.032	(0.81)
1/2	(12.7)	0.038	(0.97)
9/16	(14.3)	0.038	(0.97)
5/8	(15.9)	0.038	(0.97)
3/4	(19.1)	0.045	(1.14)
7/8	(22.2)	0.045	(1.14)

Table III**Maximum Tubing And Fitting Temperatures**

Material	Maximum Allowable Temperature, °F (°C)	
Aluminum	700	(371)
Tinned Copper	350	(176.5)
Steel (AISI Type C1010)	800	(427)
AISI Type 410 Stainless Steel	1000	(538)
AISI Type 430 Stainless Steel	1240	(671)
AISI Type 446 Stainless Steel	1600	(871)

Table IV
Characteristics Of Test Gases

	Heating Value		Sp Gr
	(Btu/ft ³)	(Mj/m ³)	(Air = 1.0)
Gas A (Natural)	1075	(40.1)	0.65
Gas D (n-Butane)	3200	(119.2)	2.00
Gas E (Propane HD 5)	2500	(93.1)	1.55
Gas G (Butane-Air)	1400	(52.2)	1.42

Table V
Inlet Test Pressures

Test Pressure - Inches Water Column (kPa)

Test Gas	Reduced	Normal	Increased
A	3.5 (0.87)	7.0 (1.74)	10.5 (2.61)
D	8.0 (1.99)	11.0 (2.74)	13.0 (3.23)
E	8.0 (1.99)	11.0 (2.74)	13.0 (3.23)
G	3.5 (0.87)	7.0 (1.74)	10.5 (2.61)

Table VI
Maximum Safety Control Timing

	Timing in seconds
Continuous Ignition	
Pilot Flame-establishing period	120
Flame failure response time (g)	180
Flame failure re-ignition time	0.8
Valve closing time	(b)
Intermittent Ignition	
Pilot Flame-establishing period	90(c)
Flame failure response time (g)	180
Flame failure re-ignition time	0.8
Valve closing time	(b)
Interrupted Ignition	
Ignition means flame-establishing period	90
Trial for Ignition Period	90(c)
Flame failure response time (d) (g)	180
Flame failure re-ignition time (e)	0.8
Valve closing time	(b)
Direct Ignition	
Valve sequence period	60
Flame failure response time (g)	60
Flame failure re-ignition time	0.8
Valve closing time	(b)
Proved Igniter	
Ignition failure response time	90
Pilot flame failure response time (g)	90(f)
Flame failure re-ignition time	0.8(f)
Valve closing time	(b)

- (a) For sectional type appliances where there is any interconnection between sections below the draft hood.
- (b) Included in flame failure response time.
- (c) Includes main gas valve pilot and main burner flame failure.
- (d) Applicable to both pilot and main burner flame failure.
- (e) Applicable to pilot flame failure re-ignition only.
- (f) These values apply when the ignition system utilizes an intermittent ignition source (2.9.3 and 2.9.4)
- (g) Direct vent fireplaces shall not exceed 30 seconds.

Table VII**Maximum Temperature For Glass**

Material	Maximum Temperature	
	°F	(°C)
Tempered (Soda-Lime) Glass & Toughened 3.25 x 10 ⁻⁶ /°K Expansion Borosilicate Glass	500	(260)
Annealed Borosilicate Glass with 3.25 x 10 ⁻⁶ /°K Expansion	446	(230)
Ceramic Glass	1328	(720*)
Other Glass Materials	**	**

* Use lower of 1328°F (720°C) or the manufacture's maximum absolute temperature.

** Absolute temperature as specified by the material supplier for normal service conditions.

Table VIII**Maximum Flame Spreader Temperatures***

Metal	Maximum Temperature Rise Above Room Temperature,	
	°F	(°C)
Gray Cast Iron	930	(516.5)
Chrome Alloy Cast Iron, 0.5 to 1.0 percent Cr, 0.2 to 0.5 percent Cu or Ni	1230	(683.5)
Ductile (Nodular Cast Iron	1230	(683.5)
Chrome Alloy Steel, 5 percent Cr, 0.45 to 0.65 percent Mo, 1.0 percent Si	1280	(711)
AISI Type 430	1325	(736)
AISI Type 442	1550	(861)
AISI Type 446	1640	(911)
AISI Type 39C0	1730	(961)

* The maximum usage temperature of steel not shown shall be 90 percent of scaling temperature for the material. (Temperatures shown have been determined on this basis, temperatures of Chrome Alloy and Ductile Cast Iron are limited on the basis of excessive decarbonization above temperatures shown.)

Table IX**Maximum Nonload-Bearing Flue Gas
Baffle Temperatures***

Metal	Maximum Temperature Rise Above Room Temperature, °F (°C)
Low Carbon Steel	930 (516.5)
Gray Cast Iron	930 (516.5)
Ceramic-Coated Steel (A-19 or equivalent)	1030 (572)
Aluminum-Coated Steel in which the bond between the steel and the aluminum is an iron-aluminum alloy	1030 (572)
Chrome Alloy Cast Iron, 0.5 to 1.0 percent Cr, 0.2 to 0.5 percent Cu or Ni	1230 (683.5)
Ductile (Nodular) Cast Iron	1230 (683.5)
Chromium-Coated Low Carbon Steel in which the chromium is diffused into the surface of the steel to form an iron-chromium alloy.	1280 (711)
Chrome Alloy Steel, 5percent Cr, 0.45 to 0.65 percent Mo, 1.0 percent Si	1280 (711)
AISI Type 430	1325 (736)
AISI Type 309C	1730 (961)

* The maximum usage temperature of steel not shown shall be 90 percent of scaling temperature for the material. (Temperatures shown have been determined on this basis, temperatures of Chrome Alloy and Ductile Cast Iron are limited on the basis of excessive decarbonization above temperatures shown.)

Table X**Time Required To Attain Minimum Temperature**

Room Temperature, °F (°C)	(Minutes)
72 (22)	Not more than 18
78 (25.5)	Not more than 17
84 (28.5)	Not more than 16
90 (32)	Not more than 15

Table XI**Maximum Heating Element And Load-Bearing
Flue Gas Baffle Temperatures***

Metal	Maximum Temperature Rise Above Inset Air Temperature		
	Temperature		Minimum Thickness Inches (mm)
	°F	(°C)	
Low Carbon Steel	830	(461)	0.0304 (0.773)
Gray Cast Iron	830	(461)	as cast
Chrome-Alloy Cast Iron, 0.5 to 1.0 percent Cr, 0.2 to 0.5 percent Cu or Ni	1010	(561)	as cast
Low Carbon Steel Coated with A-19 Enamel	1030	(572)	0.0254 (0.646)
Aluminum-Coated Steel in which the bond between the steel and the aluminum is an iron-aluminum alloy	1030	(572)	0.0254 (0.646)
Chromium-Coated Low Carbon Steel in which the chromium is diffused into the surface of the steel to form an iron-chromium alloy.	1080	(600)	0.0254 (0.646)
Chrome Steel (11 Chrome)	1080	(600)	0.0254 (0.646)
AISI Type 410 (13 chrome)	1100	(611)	0.0254 (0.572)
AISI Type 430 (17 chrome)	1100	(611)	0.0254 (0.572)
AISI Type 321 (18-8 stabilized with Ti)	1330	(738)	0.0254 (0.496)
AISI Type 309C (25-12 stabilized with Cb)	1360	(775)	0.0254 (0.496)
AISI Type 347 (18-8 stabilized with Cb)	1370	(761)	0.0254 (0.496)

* The maximum usage temperature and minimum thickness of materials not shown shall be determined as follows:

1. Maximum Usage Temperature - 90 percent of scaling temperature, or the temperature at stress to produce rupture in 1000 hours at a load of 6000 psi (41.37 MPa) for a 0.0304 in (0.772 mm) thick sample, whichever is the lower temperature. (Temperatures should have been determined on this basis.)
2. Minimum Thickness - The thickness shown in the table for a material having an equal or nearest lower maximum usage temperature.

Table C-I
Maximum Allowable Rise Above Room
Temperature For Various Component Parts

Part	Maximum Allowable Rise Above Room Temperature, °F (°C) (*1)			
	Column 1		Column 2	
WIRE, CODE (*2)				
Types RF, FF, RW, RU	63	(35)	108	(60)
Types RH, RFH, FFH	90	(50)	135	(75)
Types TF, TFF, TW	63	(35)	108	(60)
Type TA	117	(65)	162	(90)
Type CF	117	(65)	135	(75)
Types AF (*3), SFF (*4)	225	(125)	259	(144)
Type SF (*4)	315	(175)	360	(200)
Type GTF (CSA)	180	(100)	252	(140)
APPLIANCE WIRING MATERIAL				
Thermoplastic 80 C Rating	99	(55)	126	(70)
Thermoplastic 90 C Rating	117	(65)	144	(80)
Thermoplastic 105 C Rating	144	(80)	171	(95)
Power Limited Circuit Cable	108	(60)	133	(74)
			or Higher as Marked	
FLEXIBLE CORD, LINE OR LOW VOLTAGE (*5)				
Types ST, SJT, SO, SJO, SPT-3	63	(35)	108	(60)
Type SPT-3 with Thermoplastic Class 12	75	(41.5)	102	(56.5)
FLEXIBLE CORD, LOW VOLTAGE				
Types SP-2, SPT-2	63	(35)	108	(60)
Type HP	117	(65)	144	(80)
ELECTRICAL INSULATING MATERIAL (*6)				
Class A	144	(80)	208	(115.5)
Class B	180	(100)	252	(140)
Class C	Unspecified			
Class H	As Determined by Test			
Fiber	117	(65)	162	(90)
Phenolic Composition	225	(125)	270	(150)
Windings of Relays, Solenoids, and Other Coils (*7) (*8)				
Class A Insulation				
Thermocouple Method	117	(65)	208	(115.5)
Resistance Method	153	(85)	208	(115.5)
Class B Insulation				
Thermocouple Method	153	(85)	252	(140)
Resistance Method	171	(95)	252	(140)
Coil Windings of d.c., Universal, and Integral Horsepower a.c. Motors (*7) (*8)				
Thermocouple Method				
Class A Insulation				
open motors	117	(65)	208	(115.5)
totally enclosed motors	126	(70)	208	(115.5)
Class B Insulation				
open motors	153	(85)	252	(140)
totally enclosed motors	162	(90)	252	(140)
Resistance Method				
Class A Insulation				
open motors	135	(75)	208	(115.5)
totally enclosed motors	144	(80)	208	(115.5)
Class B Insulation				
open motors	171	(95)	252	(140)
totally enclosed motors	180	(100)	252	(140)
Coil Windings of Fractional Horsepower a.c. Motors (*7) (*8)				
Thermocouple or Resistance Method				
Class A Insulation				
open motors	135	(75)	208	(115.5)
totally enclosed motors	144	(80)	208	(115.5)
Class B Insulation				
open motors	171	(95)	252	(140)
totally enclosed motors	180	(100)	252	(140)
CLASS 2 TRANSFORMER ENCLOSURE	108	(60)	153	(85)
POWER AND IGNITION TRANSFORMER ENCLOSURE	117	(65)	162	(90)
CAPACITORS				
- Electrolytic Types (*9)	72	(40)	Unspecified	
- Other Types (*10)	117	(65)	Unspecified	
SEALING COMPOUND	Maximum Temperature 27 (15) less than melting point			
DIAPHRAGMS	73	(40.5)	84	(46.5)
FILTERS	90	(50)	175	(97)

NOTES APPLICABLE TO TABLE C-I

- (*1)- The values shown in Column 1 are applicable to all appliances and are the limits permitted during conduct of test specified in 2.23, Wall, Floor and Ceiling Temperatures.
- The values shown in Column 2 are applicable only to appliances tested in accordance with 2.22, Temperature At Discharge Air Opening, when temperatures are determined after the first shutoff cycle effected by operation of the limit control under the conditions of the test specified in 2.23.5-b.
- (*2)- Wires, other than those listed above, may be used providing the application and temperature limitation are in accordance with Article 310 of the *National Electrical Code, ANSI/NFPA 70*.
- (*3)- This wire is satisfactory if temperatures are such as to require the use of this type of wire and other approved wire is not readily available.
- (*4)- This wire may not meet the insulation thickness specifications.
- (*5)- Flexible cords, other than those listed above, may be used providing the application is in accordance with the *National Electrical Code, ANSI/NFPA 70*, and the temperature limitation is in accordance with the Safety Standard for *Flexible Cord and Fixture Wire, ANSI/UL 62*.
- (*6)- The classes of material used for electrical insulation referred to include materials as follows:
- Class A - A Class A insulation system is one which by experience or accepted test can be shown to have suitable thermal endurance when operating at the limiting Class A temperature specified in the temperature rise standard for the device under consideration. Typical materials used in Class A systems include cotton, paper, cellulose acetate films, enamel-coated wire and similar organic materials impregnated with suitable substances.
- Class B - A Class B insulation system is one which by experience or accepted test can be shown to have suitable thermal endurance when operating at the limiting Class B temperature specified in the temperature rise standard for the device under consideration. Typical materials used in a Class B system include mica, glass fiber, asbestos and other materials, not necessarily inorganic, with compatible bonding substances having suitable thermal stability.
- Class C - Inorganic materials such as pure mica, quartz, porcelain, etc.
- Class H - A Class H insulation system is one which by experience or accepted test can be shown to have suitable thermal endurance when operating at the limiting Class H temperature specified in the temperature rise standard for the device under consideration. Typical materials used in Class H systems include mica, glass fiber, asbestos, silicone elastomer, and other materials, not necessarily inorganic, with compatible bonding substances, such as silicone resins, having suitable thermal stability.
- (*7)- At a point on the surface of an insulated coil where the temperature is affected by an external source of heat, the temperature rise measured by means of a thermocouple may be 9°F (5°C) (for Column 1 limits for fractional-horsepower a.c. motors) and 27°F (15°C) (for Column 1 limits for d.c., Universal, and integral-horsepower more than the indicated maximum, provided that the temperature rise of the coil, as measured by the resistance method, is not more than that specified in the table.
- (*8)- For a thermocouple-measured temperature on the coil of a fractional-horsepower a.c. motor (other than a Universal motor) the thermocouple is to be applied to the conducting material, or it is to be separated from that material by not more than the integrally applied insulation of the conductor itself. For a thermocouple-measured temperature of a coil of any other motor, the thermocouple is to be mounted as described above, or it may be separated from the conductor by not more than the integrally applied insulation of the conductor itself and the conventional coil wrap normally encountered. Ordinarily, temperatures are to be measured by means of thermocouples, except that motor-coil temperatures may be determined by the resistance method if the coil is inaccessible for mounting thermocouples.
- (*9)- For an electrolytic capacitor which is physically integral with or attached to a motor, the temperature rise on insulating material integral with the capacitor enclosure may not be more than 117°F (65°C).
- (*10)- These limitations do not apply to capacitors which are recognized as being suitable for service at higher temperatures.

Table C-II

Conductor		Free Space Per Conductor	
AWG	(mm ²)	in ³	(cm ³)
18,16	(0.82, 1.3)	1.5	(24.6)
14	(2.1)	2.0	(32.8)
12	(3.3)	2.25	(36.9)
10	(5.3)	2.5	(41.0)
8	(8.4)	3.0	(49.2)

Table C-III

Minimum Average Thickness Of Sheet-Metal Junction Boxes*

MAXIMUM DIMENSIONS OF ENCLOSURE		STEEL				COPPER, BRASS OR ALUMINUM	
		Without Supporting Frame		With Supporting Frame or Equivalent Reinforcing		Without Supporting Frame	With Supporting Frame or Equivalent Reinforcing
Length or Width	Area	Zinc Coated	Uncoated	Zinc Coated	Uncoated		
Inches (mm)	Sq. In. (cm ²)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
3 (76.2)	6† (39)	0.023 (0.58) (24) ‡	0.020 (0.51) (24) ‡	0.023 (0.58) (24) ‡	0.020 (0.51) (24) ‡	0.023 (0.58) (22)	0.023 (0.58) (22)
8 (203)	36 (232)	0.029 (0.74) (22) ‡	0.026 (0.66) (22) ‡	0.023 (0.58) (24) ‡	0.020 (0.51) (24) ‡	0.045 (1.14) (16)	0.029 (0.74) (20)
12 (305)	90 (581)	0.034 (0.86) (20)	0.032 (0.81) (20)	0.023 (0.58) (24) ‡	0.020 (0.51) (24) ‡	0.058 (1.47) (14)	0.029 (0.74) (20)
18 (457)	135 (871)	0.045 (1.14) (18)	0.042 (1.07) (18)	0.034 (0.86) (20)	0.032 (0.81) (20)	0.075 (1.90) (12)	0.045 (1.14) (16)
24 (610)	360 (2323)	0.056 (1.42) (16)	0.053 (1.35) (16)	0.045 (1.14) (18)	0.042 (1.07) (18)	0.075 (1.90) (12)	0.058 (1.47) (14)
48 (1219)	1200 (7742)	0.070 (1.78) (14)	0.067 (1.70) (14)	0.056 (1.42) (16)	0.053 (1.35) (16)	0.095 (2.41) (10)	0.075 (1.90) (12)
60 (1524)	1500 (9677)	0.097 (2.46) (12)	0.093 (2.36) (12)	0.056 (1.42) (16)	0.053 (1.35) (16)	0.122 (3.10) (8)	0.075 (1.90) (12)
more than 60 (1524)	more than 1500 (9677)	0.126 (3.20) (10)	0.123 (3.12) (10)	0.056 (1.42) (16)	0.053 (1.35) (16)	0.153 (3.89) (6)	0.075 (1.90) (12)

* The figures in parentheses below the minimum average thicknesses are the Galvanized Sheet Gage numbers (for zinc-coated steel), the manufacturers' Standard Gage numbers (for uncoated steel) and the American Wire Gage (B&S) numbers (for copper, brass, or aluminum) which provide the specified minimum average thickness of metal.

† Volume of enclosure not more than 12 cubic inches (197 cm³).

‡ Sheet steel for an enclosure intended for outdoor use (raintight) shall not be less than 0.034 inch (0.86 mm) in thickness if zinc coated and not less than 0.032 inch (0.81 mm) in thickness if uncoated (No. 20 gage).

§ Sheet copper, brass, or aluminum for an enclosure intended for outdoor use (raintight) shall not be less than 0.029 inch (0.74 mm) in thickness (No. 20 gage).

Table C-IV

**Insulation Thickness Of Factory Wiring
Exposed In Burner Or Fan Compartment**

Group*	Type of Wire, Cord, Cable or Appliance Wiring Material
A	<p>FFH-2, TF, TFF, TFN, TFFN, SF-2, SFF-2, RH, RHH, RHW, RUH, THW, XHHW, MTW, THWN, TW, or thermoplastic appliance wiring material with insulation thickness of:</p> <p>$\frac{2}{64}$ in (0.8 mm) for No. 10 AWG (5.3 mm²) and smaller</p> <p>$\frac{3}{64}$ in (1.2 mm) for No. 8 AWG (8.4 mm²)</p> <p>$\frac{4}{64}$ in (1.6 mm) for No. 6, 4, 3 or 2 AWG (13.3, 21.2, 26.7 or 33.6 mm²)</p> <p>$\frac{5}{64}$ in (2.0 mm) for No. 1, 1/0, 2/0, 3/0 or 4/0 AWG (42.4, 53.5, 67.4, 85.0 or 107.2 mm²)</p>
B	<p>SO, ST, SJO, SJT, or thermoplastic or neoprene appliance wiring material with insulation thickness of:</p> <p>$\frac{4}{64}$ in (1.6 mm) for No. 18 or 16 AWG (0.82 or 1.3 mm²)</p> <p>$\frac{5}{64}$ in (2.0 mm) for No. 14, 12 or 10 AWG (2.1, 3.3 or 5.3 mm²)</p> <p>$\frac{6}{64}$ in (2.4 mm) for No. 8 AWG (8.4 mm²)</p> <p>$\frac{8}{64}$ in (3.2 mm) for No. 6 AWG (13.3 mm²)</p>

* Thermoplastic wiring materials, as referenced in Group A, with insulation thickness of $\frac{2}{64}$ in (0.8 mm) for No. 18 or 16 AWG (0.82 or 1.3 mm²) and $\frac{3}{64}$ in (1.2 mm) for No. 14, 12, 10 or 8 AWG (2.1, 3.3, 5.3 or 8.4 mm²), are considered equivalent to the wiring material referenced in Group B, when the wiring materials are covered with $\frac{1}{32}$ in (0.8 mm) wall thickness thermoplastic insulating tubing of a type recognized as suitable for the purpose from the standpoint of dielectric properties, heat resistance, moisture resistance, flammability, etc.

Table C-V

Electrical Clearances Inch (mm)

		0-150v	151-300v	301-600v
Between any uninsulated live-metal part and uninsulated live-metal part of opposite polarity and uninsulated grounded dead-metal part other than the enclosure, or an exposed dead-metal part which is isolated (insulated).	Thru Air	$\frac{1}{8}$ (3.2) *a,b	$\frac{1}{4}$ (6.4) *b,e	$\frac{3}{8}$ (9.5) *b
	Over Surface	$\frac{1}{4}$ (6.4)	$\frac{3}{8}$ (9.5) *d	$\frac{1}{2}$ (12.7)
Between an uninsulated live-metal part and the walls of a metal enclosure, including fittings for conduit or metal-clad cable. *c	Shortest Distance	$\frac{1}{2}$ (12.7) *d	$\frac{1}{2}$ (12.7) *d	$\frac{1}{2}$ (12.7)

- *a. The spacing between wiring terminals of opposite polarity and the spacing between a wiring terminal and a grounded dead-metal part shall not be less than $\frac{1}{4}$ in (6.4 mm); except that if short-circuiting or grounding of such a terminal will not result from projecting strands of wire, the spacing need not to be greater than that indicated in the table.
- *b. In a safety control the spacing between wiring terminals regardless of polarity and between a wiring terminal and a grounded when the device is installed, shall not be less than $\frac{1}{4}$ in (6.4 mm) if a short circuit between such parts may result in unsafe operation of the appliance.
- *c. A metal piece attached to the enclosure is considered to be a part of the enclosure if deformation of the enclosure is liable to reduce spacings between the metal piece and uninsulated live-metal parts.
- *d. This spacing may be reduced to $\frac{1}{4}$ in (6.4 mm) on listed devices having a maximum rating of 2000 volt-amperes, 300 volts and provided with a factory-built enclosure.
- *e. This spacing may be reduced to $\frac{1}{8}$ in (3.2 mm) on listed devices having a maximum rating of 2000 volt-amperes, 300 volts and provided with a factory-built enclosure.

Table C-VI

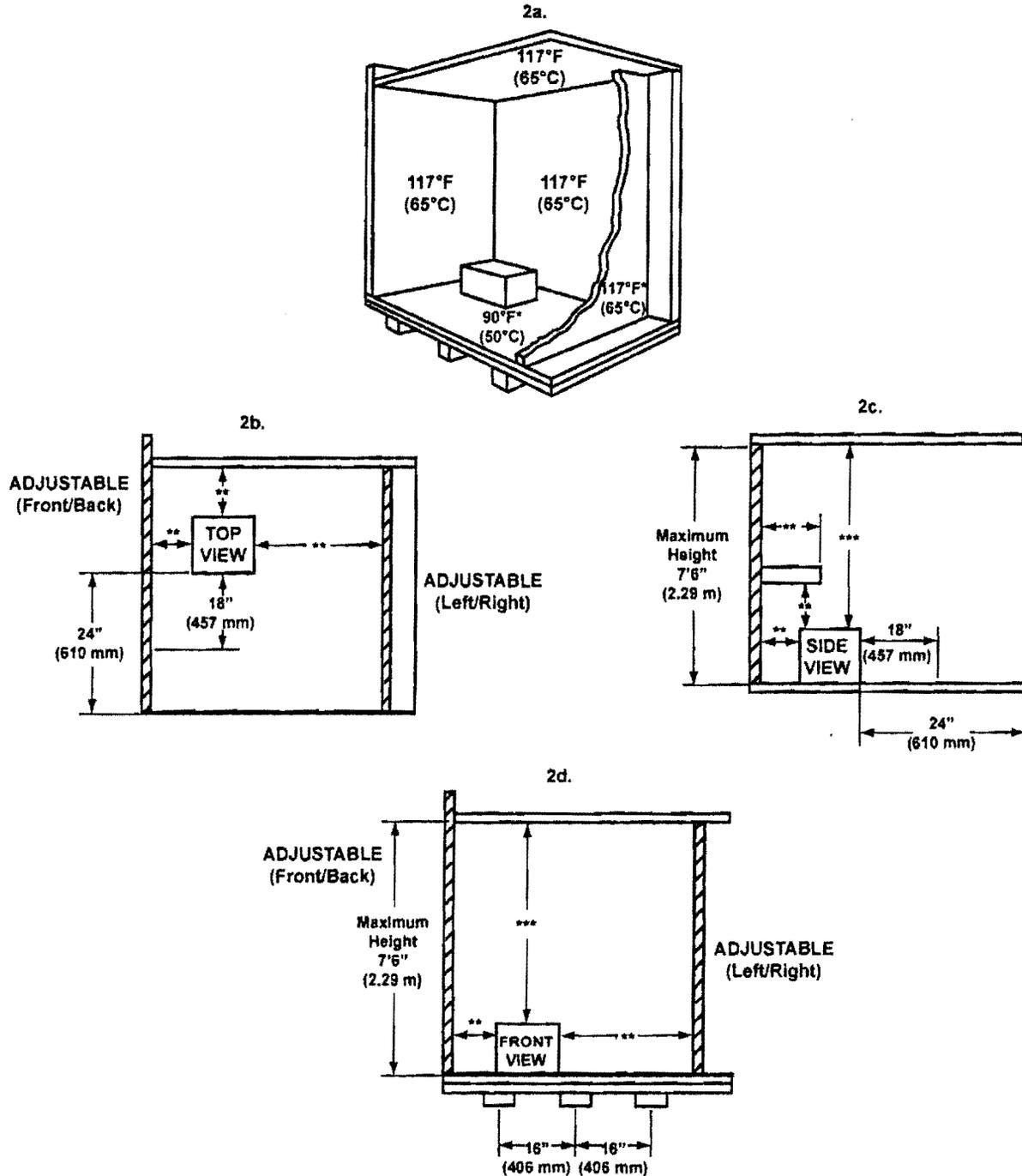
**Maximum Allowable Motor
Winding Temperature, °F (°C)**

Motor Condition	Class A Insulation	Class B Insulation
1. Locked rotor, during first hour of operation	392 (200)	437 (225)
2. Maximum Temperature, locked rotor, after first hour of operation	347 (175)	392 (200)
3. Averagetemperature, locked rotor, after first hour of operation.	302 (150)	347 (175)
4. Motor operation at any load.	284 (140)	329 (165)

***Figures Referenced In
Part I, Part II And Exhibits***

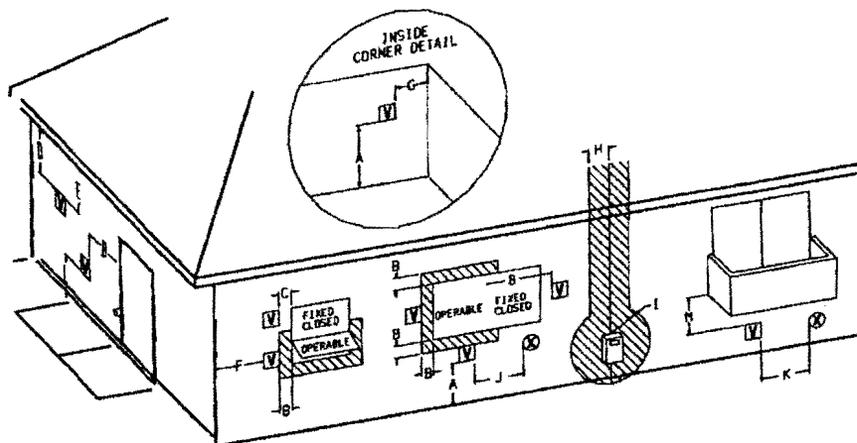


Figure 1. Type of Lock Seams Considered Acceptable for Heating Elements



- * Temperature limits are based on temperature rise above room temperature.
- ** Clearances to be specified by the manufacturer. For wall-mounted heaters, the clearance shall be zero inches from the rear wall.
- *** Ceiling clearances to be specified by the manufacturer but shall not exceed 7' 6" (2.29 m) minus the height of the heater.

Figure 2. Test Room Configuration



	Canadian Installation ¹	US Installation ²	Canadian Installation	US Installation ²
A= Clearance above grade, veranda, porch or balcony	12 in (30 cm)	12 in (30 cm)		
B= Clearance to window or door that may be opened	6 in (15 cm) for appliances ≤ 10,000 Btu/h (3 kW), 12 in (30 cm) for appliances > 10,000 Btu/h (3 kW) and ≤ 100,000 Btu/h (30 kW), 36 in (91 cm) for appliances > 100,000 Btu/h (30 kW)	6 in (15 cm) for appliances ≤ 10,000 Btu/h (3 kW), 9 in (23 cm) for appliances > 10,000 Btu/h (3 kW) and ≤ 50,000 Btu/h (15 kW), 12 in (30 cm) for appliances > 50,000 Btu/h (15 kW)		
C= Clearance to permanently closed windows	*	*		
D= Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 ft (61 mm) from the center line of the terminal.	*	*		
E= Clearance to unventilated soffit	*	*		
F= Clearance of outside corner	*	*		
G= Clearance of inside corner	*	*		
H= Clearance to each side of center line extended above meter/regulator assembly	3 ft (91 cm) within a height 15 ft (4.5 m) above the meter/regulator assembly	*		
I= Clearance to service regulator vent outlet	3 ft (91 cm)	*		
J= Clearance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance			6 in (15 cm) for appliances ≤ 10,000 Btu/h (3 kW), 12 in (30 cm) for appliances > 10,000 Btu/h (3 kW) and ≤ 100,000 Btu/h (30 kW), 36 in (91 cm) for appliances > 100,000 Btu/h (30 kW)	6 in (15 cm) for appliances ≤ 10,000 Btu/h (3 kW), 9 in (23 cm) for appliances > 10,000 Btu/h (3 kW) and ≤ 50,000 Btu/h (15 kW), 12 in (30 cm) for appliances > 50,000 Btu/h (15 kW)
K= Clearance to a mechanical air supply inlet			6 ft (1.83 m)	3 ft (91 cm) above if within 10 ft (3 m) horizontally
L= Clearance above paved sidewalk or paved driveway located on public property			7 ft (2.13 m) †	*
M= Clearance under veranda, porch deck, or balcony			12 in (30 cm) ‡	*

¹ In accordance with the current CSA B149.1, *Natural Gas and Propane installation Code*
² In accordance with the current ANSI Z223.1/NFPA 54, *National Fuel Gas Code*
 † A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.
 ‡ Permitted only if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.
 * For clearances not specified in ANSI Z223.1/NFPA 54 or CSA B149.1, one of the following shall be indicated:
 a) A minimum clearance value determined by testing in accordance with section 2.23.7, or;
 b) A reference to the following footnote:
 "Clearance in accordance with local installation codes and the requirements of the gas supplier."

Figure 3. Vent Terminal Clearances

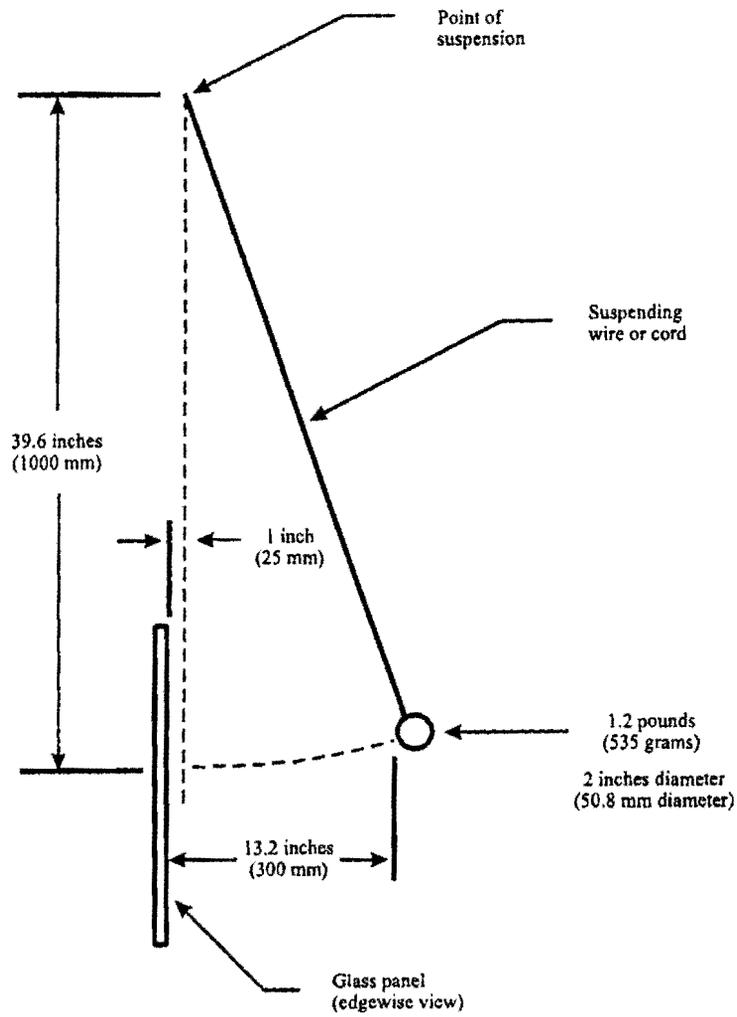
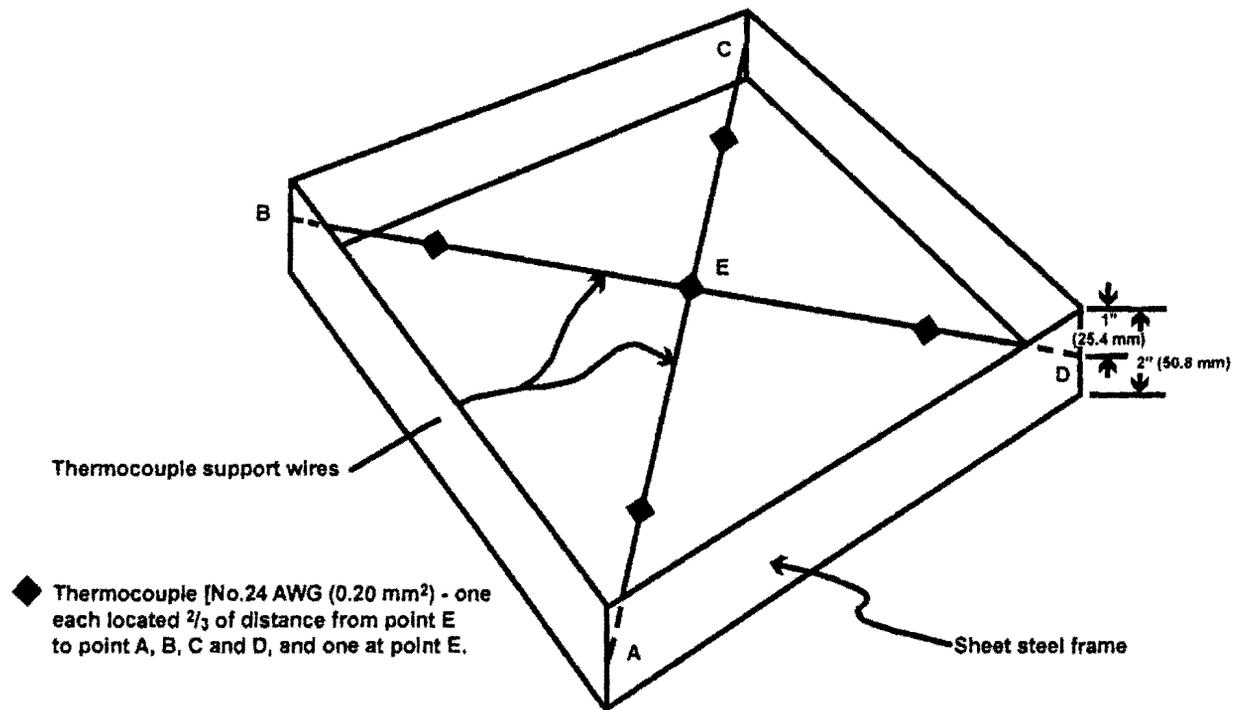
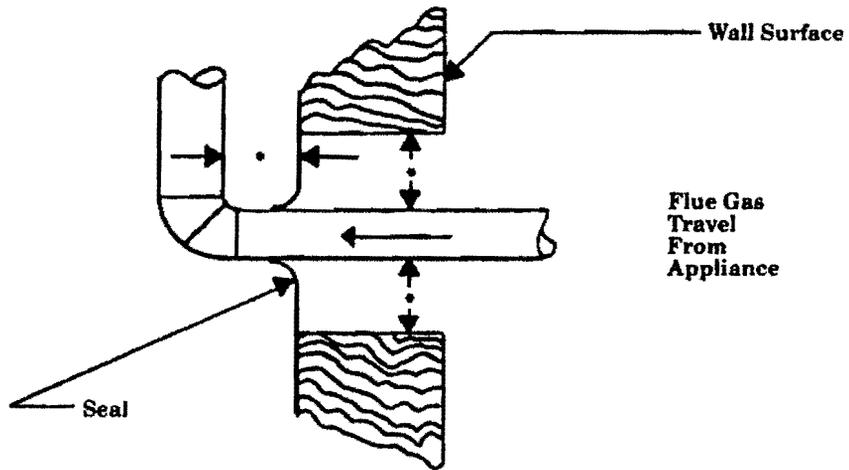


Figure 4. Glass Impact Test



**Figure 5. Typical Device for Measuring Discharge Air Temperatures
(See, 2.22, Temperatures at Discharge Air Openings,
for proper frame dimensions)**



* Minimum 6 in (152 mm) clearance.

Figure 6. Method of Sealing Annulus

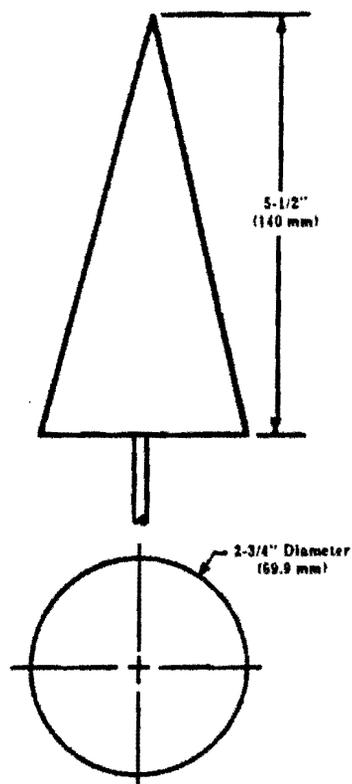


Figure 7. Accessibility Probe for Heated Surfaces

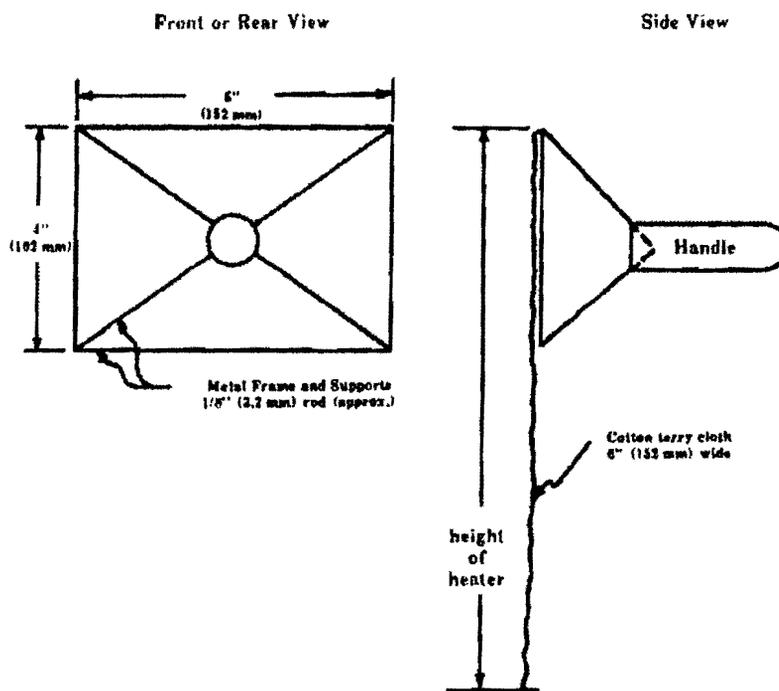
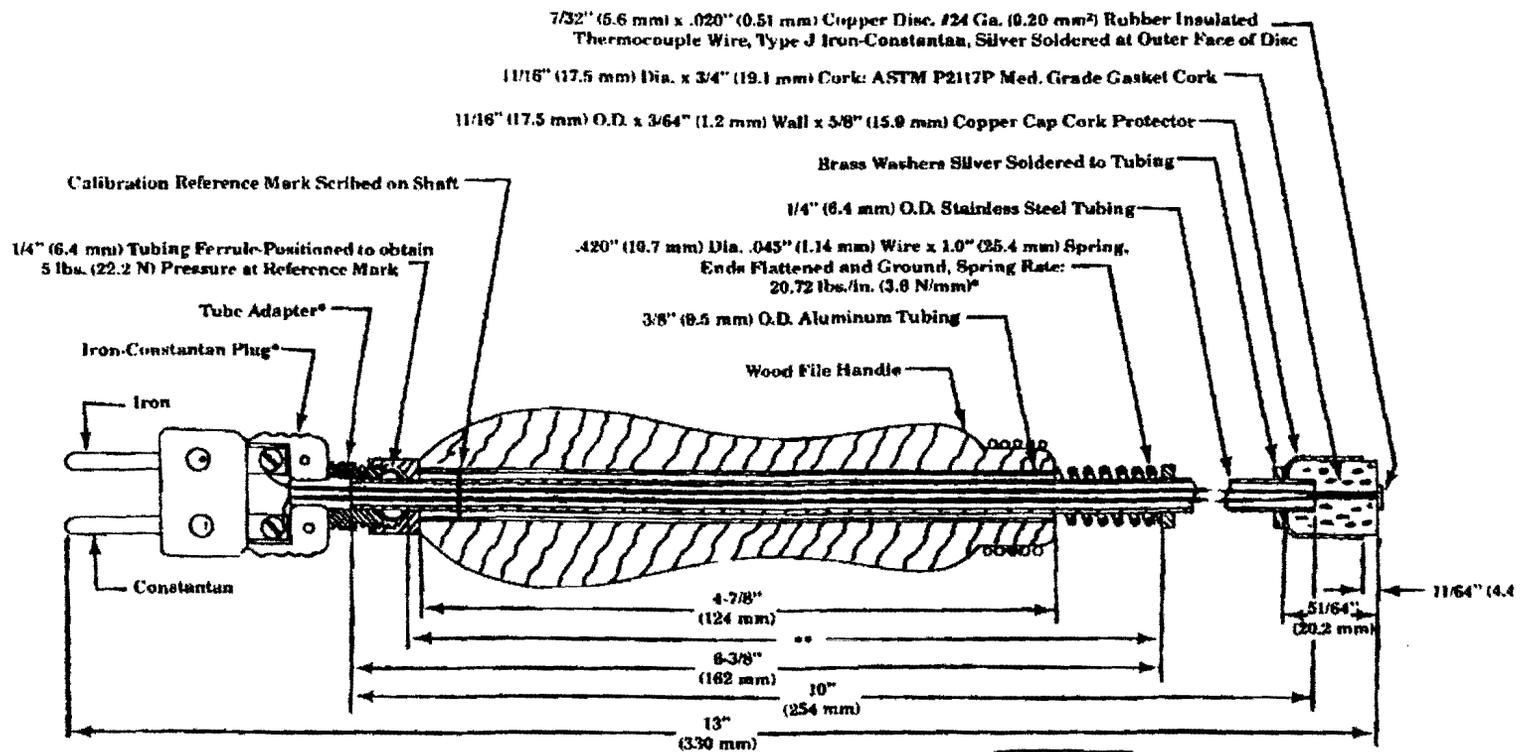
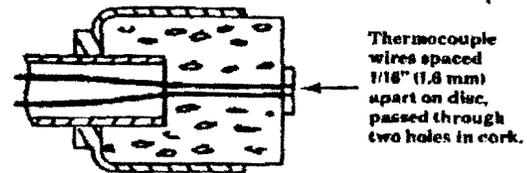


Figure 8. Probe for Evaluation of Clothing Ignition Potential



* Dimensions shown above are based on use of the following purchased parts:
 Marlin #1080 Iron-Constantan Plug
 Marlin #1070 Tube Adapter
 #C420-045-1000 Spring
 (Associated Spring Corp.)

** This dimension will vary so that 5 lbs. (22.2 N) calibration will align with reference mark on probe shaft.



Thermocouple wires spaced 1/16\"/>

Figure 9. Temperature-Measuring and Accessibility Probe

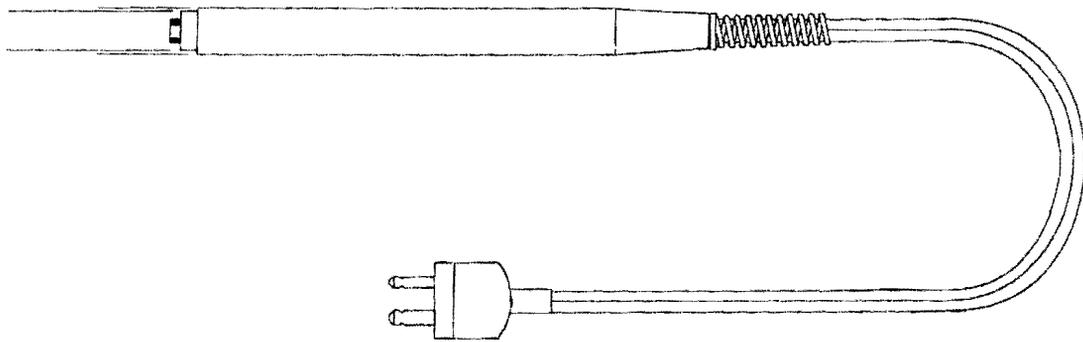
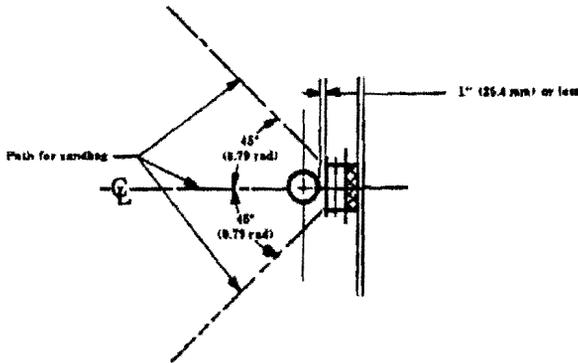
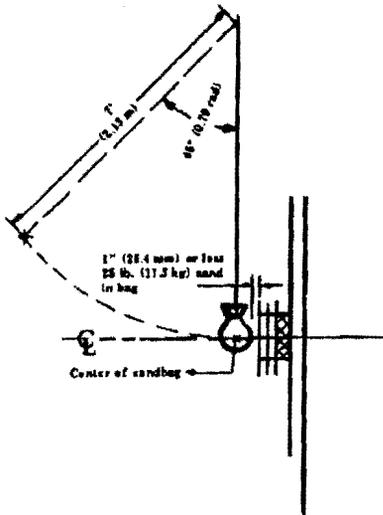


Figure 9A. Temperature-Measuring and Accessibility Probe

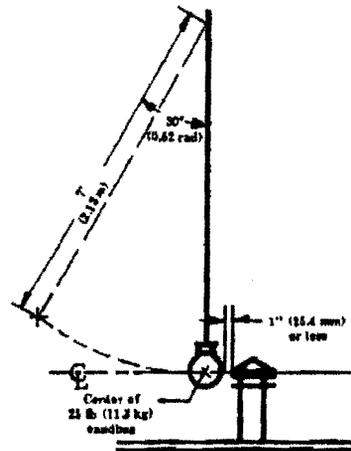


TOP VIEW



SIDE VIEW

A. HORIZONTAL CAPS



SIDE VIEW

B. VERTICAL CAPS

Figure 10. Arrangement of Sandbag and Vent Terminal for Impact Test

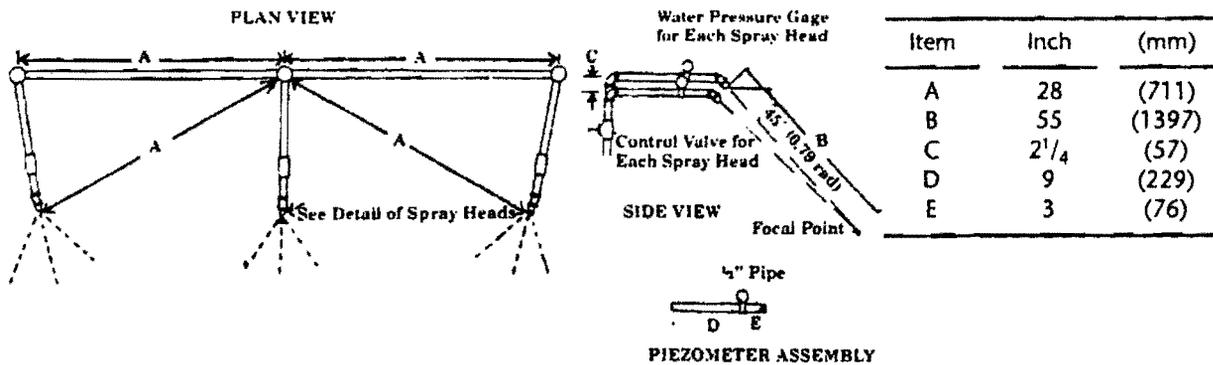


Figure 11. Arrangement of Spray Heads and Associated Piping for Simulated Rainstorm Test

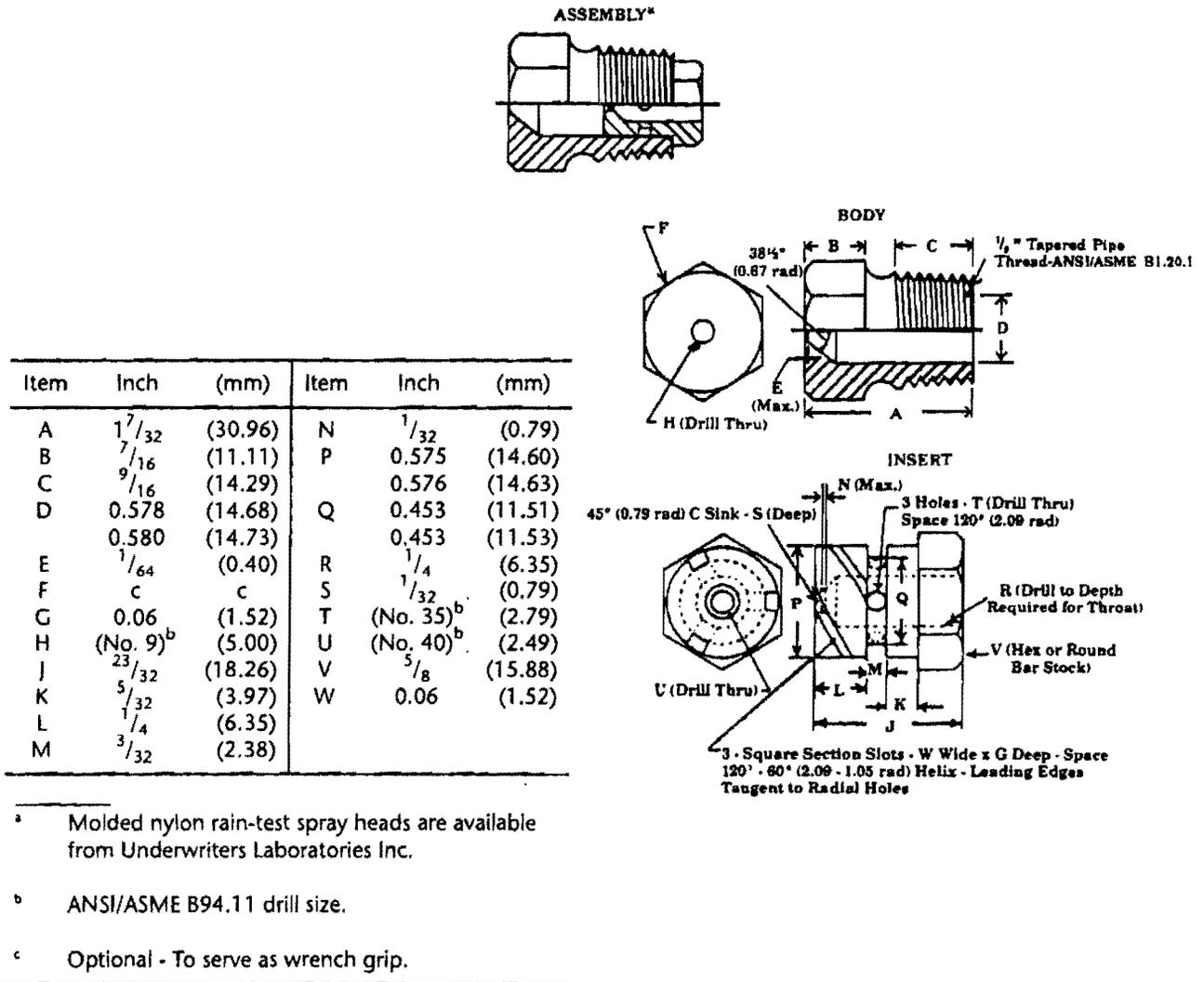


Figure 12. Spray Head Assembly and Details of Construction

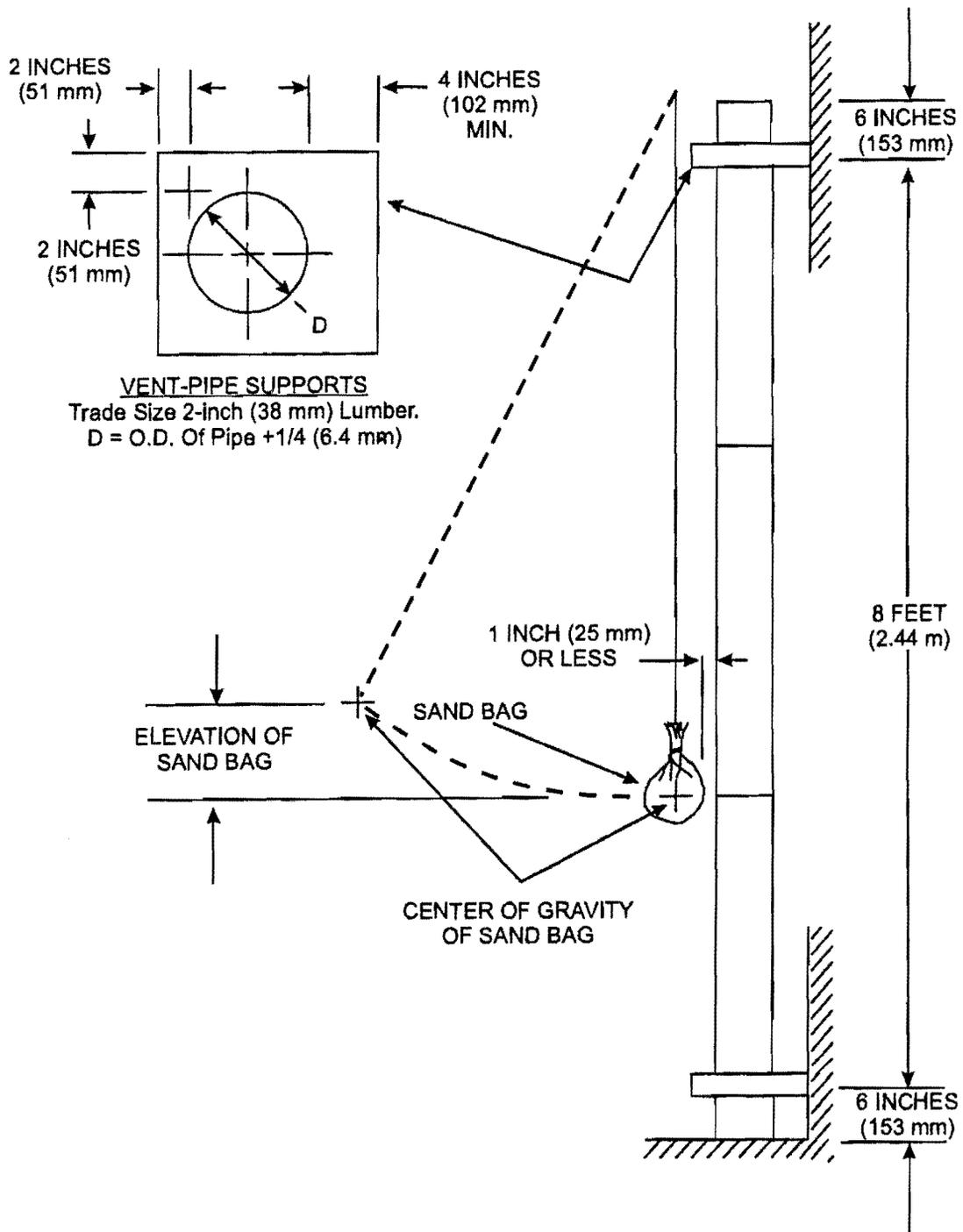
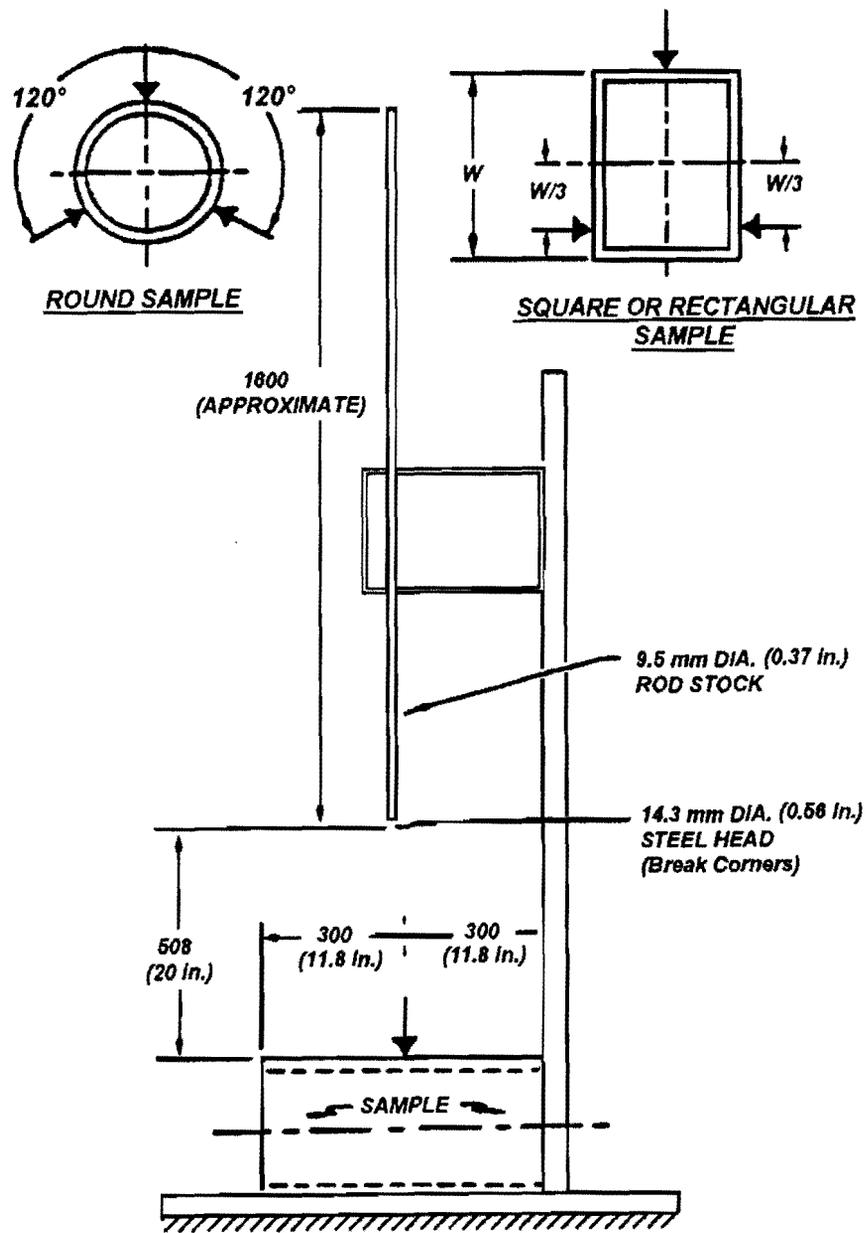


Figure 13. Impact Test for Vent/Air Intake Piping



NOTE: ALL DIMENSIONS ARE IN MILLIMETERS.

Figure 14. Puncture Test for Vent System

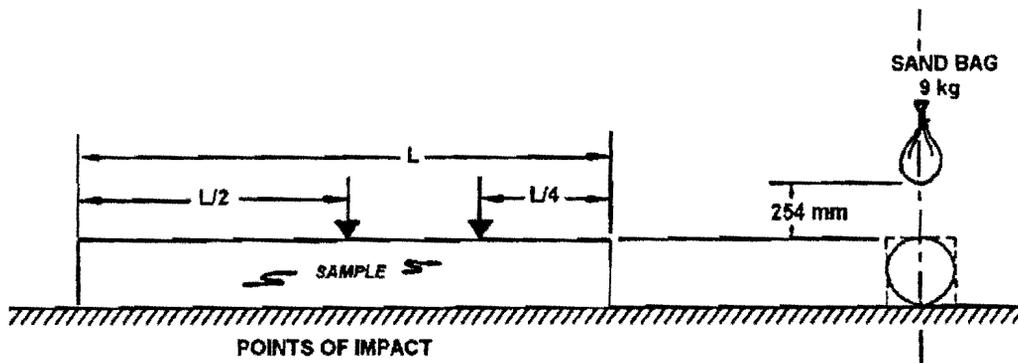


Figure 15. Impact Test for Vent System

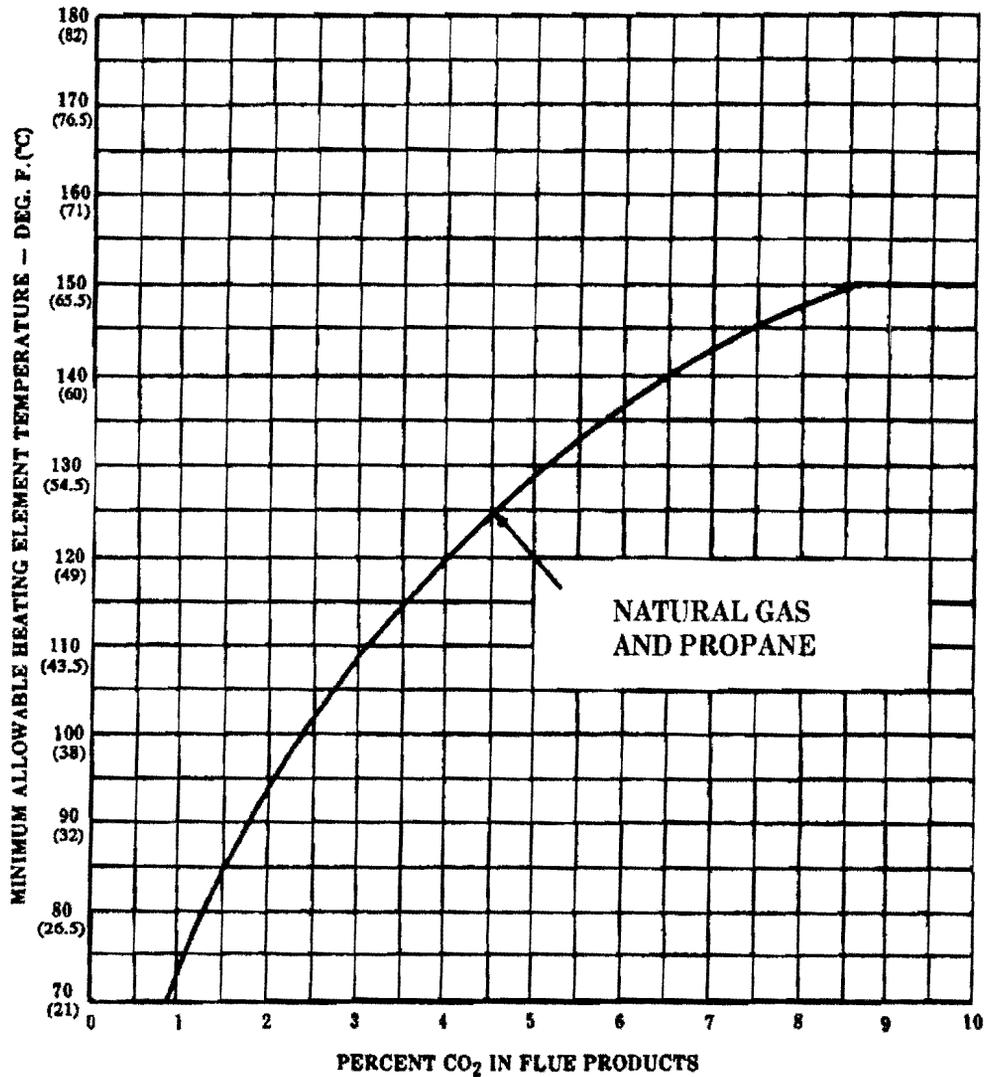


Figure 16. Chart for Determination of Minimum Allowable Heating Element Temperatures on Wall Furnaces Equipped for Modulated Operation

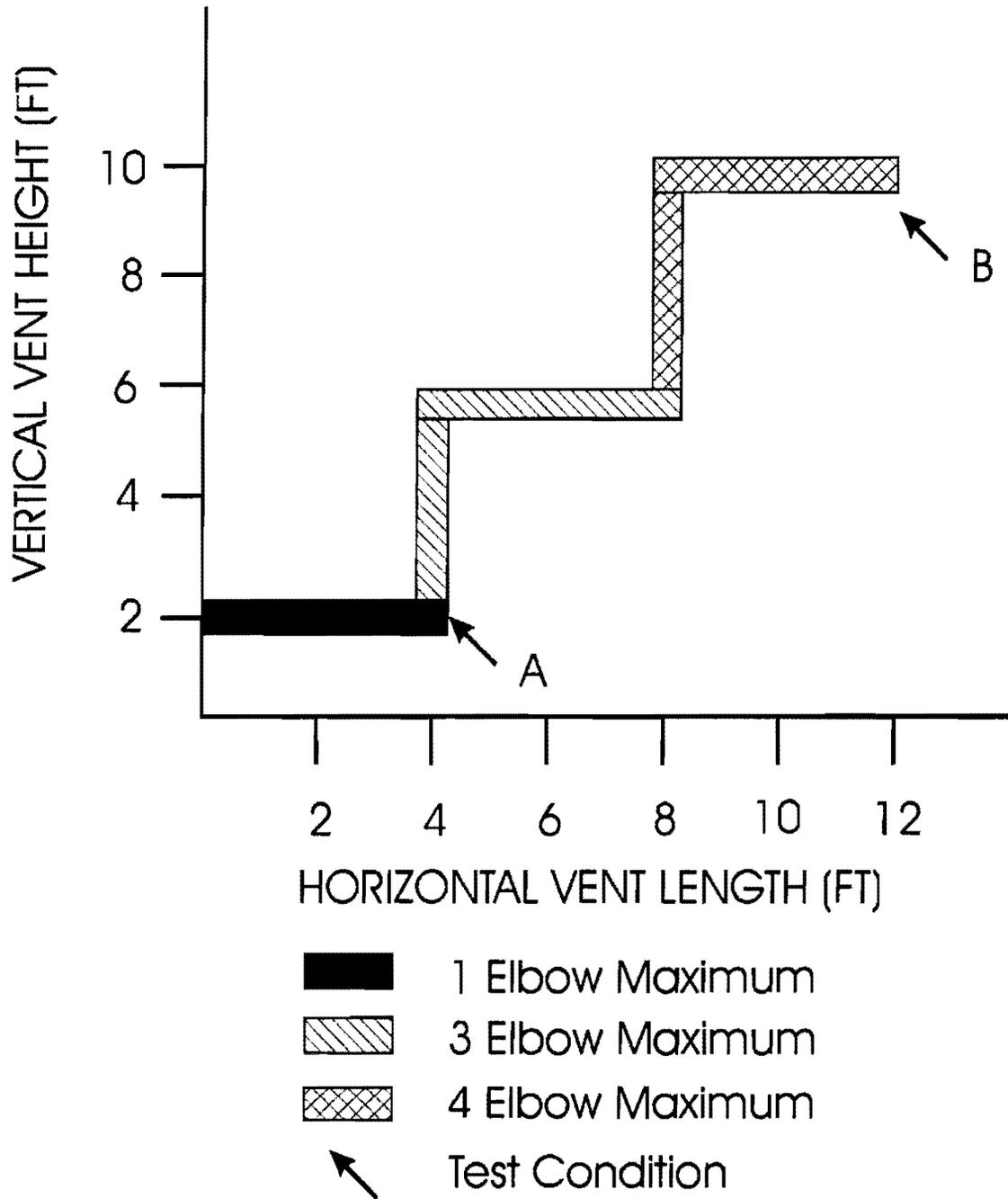


Figure 18. Example of Vent Configurations for Glass Temperatures and Thermal-Mechanical Stress Test

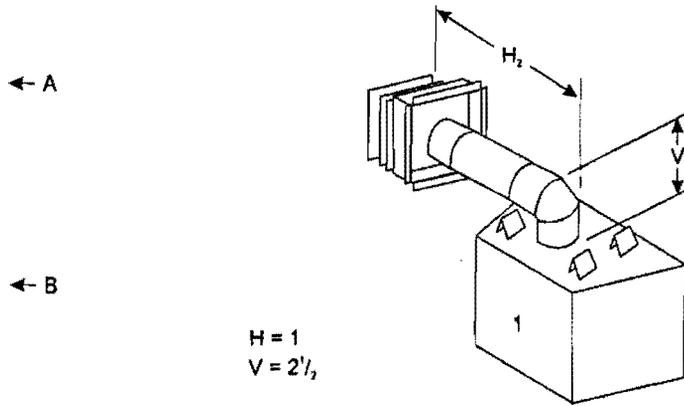
Vent Table

(All values are in feet)

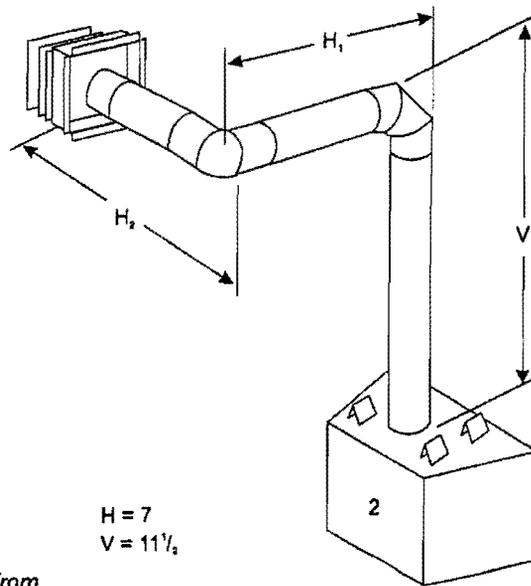
1 & 2	1	2
V	H ₁ Max.	H ₁ + H ₂ Max.
1	2½	--
2	4	--
3	5½	4½
4	7	6
5	8½	7½
6	10	9
7	11½	11½
8	11½	11½
30	11½	11½

V = 30 Feet Max.
H₁ + H₂ = 11½ Feet Max.

Top vented units are limited to two (2) Elbows.



Test Condition A



Test Condition B

NOTE: All vent dimensions are measured from the appliance surface where the vent connects to the point where exhaust gases exit the termination.

Figure 18. Example of Vent Configurations for Glass Temperatures and Thermal-Mechanical Stress Test (Continued)

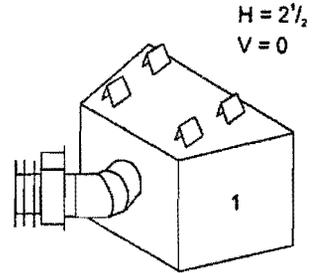
Vent Table

(All values are in feet)

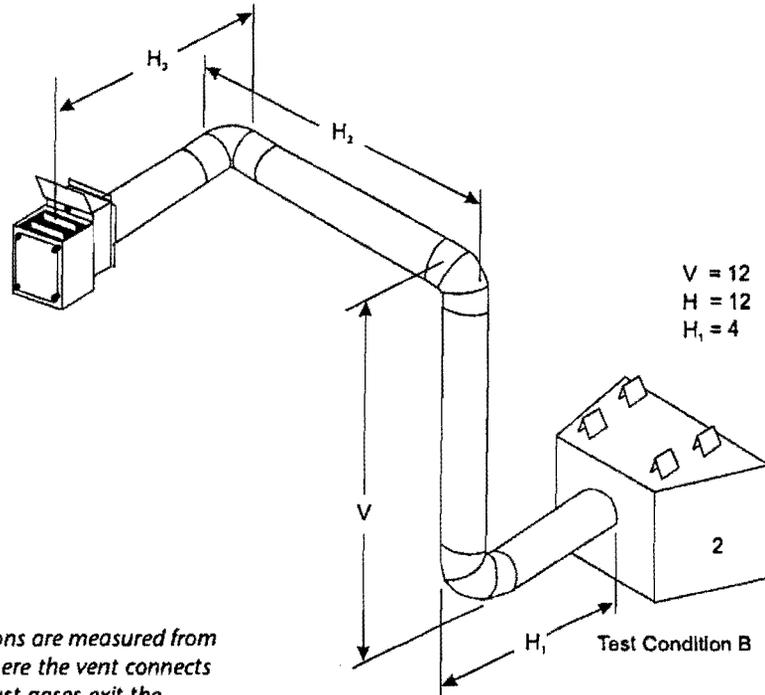
1 & 2	1 & 2	2
V	H ₁ Max.	H Max.
0	2 1/2	-
4	1	4
5	2	5
6	3	6
7	4	7
12		12
20		12

V = 20 Feet Max.
 H = H₁ + H₂ + H₃
 H = 20 Feet Max.

Rear vented units may not use more than three (3) Elbows.



Test Condition A



V = 12
 H = 12
 H₁ = 4

Test Condition B

NOTE: All vent dimensions are measured from the appliance surface where the vent connects to the point where exhaust gases exit the termination.

Figure 18. Example of Vent Configurations for Glass Temperatures and Thermal-Mechanical Stress Test (Continued)

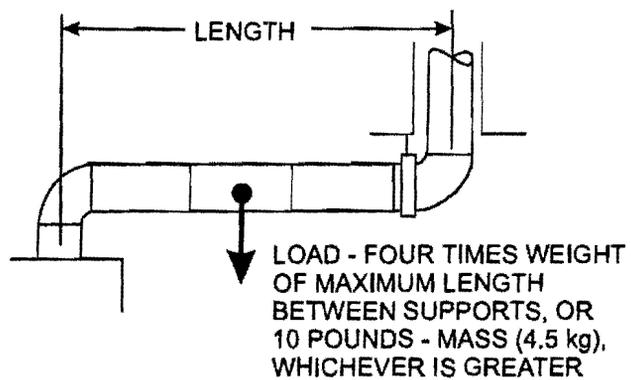


Figure 19. Load Test for Vent Elbows

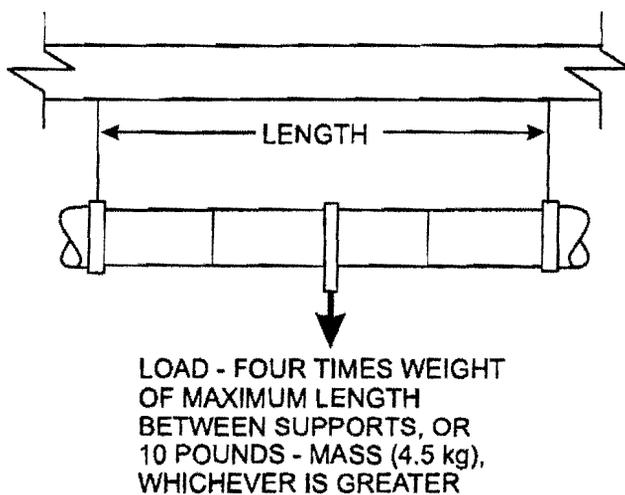


Figure 20. Vent Joint Load Test

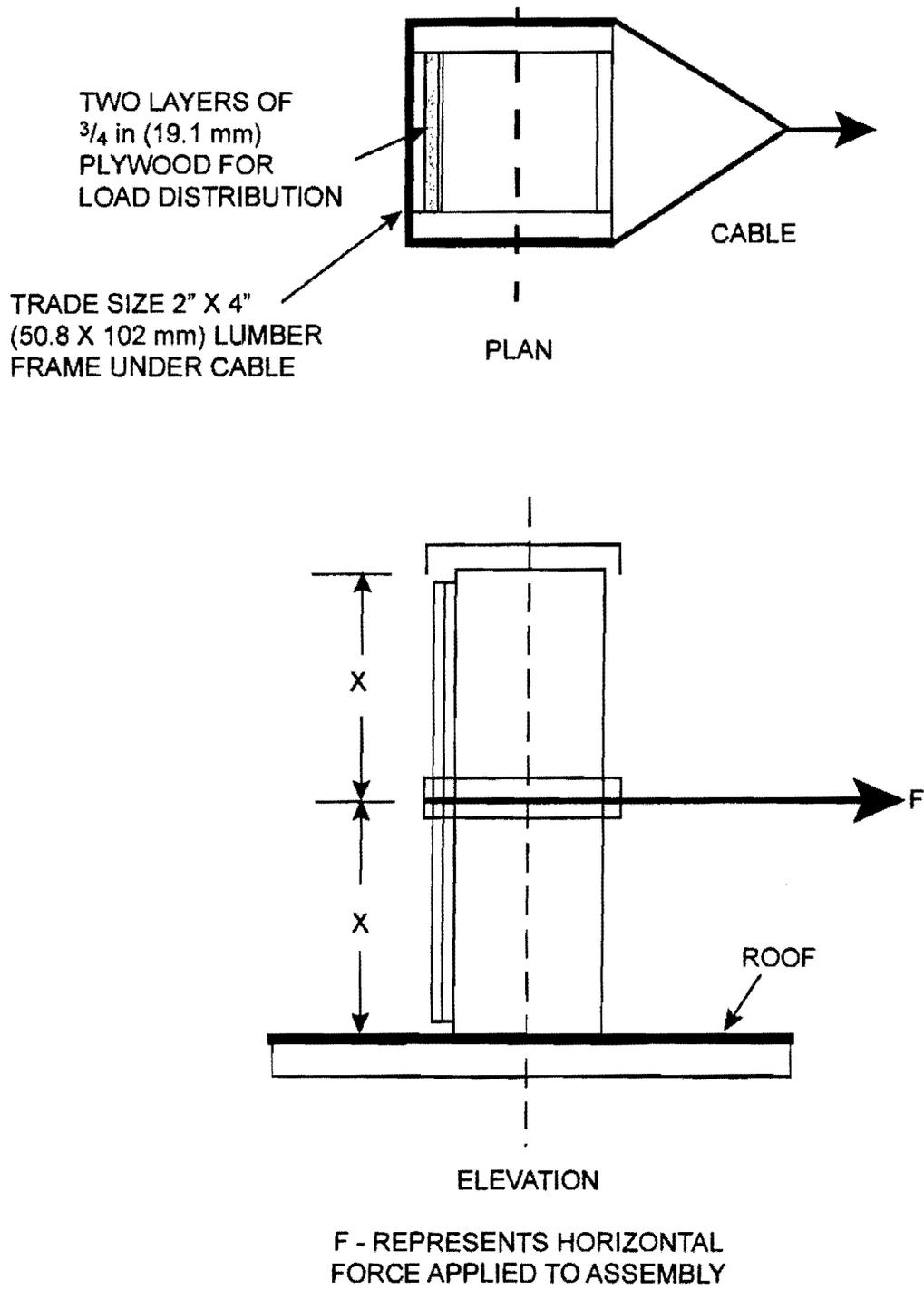


Figure 21. Wind Load Test on Roof Assembly

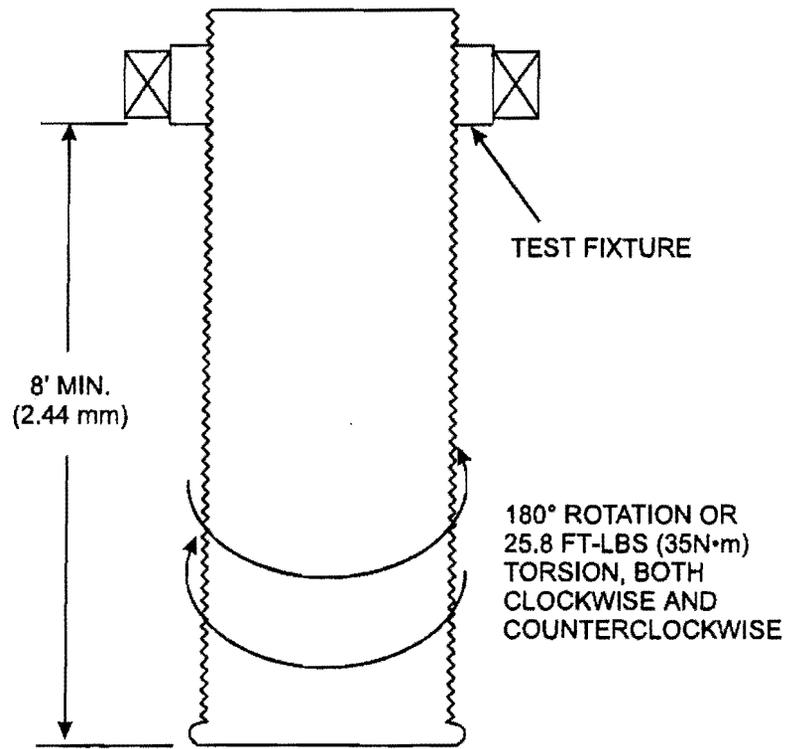


Figure 22. Torsion Test for Corrugated or Flexible Vent/Air Intake Terminals

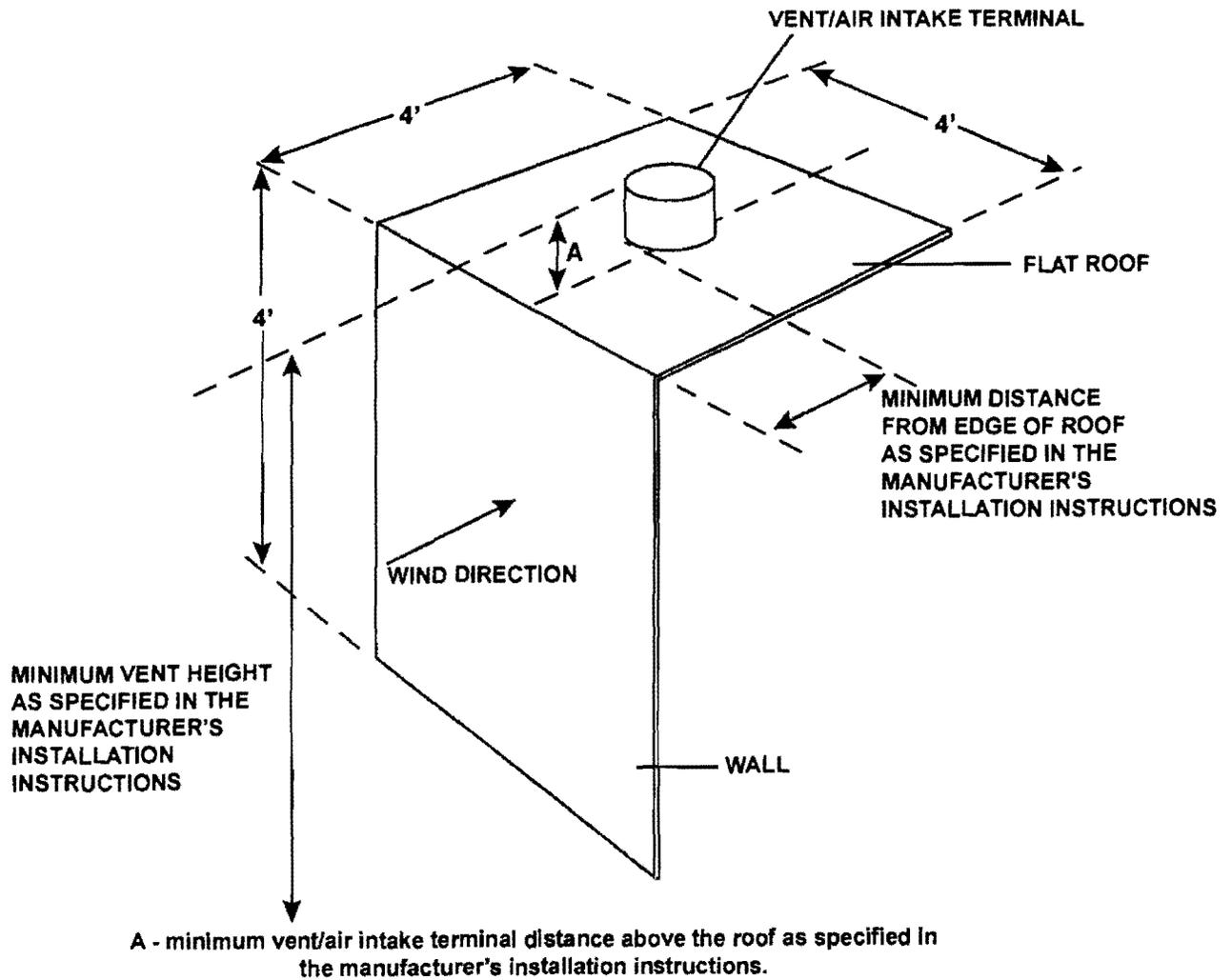


Figure 23. Test Roof with Terminal Located

Exhibit A.1

Automatic Intermittent Pilot Ignition Systems For Field Installation (See 1.1.2)

A.1.1

An appliance for use with an intermittent pilot ignition system for field installation shall be examined and tested for compliance with this standard when the automatic intermittent pilot ignition system is installed in accordance with the manufacturer's installation instructions.

A.1.2

Every part of the automatic intermittent pilot ignition system shall be constructed so that when installed in accordance with the instructions (see 1.34, Instructions), it will be secure against displacement and will maintain a fixed relationship between essential parts under normal and reasonable conditions of handling and usage.

A.1.3

The design of the appliance and the automatic intermittent pilot ignition system for field installation shall be such that the ignition system can be easily installed in the field. This shall be accomplished without the necessity of either:

- a. Drilling, cutting, or bending parts for positioning the pilot assembly; or
- b. Drilling holes in any gas confining compartment.

A.1.4

The design of the automatic intermittent pilot ignition system for field installation shall be such that when it is installed in accordance with the manufacturer's installation instructions, any connection to the controls of the appliance shall not adversely affect the operation of the appliance.

A.1.5

Under normal operating conditions, the sequence of operation of the automatic intermittent pilot ignition system when installed in accordance with the manufacturer's installation instructions shall be:

- a. Upon a call for heat the pilot flame shall be established and proven before gas is allowed to flow to the main burner; and
- b. When the call for heat has been satisfied, both main burner and pilot burner gas shall be shut off.

A.1.6

When the pilot flame is not proved, the system shall provide for automatic shut off of

- a. The main burner gas; and
- b. The pilot burner gas when for use with propane.

A.1.7

Each automatic intermittent pilot ignition system for field installation shall be accompanied by printed instructions and diagrams adequate for its proper field assembly, installation, checkout procedure, safe operation, and servicing. These instructions shall include the following:

- a. A statement that the device must be installed by a qualified installing agency (See Part IV, Definitions).

- b. The qualified installing agency must fill in and attach a label specifying the date of installation, name of installing agency and where installing agency can be reached either by address or telephone number. This information shall be provided on a label of Class VI or better working materials.
- c. The necessity for compliance with local codes, or, in the absence of local codes, with the current *National Fuel Gas Code, ANSI Z223.1/NFPA 54* or *CSA B149.1, Natural Gas and Propane Installation Code*.
- d. A list and pictorial representation of all components furnished with the system.
- e. The step-by-step safety inspection procedure as specified in Exhibit A.2, Recommended Procedure for Safety Inspection of the Existing Appliance Installation as a Preliminary Step to Field Installing the Automatic Intermittent Pilot Ignition System.
- f. A statement that all gas and electricity to the appliance must be shut off before making any modifications to the appliance.
- g. A statement concerning the proper electrical supply in volts and amperes or VA rating, if applicable, to properly operate the system and instructions as to how the installer can determine that the electrical supply is adequate.
- h. Instructions and illustrations indicating the proper manner in which:
 - 1. The existing wiring is disconnected and identified;
 - 2. The existing gas controls are removed;
 - 3. The pilot flame sensor, igniter, and pilot burner if applicable, are installed;
 - 4. The new gas control is installed;
 - 5. Manifold pressure is tested and regulator is adjusted to match original input;
 - 6. The system control is mounted and proper method of mounting; and
 - 7. All wiring is properly routed and connected.
- i. The step-by-step testing procedure is specified below to determine that the system is operating properly and safely.
 - 1. Turn on all gas and electricity to the appliance.
 - 2. Check the heat anticipator in the comfort thermostat to determine if it is properly adjusted to the current draw of the control system.
 - 3. Make certain wiring connections are tight and wires are positioned and secured so they will not be able to contact high temperature locations.
 - 4. Conduct a gas leakage test of the appliance piping and control system downstream of the shutoff valve in the supply line to the appliance.
 - 5. Adjust the thermostat to its highest temperature setting. Visually determine that main burner gas is burning properly: i.e., no floating, lifting or flashback. Adjust the primary air shutter(s) as required.

6. If the appliance is equipped with high and low flame controlling or flame modulation, check for proper main burner operation at both high and low flame.
7. Determine that the pilot is igniting and burning properly and that main burner ignition is satisfactory by interrupting and reestablishing the electrical supply to the appliance in any convenient manner. Make this determination with the appliance burner both cold and hot. Perform this step as many times as necessary to satisfy yourself that the automatic intermittent pilot system is operating properly.
8. Test the pilot safety device:
 - (a) To determine if it is operating properly; and
 - (b) For turndown characteristics according to the manufacturer's installation instructions.
9. Sequence the appliance through at least three operating cycles.
10. Check both the limit control and the fan control for proper operation. Limit control operation can be checked by blocking the circulating air inlet or temporarily disconnecting the electrical supply to the blower motor and determining that the limit control acts to shut off the main burner gas.
- j. The complete procedure for troubleshooting and servicing the system.
- k. The location and instructions for applying a Class IIIA-1 label warning the homeowner not to try to light the appliance manually. (See Exhibit B, Items Unique to Canada).
- l. Directions that the installing agency give the homeowner all instructions.
- m. Directions that the installing agency cover or remove the manual lighting instructions.

A.1.8

Each automatic intermittent pilot ignition system intended for field installation shall be accompanied by separate printed instructions for use by the homeowner. These instructions shall contain clearly defined, legible, and complete instructions for at least the following:

- a. A statement that the appliance has been modified from a continuously burning pilot to an intermittent pilot operation;
- b. Complete operating instructions for the system; and
- c. A statement that if the automatic intermittent pilot ignition system fails to operate or becomes inoperative, it is recommended that the installer or qualified servicing agency be called for service.

A.1.9

The printed instructions accompanying the appliance shall also include the following minimum information presented in a readily obvious and prominent manner, such as being underlined, encircled, or printed in larger or different color type:

- a. Due to high temperatures, the appliance should be located out of traffic and away from furniture and draperies;
- b. Children and adults should be alerted to the hazards of high surface temperature and should stay away to avoid burns or clothing ignition;

- c. Young children should be carefully supervised when they are in the same room as the appliance;
- d. Clothing or other flammable material should not be placed on or near the appliance;
- e. Any safety screen or guard removed for servicing an appliance must be replaced prior to operating the appliance. (See 1.2.6); and
- f. Installation and repair should be done by a qualified service person. The appliance should be inspected before use and at least annually by a professional service person. More frequent cleaning may be required due to excessive lint from carpeting, bedding material, etc. It is imperative that control compartments, burners and circulating air passageways of the appliance be kept clean.

Exhibit A.2

Recommended Procedure For Safety Inspection Of The Existing Appliance Installation As A Preliminary Step To Field Installing The Automatic Intermittent Pilot Ignition System.

A.2.1

The following procedure is intended as a guide to aid in determining that the appliance is properly installed and is in a safe condition for continuing use.

A.2.2

It should be recognized that generalized test procedures cannot anticipate all situations. Accordingly, in some cases, deviation from this procedure may be necessary to determine safe operation of the equipment.

- a. This procedure should be performed prior to any attempt at modification of the appliance or the installation.
- b. If it is determined there is a condition which could result in unsafe operation, the appliance should be shut off and the owner advised of the unsafe condition.

A.2.2

The following steps should be followed in making the safety inspection.

- a. Conduct a gas leakage test of the appliance piping and control system downstream of the shutoff valve in the supply line to the appliance.
- b. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restrictions, leakage or corrosion or other deficiencies which could cause an unsafe condition.
- c. Shut off all gas to the appliance and shut off any other fuel-burning appliance within the same room. Use the shut-off valve in the supply line to each appliance.
- d. Inspect burners and crossovers for blockage and corrosion.
- e. Inspect heat exchangers for cracks, openings or excessive corrosion.
- f. Insofar as is practical, close all windows and all doors between the space in which the appliance is located and other spaces of the building. Turn on clothes dryer. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers. If after completing Steps -f through -j, it is believed sufficient combustion air is not available, refer to the section covering air for combustion, venting and ventilation of the *National Fuel Gas Code, ANSI Z223.1/NFPA 54, or CSA B149.1, Natural Gas and Propane Installation Code* for guidance.
- g. Place in operation the appliance following the lighting instructions. Adjust thermostat so the appliance will operate continuously. Other fuel burning appliances shall be placed in operation.

- h. Determine that the pilot is burning properly and that main burner ignition is satisfactory by interrupting and reestablishing the electrical supply to the appliance in any convenient manner.
 - 1. Visually determine that main burner gas is burning properly: i.e., no floating, lifting or flashback. Adjust the primary air shutter(s) as required.
 - 2. If appliance is equipped with high and low flame control or flame modulation, check for proper main burner operation at low flame.
- i. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use a draft gauge, the flame of a match or candle, or smoke from a cigarette, cigar or pipe.
- j. Return doors, windows, exhaust fans, fireplace dampers and all other fuel-burning appliances to their previous conditions of use.
- k. Check both limit control and fan control for proper operation. Limit control operation can be checked by temporarily disconnecting the electrical supply to the blower motor and determining that the limit control acts to shut off the main burner gas.

Exhibit B

Items Unique To Canada

B.1.

An appliance for installation at high altitudes shall conform to the applicable construction provisions of the current Standard *CGA 2.17, Gas Appliances for Use At High Altitudes*.

B.2.

An appliance will comply to *CGA P.4.1, Testing Method for Measuring Annual Fireplace Efficiencies*.

B.3.

Timing requirements must comply with the Standard for *Gas-Fired Appliances Equipped with Electrically Operated Automatic Vent Damper Devices Provided as Integral Components, CAN/CGA 2.28*, which specifies actual opening and closing times for electrical vent dampers. The current harmonized vented fireplace heater standard does not specify such timings.

B.4.

Electrical equipment and wiring supplied on the appliance shall be investigated for compliance with the applicable sections of the current Standard *CSA C22.2 No. 3, Electrical Features of Fuel Burning Equipment*.

B.5.

Vented Gas Fireplaces for installation in a bedroom or bedsitting room shall be certified with a thermostat and automatic ignition system.

B.6.

All markings and instructions required by this standard, shall be provided in a form that is easily understood in both the English and French languages. Samples as follows:

	ENGLISH	FRENCH
1.8	Main Burners	
1.8.12	<p>"THIS APPLIANCE IS EQUIPPED FOR NATURAL (LP/PROPANE) GAS. This appliance is equipped with main burner(s) designed for operation with natural (LP/propane) gas. Main burner(s) necessary for LP/propane (natural) conversion are provided ."</p> <p>(*Location to be determined by manufacturer.)</p>	<p>«CET APPAREIL EST ÉQUIPÉ POUR FONCTIONNER AU GAZ NATUREL (PROPANE LIQUÉFIÉ). Ses brûleurs principaux sont conçus pour fonctionner au gaz naturel (propane liquéfié). Les brûleurs principaux nécessaires pour la conversion au propane (gaz naturel) sont __.»</p> <p>(L'emplacement doit être indiqué par le fabricant.)</p>
1.10	Orifice Spuds And Orifice Fittings	
1.10.5	<p>"THIS APPLIANCE IS EQUIPPED FOR NATURAL (OR PROPANE) GAS.</p>	<p>«CET APPAREIL EST ÉQUIPÉ POUR FONCTIONNER AU GAZ NATUREL OU AU PROPANE.</p>

This appliance is equipped with orifices sized for operation with natural (or propane) gas.

Cet appareil est muni d'injecteurs dimensionnés pour une alimentation au gaz naturel (ou au propane).

For conversion to propane (or natural) gas see instructions provided with the appliance.

Consulter les instructions fournies avec l'appareil pour la conversion au propane (ou au gaz naturel).

Orifices and instructions necessary for propane (or natural) conversion are provided .**

Les injecteurs et les instructions nécessaires pour la conversion au propane liquéfié (gaz naturel) se trouvent _____»

(* Location to be determined by manufacturer.)

(*L'emplacement doit être déterminé par le fabricant.)

1.34

Instructions

1.34.1

WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS
 - Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

AVERTISSEMENT. Assurez-vous de bien suivre les instructions données dans cette notice pour réduire au minimum le risque d'incendie ou d'explosion ou pour éviter tout dommage matériel, toute blessure ou la mort.

- Ne pas entreposer ni utiliser d'essence ni d'autres vapeurs ou liquides inflammables dans le voisinage de cet appareil ou de tout autre appareil.
- QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ:
 - Ne pas tenter d'allumer d'appareil.
 - Ne touchez à aucun interrupteur. Ne pas vous servir des téléphones se trouvant dans le bâtiment où vous vous trouvez..
 - Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.
 - Si vous ne pouvez rejoindre le fournisseur de gaz, appelez le service des incendies.
- L'installation et l'entretien doivent être assurés par un installateur ou un service d'entretien qualifié ou par le fournisseur de gaz.

WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- **WHAT TO DO IF YOU SMELL GAS**
 - Evacuate all persons from the vehicle.
 - Shut off the gas supply at the gas container or source.
 - Do not touch any electrical switch or use any phone or radio in the vehicle.
 - Do not start the vehicle's engine or electric generator.
 - Contact the nearest gas supplier or qualified service technician for repairs.
 - If you cannot reach your gas supplier, or qualified technician, contact the nearest fire department.
 - Do not turn on the gas supply until the gas leak(s) has been repaired.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

AVERTISSEMENT. Assurez-vous de bien suivre les instructions données dans cette notice pour réduire au minimum le risque d'incendie ou d'explosion ou pour éviter tout dommage matériel, toute blessure ou la mort.

- Ne pas entreposer ni utiliser d'essence ni d'autres vapeurs ou liquides inflammables à proximité de cet appareil ou de tout autre appareil.
- **QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ :**
 - Évacuez le véhicule.
 - Fermez toutes les sources d'arrivée de gaz
 - Ne touchez à aucun interrupteur ; ne pas vous servir du téléphone ni de la radio se trouvant dans le véhicule.
 - Ne pas démarrer le moteur du véhicule ni aucune génératrice électrique.
 - Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.
 - Si vous ne pouvez rejoindre le fournisseur de gaz, appelez le service des incendies.
 - Ne pas rallumer la source de gaz tant que la fuite n'a pas été réparée.
- L'installation et l'entretien doivent être assurés par un installateur ou un service d'entretien qualifié ou par le fournisseur de gaz.

This appliance may be installed as an OEM installation in a manufactured home (USA only) or mobile home and must be installed in accordance with the manufacturer's instructions and the *Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280*, in the United States, or the Standard for installation in *Mobile Homes, CAN/CSA Z240 MH*, in Canada.

This appliance is only for use with the type(s) of gas indicated on the rating plate. A conversion kit is supplied with the appliance.

Cet appareil peut être installé comme du matériel d'origine dans une maison préfabriquée (É.-U. seulement) ou mobile et doit être installé selon les instructions du fabricant et conformément à la norme *Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280* aux États-Unis ou à la norme *CAN/CSA-Z240 Série MM, Maisons mobiles* au Canada.

Cet appareil doit être utilisé uniquement avec les types de gaz indiqués sur la plaque signalétique. Une trousse de conversion est fournie avec l'appareil.

This appliance may be installed in an aftermarket, permanently located, manufactured home (USA only) or mobile home, where not prohibited by local codes.

This appliance is only for use with the type of gas indicated on the rating plate. This appliance is not convertible for use with other gases, unless a certified kit is used.

Cet appareil peut être installé dans une maison préfabriquée (mobile) déjà installée à demeure si les règlements locaux le permettent.

Cet appareil doit être utilisé uniquement avec le type de gaz indiqué sur la plaque signalétique. Cet appareil ne peut être converti à d'autres gaz, sauf si une trousse de conversion est utilisée.

This appliance may be installed in an aftermarket, permanently located, manufactured home (USA only) or mobile home, where not prohibited by local codes.

This appliance is only for use with the types of gas indicated on the rating plate. A conversion kit is supplied with the appliance.

Cet appareil peut être installé dans une maison préfabriquée (É.-U. seulement) ou mobile déjà installée à demeure si les règlements locaux le permettent.

Cet appareil doit être utilisé uniquement avec les types de gaz indiqués sur la plaque signalétique. Une trousse de conversion est fournie avec cet appareil.

This appliance may be installed in an OEM installation in a manufactured home (USA only) or mobile home and must be installed in accordance with the manufacturer's instructions and the *Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280*, in the United States, or the *Standard for Installation in Mobile Homes, CAN/CSA Z240 MH Series*, in Canada.

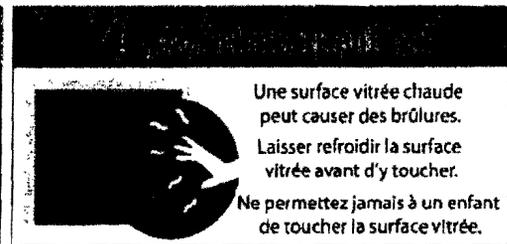
This appliance is only for use with the type of gas indicated on the rating plate. This appliance is not convertible for use with other gases, unless a certified kit is used.

Cet appareil peut être installé comme du matériel d'origine dans une maison préfabriquée (É.-U. seulement) ou mobile et doit être installé selon les instructions du fabricant et conformément à la norme *Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280* aux États-Unis ou à la norme *CAN/CSA-Z240 Série MM, Maisons mobiles* au Canada.

Cet appareil doit être utilisé uniquement avec le type de gaz indiqué sur la plaque signalétique. Cet appareil ne peut être converti à d'autres gaz, sauf si une trousse de conversion est utilisée.

INSTALLER: Leave this manual with the appliance.
CONSUMER: Retain this manual for future reference.

«**INSTALLATEUR :** Laissez cette notice avec l'appareil.
CONSOMMATEUR : Conservez cette notice pour consultation ultérieure.»



1.34.1-e

"Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water."

«Ne pas utiliser cet appareil s'il a été plongé, même partiellement, dans l'eau. Appeler un technicien qualifié pour inspecter l'appareil et remplacer toute partie du système de commande et toute commande qui a été plongée dans l'eau.»

1.34.1-g

"Caution: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation."

« Attention. Au moment de l'entretien des commandes, étiquetez tous les fils avant de les débrancher. Des erreurs de câblage peuvent entraîner un fonctionnement inadéquat et dangereux. »

"Verify proper operation after servicing."

« S'assurer que l'appareil fonctionne adéquatement une fois l'entretien terminé. »

1.34.2a

a. Due to high temperatures, the appliance should be located out of traffic and away from furniture and draperies.

a. «En raison des températures élevées, l'appareil devrait être installé dans un endroit où il y a peu de circulation et loin du mobilier et des tentures.»

1.34.2b	b. Children and adults should be alerted to the hazards of high surface temperature and should stay away to avoid burns or clothing ignition.	b. «Les enfants et les adultes devraient être informés des dangers que posent les températures de surface élevées et se tenir à distance afin d'éviter des brûlures ou que leurs vêtements ne s'enflamment.»
1.34.2c	c. Young children should be carefully supervised when they are in the same room as the appliance. Toddlers, young children and others may be susceptible to accidental contact burns. A physical barrier is recommended if there are at risk individuals in the house. To restrict access to a fireplace or stove, install an adjustable safety gate to keep toddlers, young children and other at risk individuals out of the room and away from hot surfaces.	c. «Les jeunes enfants devraient être surveillés étroitement lorsqu'ils se trouvent dans la même pièce que l'appareil. Les tout petits, les jeunes enfants ou les adultes peuvent subir des brûlures s'ils viennent en contact avec la surface chaude. Il est recommandé d'installer une barrière physique si des personnes à risques habitent la maison. Pour empêcher l'accès à un foyer ou à un poêle, installez une barrière de sécurité ; cette mesure empêchera les tout petits, les jeunes enfants et toute autre personne à risque d'avoir accès à la pièce et aux surfaces chaudes.»
1.34.2d	d. Clothing or other flammable material should not be placed on or near the appliance.	d. «On ne devrait pas placer de vêtements ni d'autres matières inflammables sur l'appareil ni à proximité.»
1.34.2e	e. Any safety screen or guard removed for servicing an appliance must be replaced prior to operating the appliance.	e. «Tout écran ou protecteur retiré pour permettre l'entretien de l'appareil doit être remis en place avant de mettre l'appareil en marche.»
1.34.2f	f. Installation and repair should be done by a qualified service person. The appliance should be inspected before use and at least annually by a professional service person. More frequent cleaning may be required due to excessive lint from carpeting, bedding material, etcetera. It is imperative that control compartments, burners and circulating air passageways of the appliance be kept clean.	f. «L'installation et la réparation devrait être confiées à un technicien qualifié. L'appareil devrait faire l'objet d'une inspection par un technicien professionnel avant d'être utilisé et au moins une fois l'an par la suite. Des nettoyages plus fréquents peuvent être nécessaires si les tapis, la literie, et cetera produisent une quantité importante de poussière. Il est essentiel que les compartiments abritant les commandes, les brûleurs et les conduits de circulation d'air de l'appareil soient tenus propres.»
1.34.2g	g. Only doors certified with the appliance shall be used. The appliance is not for use with glass doors.	g. «Seules des portes certifiées pour cet appareil doivent être utilisées.» «Cet appareil ne peut être équipé de portes en verre.»
1.34.4-a	"Only trim kit(s) supplied by the manufacturer shall be used in the installation of this appliance."	« Seules les trousse de garniture fournies par le fabricant doivent être utilisées pour l'installation de cet appareil. »
1.34.4-b	"Draft Relief Openings must not be covered or blocked."	« Les ouvertures de sûreté ne doivent pas être obstruées. »

1.34.5-a	"WARNING: Failure to position the parts in accordance with these diagrams or failure to use only parts specifically approved with this appliance may result in property damage or personal injury."	« AVERTISSEMENT. Risque de dommages ou de blessures si les pièces ne sont pas installées conformément à ces schémas et ou si des pièces autres que celles spécifiquement approuvées avec cet appareil sont utilisées. »
1.34.5-d	"If the factory-built fireplace has no gas access hole(s) provided, an access hole of 1.5-inch (37.5 mm) or less may be drilled through the lower sides or bottom of the firebox in a proper workmanship like manner. This access hole must be plugged with non-combustible insulation after the gas supply line has been installed."	«Si le foyer préfabriqué ne comporte pas d'orifices d'amenée du gaz, un orifice d'au plus 37,5 mm (1,5 po) peut être pratiqué, selon les règles de l'art, dans la partie inférieure des parois ou au fond de la chambre de combustion. Cet orifice doit être obturé au moyen d'isolant incombustible une fois la conduite de gaz en place.»
1.34.6	"WARNING: Do not operate appliance with the glass front removed, cracked or broken. Replacement of the glass should be done by a licensed or qualified service person."	« AVERTISSEMENT. Ne pas utiliser l'appareil si le panneau frontal en verre n'est pas en place, est craqué ou brisé. Confiez le remplacement du panneau à un technicien agréé. »
1.34.7-b	"Clearance in accordance with local installation codes and the requirements of the gas supplier."	«Dégagement conforme aux codes d'installation locaux et aux exigences du fournisseur de gaz.»
1.34.8-g	"Damper must be in open position when appliance main burner(s) is operating."	« Le registre doit être en position ouverte ouvert lorsque le ou les brûleurs principaux de l'appareil fonctionnent. »
1.35	Marking	
1.35.2-a	"Vented Gas Fireplace Heater"	«Foyer au gaz à évacuation »
1.35.2-b	"For use only with automatic vent damper device Part No. _____. Follow installation instructions."	«Pour utilisation avec un registre de conduit d'évacuation automatique n° _____ seulement. Suivre les instructions d'installation.»
1.35.2-c	"May be used with automatic vent damper device Part No. _____. Follow installation instructions."	«Peut être utilisé avec un registre de conduit d'évacuation automatique n° _____. Suivre les instructions d'installation.»
1.35.2-d	"For use only with trim kit(s) Part No(s). _____. Follow installation instructions."	« Utiliser uniquement avec la trousse de garniture n° _____." Suivre les instructions d'installation.»
1.35.2-l	"Vented Gas Fireplace Heater - Not for Use with Solid Fuel."	«Foyer au gaz à évacuation.- Ne pas utiliser avec du combustible solide.»
1.35.2-m	"This vented gas fireplace heater is not for use with air filters."	« Ne pas utiliser de filtre à air avec ce foyer au gaz à évacuation. »
1.35.2-n	"ANS Z21.88-(year) • CSA 2.33-(year) Vented Gas Fireplace Heater;"	«ANS Z21.88-(année) • CSA-2.33 (année), Vented Gas Fireplace Heater; »
	"ANS Z21.88a-(year) • CSA 2.33a-(year) Vented Gas Fireplace Heater;" or	«ANS Z21.88a-(année) • CSA-2.33a (année), Vented Gas Fireplace Heater ;» or
	"ANS Z21.88b-(year) • CSA 2.33b-(year) Vented Gas Fireplace Heater."	«ANS Z21.88b-(année) • CSA-2.33b (année), Vented Gas Fireplace Heater.»
1.35.2-o	"less than ____* amperes."	«moins de ____* ampères.»

1.35.2-q	"FOR USE WITH GLASS DOORS CERTIFIED WITH THE APPLIANCE ONLY" or "NOT FOR USE WITH GLASS DOORS."	«POUR UTILISATION UNIQUEMENT AVEC LES PORTES EN VERRE CERTIFIÉES AVEC L'APPAREIL» ou «NE PAS UTILISER AVEC DES PORTES EN VERRE.»
1.35.2-r	"For natural gas when equipped with No. _____ drill size orifice." "For propane when equipped with No. _____ drill size orifice."	«Convient au gaz naturel quand l'appareil est muni d'un injecteur de diamètre n° ____.» «Convient au propane quand l'appareil est muni d'un injecteur de diamètre n° ____.»
1.35.2-s	"This appliance is only for use with the type of gas indicated on the rating plate and may be installed in an aftermarket, permanently located, manufactured (mobile) home where not prohibited by local codes. See owner's manual for details. This appliance is not convertible for use with other gases, unless a certified kit is used."	« Cet appareil doit être utilisé uniquement avec le type de gaz indiqué sur la plaque signalétique. Cet appareil peut être installé dans une maison préfabriquée ou mobile (É.-U. seulement) installée à demeure si les règlements locaux le permettent. Voir la notice de l'utilisateur pour plus de renseignements. Cet appareil ne peut pas être utilisé avec d'autres gaz sauf si une trousse de conversion certifiée est fournie. »
1.35.2-t	"This appliance is only for use with the type(s) of gas indicated on the rating plate and may be installed in an aftermarket, permanently located, manufactured home (USA only) or mobile home, where not prohibited by local codes. See owner's manual for details. This appliance is supplied with a conversion kit."	«Cet appareil doit être utilisé uniquement avec le type de gaz indiqué sur la plaque signalétique. Cet appareil peut être installé dans une maison préfabriquée ou mobile (É.-U. seulement) installée à demeure si les règlements locaux le permettent. Voir la notice de l'utilisateur pour plus de renseignements. Cet appareil ne peut pas être utilisé avec d'autres gaz sauf si une trousse de conversion certifiée est fournie.»
1.35.6-a	CAUTION: Hot while in operation. Do not touch. Severe Burns may result. Keep children, clothing furniture, gasoline and other liquids having flammable vapors away. or CAUTION: Hot while in operation. Do not touch. Severe Burns may result. Keep children, clothing and furniture away.	ATTENTION : L'appareil est chaud lorsqu'il fonctionne. Ne pas toucher l'appareil. Risque de brûlures graves. Surveiller les enfants. Garder les vêtements, les meubles, l'essence ou autres liquides produisant des vapeur inflammables loin de l'appareil. Ou ATTENTION. L'appareil est chaud lorsqu'il fonctionne. Ne pas toucher l'appareil. Risque de brûlures graves. Surveiller les enfants. Garder les vêtements et les meubles loin de l'appareil.
1.35.6-b	CAUTION:Keep gasoline and other liquids having flammable vapors away. "Keep burner and control compartment clean. See installation and operating instructions accompanying appliance."	ATTENTION.Garder l'essence ou autres liquides produisant des vapeurs inflammables loin de l'appareil. « S'assurer que le brûleur et le compartiment des commande sont propres. Voir les instructions d'installation et d'utilisation qui accompagnent l'appareil. »

1.35.7-a	<p>"This appliance must be installed in accordance with local codes, if any; if none, follow the <i>National Fuel Gas Code, ANSI Z223.1</i>, or <i>Natural Gas and Propane Installation Code, CSA B149.1</i>."</p>	<p>«Installer l'appareil selon les codes ou règlements locaux, ou, en l'absence de tels règlements, selon les codes d'installation ANSI Z223.1, National Fuel Gas Code ou CSA-B149.1 en vigueur.»</p>
1.35.7-b	<p>"WARNING: Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to the owner's information manual provided with this appliance. For assistance or additional information consult a qualified installer, service agency or the gas supplier."</p>	<p>« AVERTISSEMENT : Une installation, un réglage, une modification, une réparation ou un entretien mal effectué peut causer des dommages matériels ou des blessures. Voir la notice de l'utilisateur qui accompagne l'appareil. Pour de l'aide ou des renseignements supplémentaires, consultez un installateur, un technicien agréé ou le fournisseur de gaz. »</p>
1.35.7-d1	<p>"This appliance must be properly connected to a venting system in accordance with the manufacturer's installation instructions." or</p>	<p>« Cet appareil doit être correctement raccordé à un système d'évacuation, conformément aux instructions du fabricant. » ou</p>
1.35.7-d2	<p>"This appliance must be properly connected to a venting system in accordance with the manufacturer's installation instructions. This appliance is equipped with a vent safety shutoff system."</p> <p>"WARNING: Operation of this appliance when not connected to a properly installed and maintained venting system or tampering with the blocked vent shutoff system can result in carbon monoxide (CO) poisoning and possible death."</p> <p>"This appliance needs fresh air for safe operation and must be installed so there are provisions for adequate combustion and ventilation air."</p>	<p>«Cet appareil doit être correctement raccordé à un système d'évacuation, conformément aux instructions du fabricant. Cet appareil est équipé d'un système d'arrêt d'évent.»</p> <p>«AVERTISSEMENT. Si cet appareil fonctionne sans être raccordé à un système d'évacuation correctement installé et entretenu, ou si le système d'évacuation est modifié, il peut en résulter un empoisonnement au monoxyde de carbone et la mort.»</p> <p>«Cet appareil doit être alimenté en air frais pour fonctionner en toute sécurité et doit être installé de façon qu'il y ait un apport suffisant en air comburant et en air frais.»</p>
1.35.7-f	<p>"This appliance must be installed in accordance with the Standard <i>CAN/CSA Z240 MH, Mobile Housing</i>, in Canada, or with the <i>Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280</i>, in the United States, or when such a standard is not applicable, <i>ANSI/NCSBCS A225.1/NFPA 501A, Manufactured Home Installations Standard</i>."</p>	<p>« Installer l'appareil selon la norme CAN/CSA-Z240, Série MM, Maison mobiles ou CAN/CSA-Z240 VC, Véhicules de camping, ou la norme 24 CFR Part 3280, Manufactured Home Construction and Safety Standard. Si ces normes ne sont pas pertinentes, utilisez la norme ANSI/NCSBCS A225.1/NFPA 501A, Manufactured Home Installations Standard, ou ANSI A119.2 ou NFPA 501C Standard for Recreational Vehicles.»</p>
1.35.7-g	<p>"This appliance must be installed in accordance with the Standard <i>CAN/CSA Z240 RV, Recreational Vehicles</i>, in Canada, or with <i>ANSI A119.2/NFPA 501C, Standard for Recreational Vehicles</i>, in the United States"</p>	<p>«Cet appareil doit être installé selon la norme CAN/CSA Z240 VC, Véhicules de camping, au Canada ou la norme ANSI A119.2/NFPA 501C, Standard for Recreational Vehicles aux États-Unis»</p>

1.35.7-h	“For OEM installation in a manufactured home (USA only) or mobile home only,” “for installation in a recreational vehicle only,” or “for OEM installation in a manufactured home (USA only) or mobile home or recreational vehicle only.”	« Pour installation comme appareil d’origine dans une maison préfabriquée (mobile) seulement», « pour installation dans un véhicule de camping seulement », « pour installation comme appareil d’origine dans une maison préfabriquée (mobile) ou dans un véhicule de camping seulement ».
1.35.7-i	“Sections of the venting system have not been installed. WARNING - Do not operate the appliance until all sections have been assembled and installed in accordance with the manufacturer’s instructions.”	«Des sections du système d’évacuation n’ont pas été installées. AVERTISSEMENT - Ne pas utiliser l’appareil tant que toutes les sections n’ont pas été assemblées et installées selon les instructions du fabricant.»
1.35.7-j	“WARNING. This fireplace has been converted for use with a gas fireplace insert only and cannot be used for burning wood or solid fuels unless all original parts have been replaced, and the fireplace re-approved by the authority having jurisdiction.”	«AVERTISSEMENT : Ce foyer a été converti pour utilisation avec un foyer au gaz encastrable et ne peut être utilisé pour brûler du bois ou d’autres combustibles solides à moins que toutes les pièces d’origine aient été remplacées et que le foyer ait été approuvé de nouveau par l’autorité compétente.»
1.35.7-l	“WARNING: Failure to install this appliance per the manufacturer’s instructions or failure to use only parts specifically approved with this appliance may result in property damage or personal injury.”	«AVERTISSEMENT : Risque de dommages ou de blessures si l’appareil n’est pas installé selon les instructions du fabricant ou si des pièces autres que celles spécifiquement approuvées avec cet appareil sont utilisées.»
1.35.8	“Warning: fire or explosion hazard. Can cause property damage, severe injury or death. This is a fast-acting thermocouple. Replace with another fast-acting thermocouple specified by the appliance manufacturer. Refer to the manual for the part number.”	«Avertissement : Risque d’incendie ou d’explosion. Peut causer des dommages à la propriété, des blessures graves ou entraîner la mort. Ceci est un thermocouple à action rapide. Le remplacer uniquement par un autre thermocouple à action rapide prescrit par le fabricant de l’appareil. Voir la notice pour connaître le numéro de pièce. »
1.35.10	“THIS CONNECTION IS FOR LOW-VOLTAGE BATTERY OR DIRECT CURRENT ONLY. DO NOT CONNECT TO 120 OR 240 VOLTS AC.”	«CE POINT DE CONNEXION EST RÉSERVÉ À UNE PILE DE FAIBLE TENSION OU À UNE SOURCE DE COURANT CONTINU SEULEMENT. NE PAS RACCORDER À UN COURANT DE 120 OU 240 V C.A.»
1.35.11	“(Part No. ____) fan or blower assembly may be used.”	« Le ventilateur ou l’ensemble (pièce n° ____) peut être utilisé. »
1.35.14	“This appliance equipped only for altitudes 0-2000 feet (0-610 m).”	« Cet appareil peut être utilisé à des altitudes comprises entre 0 et 610 mètres (0 et 2000 pieds) seulement. »
1.35.15-c	“FOR USE WITH (Manufacturer) (Model No.____) ONLY.”	« UTILISER AVEC LE ____ (n° de modèle) DE _____ (nom du fabricant) SEULEMENT. »
1.35.17	“(Part No. ____) register kit may be used.”	« La trousse de registre (n° de pièce ____) peut être utilisée. »
1.35.22	“Trim Kit Part No. ____ . This trim assembly is a component part of the draft hood. Follow installation instructions.”	« Trousse de garniture n° ____ . Cette garniture est un élément de la hotte de tirage. Suivre les instructions d’installation. »

1.35.23

“CAUTION: Do not operate the appliance with glass removed, cracked or broken. Replacement of the panel(s) should be done by a licensed or qualified service person.”

« Attention. Ne pas utiliser l'appareil si le panneau frontal en verre n'est pas en place, est craqué ou brisé. Confiez le remplacement du panneau à un technicien agréé. »

Exhibit B (Continued)
Exhibits — Exhibit D - (Optional), Provisions for Listed Gas Appliance Conversions

D.3. Instructions

D.3-b

"WARNING

AVERTISSEMENT

This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instruction is not followed exactly, a fire, explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit."

Cette trousse de conversion doit être installée par un technicien agréé, selon les instructions du fabricant et selon toutes les exigences et tous les codes pertinents de l'autorité compétente. Assurez-vous de bien suivre les instructions dans cette notice pour réduire au minimum le risque d'incendie, d'explosion ou la production de monoxyde de carbone pouvant causer des dommages matériels, des blessures ou la mort. Le technicien agréé est responsable de l'installation de cette trousse. L'installation n'est pas adéquate ni complète tant que le bon fonctionnement de l'appareil converti n'a pas été vérifié selon les instructions du fabricant fournies avec la trousse. »

D.3-f

"Caution the gas supply shall be shut off prior to disconnecting the electrical power, before proceeding with the conversion."

« Attention. Avant d'effectuer la conversion, coupez d'abord l'alimentation en gaz, ensuite, coupez l'alimentation électrique. »

D.4 Marking

D.4-d

"This appliance was converted on day-month-year to ___ gas with Kit No. ___ by ___ (name and address of organization making this conversion), which accepts the responsibility that this conversion has been properly made."

«Cet appareil a été converti le (jour-mois-année) pour fonctionner au gaz _____ à l'aide de la trousse n° _____ par _____ (nom et adresse de l'organisme qui a effectué la conversion), qui accepte l'entière responsabilité de la conversion.»

D.4-e

"This control has been converted for use with gas ____."

« Cette commande a été convertie pour fonctionner au gaz ____ . »

Exhibit B (Continued)

Exhibits — Exhibit F, Outline of Lighting Instructions for Appliances Equipped with Continuous Pilots

The following is a guide to aid in the writing of the lighting instructions label for an appliance equipped with a continuous pilot. The statements in quotes are to be worded as shown. For purposes of this Exhibit, the word “knob” is used. An actual label shall use the word knob, button, lever, switch, etc., as appropriate. If the action necessary to operate the control is other than stated below, modification of the sentence(s) is acceptable.

A sample of this label is shown in Figure F.

Section 1

“FOR YOUR SAFETY READ BEFORE LIGHTING”

The following warning shall be indented and boxed at the top of this section:

“WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life. ”

“A. This appliance has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.”

“B. BEFORE LIGHTING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor’s phone. Follow the gas supplier’s instructions.
- If you cannot reach your gas supplier, call the fire department.”

Cette annexe vise à aider à la rédaction des instructions d’allumage des appareils pourvus de veilleuses. Les énoncés entre guillemets doivent être repris tels quels. Dans les exemples donnés plus bas le terme « manette » est utilisé, mais les termes précis (bouton, levier, etc.) devraient être utilisés dans les mises en garde. Si l’utilisation des commandes est différente de celle donnée ci-dessous, les énoncés peuvent être modifiés.

Une étiquette type est montrée à la figure F.

Section 1

« POUR PLUS DE SÉCURITÉ, LIRE AVANT D’ALLUMER »

« AVERTISSEMENT. Quiconque ne respecte pas à la lettre les instructions dans la présente notice risque de déclencher un incendie ou une explosion entraînant des dommages, des blessures ou la mort. »

« A. Cet appareil est muni d’une veilleuse qui doit être allumée manuellement. Respectez les instructions ci-dessous à la lettre. »

« B. Avant d’allumer la veilleuse, reniflez tout autour de l’appareil pour déceler une odeur de gaz. Reniflez près du plancher, car certains gaz sont plus lourds que l’air et peuvent s’accumuler au niveau du sol. »

QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ :

- Ne pas tenter d’allumer d’appareil.
- Ne touchez à aucun interrupteur ; ne pas vous servir des téléphones se trouvant dans le bâtiment.
- Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.
- Si vous ne pouvez rejoindre le fournisseur, appelez le service des incendies.

"C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion."

"D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water."

Section 2

"LIGHTING INSTRUCTIONS"

1. "STOP! Read the safety information above (to the left) on this label."
2. For an appliance equipped with or for use with an adjustable thermostat:

"Set the thermostat to lowest setting."
3. For an appliance which utilizes an external electrical supply:

"Turn off all electric power to the appliance."
4. For an appliance which requires removal of a panel(s) or other part to gain access to the gas control, instructions for gaining access to the gas control.
5. Instructions, with an illustration, for turning the gas control manual valve to the full OFF position.*
6. "Wait five (5) minutes** to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above (to the left) on this label. If you don't smell gas, go to the next step."
7. For an appliance which requires removal of a part(s) to gain access to the pilot, instructions for gaining access to the pilot.
8. Instructions for locating the pilot. Illustration of the pilot is required.

* *Wherever rotation is required, the following words and symbols shall be used to indicate direction:*

clockwise  *counterclockwise* 

** *The manufacturer may specify a longer time.*

« C. Ne pousser ou tourner la manette d'admission du gaz qu'à la main. Ne jamais employer d'outil à cette fin. Si la manette reste coincée, ne tentez pas de la réparer; appelez un technicien qualifié. Quiconque tente de forcer la manette ou de la réparer peut provoquer une explosion ou un incendie. »

« D. N'utilisez pas cet appareil s'il a été plongé dans l'eau, même partiellement. Faites inspecter l'appareil par un technicien qualifié et remplacez toute partie du système de contrôle et toute commande qui ont été plongés dans l'eau. »

Section 2

« Instructions d'allumage »

1. « ARRÊTEZ ! Lisez les instructions de sécurité sur la portion supérieure (à gauche) de cette étiquette. »
2. Appareil pourvu d'un thermostat réglable ou destiné à être utilisé avec un tel dispositif :

« Réglez le thermostat à la température la plus basse. »
3. Appareil à alimentation électrique externe :

« Coupez l'alimentation électrique de l'appareil. »
4. Si des panneaux ou des pièces de l'appareil doivent être retirés pour atteindre la commande d'admission du gaz, des instructions doivent indiquer la marche à suivre.
5. Des instructions, et une illustration, doivent être fournies pour la fermeture complète (position OFF) du robinet manuel de l'admission du gaz.
6. Attendre cinq (5) minutes** pour laisser échapper tout le gaz. Reniflez tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si vous sentez une odeur de gaz, ARRÊTEZ ! Passez à l'étape B des instructions de sécurité sur la portion supérieure (à gauche) de cette étiquette. S'il n'y a pas d'odeur de gaz, passez à l'étape suivante. »
7. Si des pièces doivent être retirées pour atteindre la veilleuse, des instructions doivent indiquer la marche à suivre.
8. Fournir des instructions sur la façon de localiser la veilleuse. Fournir une illustration de la veilleuse.

* *Lorsqu'une rotation est requise, les mots et symboles suivants doivent être utilisés pour indiquer le sens de la rotation.*

Sens horaire  *sens antihoraire*

** *Le fabricant peut spécifier un intervalle plus long.*

9. Instructions for putting the gas control into the PILOT position.*

* *Wherever rotation is required, the following words and symbols shall be used to indicate direction:*

clockwise  *counterclockwise* 

10. Step by step instructions for lighting the pilot.

An indented statement relative to maloperation of the control such as:

- "If the knob does not pop up when released, stop and immediately call your service technician or gas supplier."
- "If the pilot will not stay lit after several tries, turn the gas control knob to "OFF" and call your service technician or gas supplier."*

11. If applicable, instructions to replace the pilot access panel(s).

12. Instructions for turning the gas control manual valve to the ON position.*

13. If applicable, instructions to replace the gas control access panel(s) or other part(s).

14. If applicable:

"Turn on all electric power to the appliance."

15. If applicable:

"Set thermostat to desired setting."

* *Wherever rotation is required, the following words and symbols shall be used to indicate direction:*

clockwise  *counterclockwise* 

Section 3

"TO TURN OFF GAS TO APPLIANCE"

1. If applicable:

"Set the thermostat to lowest setting."

2. If applicable:

"Turn off all electric power to the appliance if service is to be performed."

9. Fournir des instructions sur la façon de mettre la commande de gaz à la position veilleuse. *

* *Lorsqu'une rotation est requise, les mots et symboles suivants doivent être utilisés pour indiquer le sens de la rotation.*

sens horaire *sens antihoraire*

10. Fournir des instructions détaillées sur la façon d'allumer la veilleuse.

L'énoncé suivant ou l'équivalent, en retrait, visant le mauvais fonctionnement de la commande. :

- « Si la manette ne se soulève pas d'elle-même lorsqu'on la relâche, arrêter et appeler immédiatement un technicien qualifié ou le fournisseur de gaz. »
- « Si la veilleuse ne reste pas allumée après plusieurs tentatives, réglez la manette d'admission du gaz à la position OFF et appelez un technicien qualifié ou le fournisseur de gaz. »

11. Le cas échéant, fournir des instructions pour la réinstallation des panneaux d'accès à la veilleuse.

12. Fournir des instructions pour l'ouverture (position ON) du robinet manuel de l'admission du gaz.

13. Le cas échéant, fournir des instructions sur la réinstallation des panneaux d'accès à la commande d'admission de gaz ou autres pièces.

14. Le cas échéant :

« Mettez l'appareil sous tension. »

15. Le cas échéant :

« Réglez le thermostat à la température désirée. »

* *Lorsqu'une rotation est requise, les mots et symboles suivants doivent être utilisés pour indiquer le sens de la rotation.*

sens horaire *sens antihoraire*

Section 3

« Comment couper l'admission de gaz de l'appareil. »

1. Le cas échéant :

« Réglez le thermostat à la température la plus basse. »

2. Le cas échéant :

« Coupez l'alimentation électrique de l'appareil s'il faut procéder à l'entretien. »

- | | |
|---|--|
| <p>3. If applicable, instructions for gaining access to the gas control.</p> <p>4. Instructions for turning the gas control manual valve to the full OFF position.*</p> <p>5. If applicable, instructions to replace the gas control access panel(s).</p> | <p>3. Le cas échéant, fournir des instructions sur la marche à suivre pour atteindre la commande d'admission du gaz.</p> <p>4. Fournir des instructions pour la fermeture complète (position OFF) du robinet manuel de l'admission du gaz.</p> <p>5. Le cas échéant, fournir des instructions sur la réinstallation des panneaux d'accès à la commande d'admission de gaz.</p> |
|---|--|

* Wherever rotation is required, the following words and symbols shall be used to indicate direction:
 clockwise  counterclockwise 

* Lorsqu'une rotation est requise, les mots et symboles suivants doivent être utilisés pour indiquer le sens de la rotation.
 sens horaire sens antihoraire

Exhibit B (Continued)

Exhibits — Exhibit G, Outline of Operating Instructions for Appliances Equipped with Intermittent Pilot or Interrupted Pilot Systems

The following is a guide to aid in the writing of the operating instructions label for an appliance equipped with an intermittent pilot or interrupted pilot system. The statements in quotes are to be worded as shown. For purposes of this Exhibit, the word "knob" is used. An actual label shall use the word knob, button, lever, switch, etc., as appropriate. If the action necessary to operate the control is other than stated below, modification of the sentence(s) is acceptable.

A sample of this label is shown in Figure G.

Section 1

"FOR YOUR SAFETY READ BEFORE OPERATING"

The following warning shall be indented and boxed at the top of this section:

"WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life. "

- "A. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand."
- "B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor."

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Cette annexe vise à aider à la rédaction des instructions de fonctionnement des appareils pourvus de veilleuses intermittentes ou d'un système à veilleuse interrompue. Les énoncés entre guillemets doivent être repris tels quels. Dans les exemples donnés plus bas le terme « manette » est utilisé, mais les termes précis (bouton, levier, etc.) doivent être utilisés dans les mises en garde. Si l'utilisation des commandes est différente de celle donnée ci-dessous, les énoncés peuvent être modifiés.

Une étiquette type est montrée à la figure G.

Section 1

« POUR PLUS DE SÉCURITÉ LIRE AVANT DE METTRE EN MARCHÉ »

« AVERTISSEMENT. Quiconque ne respecte pas à la lettre les instructions dans la présente notice risque de déclencher un incendie ou une explosion entraînant des dommages, des blessures ou la mort. »

- « A. Cet appareil est muni d'un dispositif d'allumage qui allume automatiquement la veilleuse. Ne tentez pas d'allumer la veilleuse manuellement. »
- « B. AVANT DE FAIRE FONCTIONNER, reniflez tout autour de l'appareil pour déceler une odeur de gaz. Reniflez près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du sol. »

QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ :

- Ne pas tenter d'allumer d'appareil.
- Ne touchez à aucun interrupteur; ne pas vous servir des téléphones se trouvant dans le bâtiment.
- Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.
- Si vous ne pouvez rejoindre le fournisseur, appelez le service des incendies.

"C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion."

"D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water."

Section 2

"OPERATING INSTRUCTIONS"

1. "STOP! Read the safety information above (to the left) on this label."
2. For an appliance equipped with or for use with an adjustable thermostat:

"Set the thermostat to lowest setting."
3. For an appliance which utilizes an external electrical supply:

"Turn off all electric power to the appliance."
4. Instructions not to attempt to light the pilot by hand.
5. For an appliance which requires removal of a panel(s) or other part to gain access to the gas control, instructions for gaining access to the gas control.
6. Instructions, with an illustration, for turning the gas control manual valve to the full OFF position.* If a remote switch is provided the illustration shall show its location.

* Wherever rotation is required, the following words and symbols shall be used to indicate direction:
clockwise  counterclockwise 

« C. Ne poussez ou tournez la manette d'admission du gaz qu'à la main; ne jamais utiliser d'outil. Si la manette reste coincée, ne tentez pas de la réparer; appelez un technicien qualifié. Le fait de forcer la manette ou de la réparer peut déclencher une explosion ou un incendie. »

« D. N'utilisez pas cet appareil s'il a été plongé dans l'eau, même partiellement. Faites inspecter l'appareil par un technicien qualifié et remplacez toute partie du système de contrôle et toute commande qui ont été plongés dans l'eau. »

Section 2

« INSTRUCTIONS DE MISE EN MARCHÉ »

1. « **ARRÊTEZ !** Lisez les instructions de sécurité sur la portion supérieure (à gauche) de cette étiquette. »
2. Appareil pourvu d'un thermostat réglable ou destiné à être utilisé avec un tel dispositif:

« Réglez le thermostat à la température la plus basse. »
3. Appareil à alimentation électrique externe:

« Coupez l'alimentation électrique de l'appareil. »
4. Fournir des instructions qui indiquent de ne pas tenter d'allumer la veilleuse de façon manuelle.
5. Si des panneaux ou des pièces de l'appareil doivent être retirés pour atteindre la commande d'admission du gaz, des instructions doivent indiquer la marche à suivre.
6. Des instructions, et une illustration, doivent être fournies pour la fermeture complète (position OFF) du robinet manuel de l'admission du gaz.* Si l'appareil est équipé d'un interrupteur éloigné, son emplacement doit être montré sur l'illustration.

* Lorsqu'une rotation est requise, les mots et symboles suivants doivent être utilisés pour indiquer le sens de la rotation.
sens horaire sens antihoraire

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| <p>7. "Wait five (5) minutes** to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above (to the left) on this label. If you don't smell gas, go to the next step."</p> | <p>7. « Attendre cinq (5) minutes** pour laisser échapper tout le gaz. Reniflez tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si vous sentez une odeur de gaz, ARRÊTEZ ! Passez à l'étape B des instructions de sécurité sur la portion supérieure (à gauche) de cette étiquette. S'il n'y a pas d'odeur de gaz, passez à l'étape suivante. »</p> |
| <p>8. Instructions for turning the gas control manual valve to the ON position.*</p> | <p>8. Fournir des instructions pour l'ouverture (position ON) du robinet manuel de l'admission du gaz.</p> |

* *Whenever rotation is required, the following words and symbols shall be used to indicate direction:*

clockwise  *counterclockwise* 

** *The manufacturer may specify a longer time.*

* *Lorsqu'une rotation est requise, les mots et symboles suivants doivent être utilisés pour indiquer le sens de la rotation.*

sens horaire *sens antihoraire*

** *Le fabricant peut spécifier un intervalle plus long.*

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| <p>9. If applicable, instructions to replace the gas control access panel(s) or other part(s).</p> | <p>9. Le cas échéant, fournir des instructions sur la réinstallation des panneaux ou pièces d'accès à la commande d'admission de gaz.</p> |
| <p>10. If applicable:
"Turn on all electric power to the appliance."</p> | <p>10. Le cas échéant :
« Mettez l'appareil sous tension. »</p> |
| <p>11. If applicable:
"Set thermostat to desired setting."</p> | <p>11. Le cas échéant :
« Réglez le thermostat à la température désirée. »</p> |
| <p>12. Instructions as to what to do next if the appliance fails to operate after following the above steps, and the following:

"If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier."</p> | <p>12. Fournir des instructions donnant les mesures à prendre si l'appareil ne fonctionne pas même si les instructions ci-dessus ont été respectées ainsi que l'énoncé suivant :

« Si l'appareil ne se met pas en marche, suivez les instructions intitulées « Comment couper l'admission de gaz de l'appareil » et appelez un technicien qualifié ou le fournisseur de gaz. »</p> |

Section 3

"TO TURN OFF GAS TO APPLIANCE"

1. If applicable:
"Set the thermostat to lowest setting."
2. If applicable:
"Turn off all electric power to the appliance if service is to be performed."

Section 3

« Comment couper l'admission de gaz de l'appareil. »

1. Le cas échéant:
« Réglez le thermostat à la température la plus basse. »
2. Le cas échéant:
« Coupez l'alimentation électrique de l'appareil s'il faut procéder à l'entretien. »

- | | |
|---|---|
| <p>3. If applicable, instructions for gaining access to the gas control.</p> <p>4. Instructions for turning the gas control manual valve to the full OFF position.*</p> <p>5. If applicable, instructions to replace the gas control access panel(s).</p> | <p>3. Le cas échéant, fournir des instructions sur la marche à suivre pour atteindre la commande d'admission du gaz.</p> <p>4. Fournir des instructions pour la fermeture complète (position OFF) du robinet manuel de l'admission du gaz.</p> <p>5. Le cas échéant, fournir des instructions sur réinstallation des panneaux d'accès à la commande d'admission de gaz.</p> |
|---|---|

* Wherever rotation is required, the following words and symbols shall be used to indicate direction:
 clockwise  counterclockwise 

* Lorsqu'une rotation est requise, les mots et symboles suivants doivent être utilisés pour indiquer le sens de la rotation.
 sens horaire sens antihoraire

Exhibit B (Continued)

Exhibits — Exhibit H, Outline of Operating Instructions for Appliances Equipped with Direct Ignition Systems

The following is a guide to aid in the writing of the operating instructions label for an appliance equipped with a direct ignition system. The statements in quotes are to be worded as shown. For purposes of this Exhibit, the word "knob" is used. An actual label shall use the word knob, button, lever, switch, etc., as appropriate. If the action necessary to operate the control is other than stated below, modification of the sentence(s) is acceptable.

A sample of this label is shown in Figure H.

Section 1

"FOR YOUR SAFETY READ BEFORE OPERATING"

The following warning shall be indented and boxed at the top of this section:

"WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life."

"A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand."

"B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department."

Cette annexe vise à aider à la rédaction des instructions de fonctionnement des appareils pourvus d'un système d'allumage direct. Les énoncés entre guillemets doivent être repris tels quels. Dans les exemples donnés plus bas le terme « manette » est utilisé, mais les termes précis (bouton, levier, etc.) doivent être utilisés dans les mises en garde. Si l'utilisation des commandes est différente de celle donnée ci-dessous, les énoncés peuvent être modifiés.

Une étiquette type est montrée à la figure H.

Section 1

POUR PLUS DE SÉCURITÉ LIRE AVANT DE METTRE EN MARCHÉ

« **AVERTISSEMENT.** Quiconque ne respecte pas à la lettre les instructions dans la présente notice risque de déclencher un incendie ou une explosion entraînant des dommages, des blessures ou la mort. »

« A. Cet appareil ne comporte pas de veilleuse. Il est muni d'un dispositif d'allumage qui allume automatiquement le brûleur. Ne tentez pas d'allumer le brûleur manuellement. »

« B. AVANT DE FAIRE FONCTIONNER, reniflez tout autour de l'appareil pour déceler une odeur de gaz. Reniflez près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du sol. »

QUE FAIRE SI VOUS SENTEZ UNE ODEUR DE GAZ :

- Ne pas tenter d'allumer d'appareil
- Ne touchez à aucun interrupteur; ne pas vous servir des téléphones se trouvant dans le bâtiment.
- Appelez immédiatement votre fournisseur de gaz depuis un voisin. Suivez les instructions du fournisseur.
- Si vous ne pouvez rejoindre le fournisseur, appelez le service des incendies.

"C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion."

"D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water."

Section 2

"OPERATING INSTRUCTIONS"

1. "STOP! Read the safety information above (to the left) on this label."
2. For an appliance equipped with or for use with an adjustable thermostat:

"Set the thermostat to lowest setting."
3. For an appliance which utilizes an external electrical supply:

"Turn off all electric power to the appliance."
4. Instructions not to attempt to light the burner by hand.
5. For an appliance which requires removal of a panel(s) or other part to gain access to the gas control, instructions for gaining access to the gas control.
6. Instructions, with an illustration, for turning the gas control manual valve to the full OFF position.*
7. "Wait five (5) minutes** to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above (to the left) on this label. If you don't smell gas, go to the next step."

* Wherever rotation is required, the following words and symbols shall be used to indicate direction:

clockwise  counterclockwise 

** The manufacturer may specify a longer time.

8. Instructions for turning the gas control manual valve to the ON position.*

« C. Ne poussez ou tournez la manette d'admission du gaz qu'à la main; ne jamais utiliser d'outil. Si la manette reste coincée, ne pas tenter de la réparer; appelez un technicien qualifié. Le fait de forcer la manette ou de la réparer peut déclencher une explosion ou un incendie. »

« D. N'utilisez pas cet appareil s'il a été plongé dans l'eau, même partiellement. Faites inspecter l'appareil par un technicien qualifié et remplacez toute partie du système de contrôle et toute commande qui ont été plongés dans l'eau. »

Section 2

« INSTRUCTIONS DE MISE EN MARCHÉ »

1. « **ARRÊTEZ !** Lisez les instructions de sécurité sur la portion supérieure (à gauche) de cette étiquette. »
2. Appareil pourvu d'un thermostat réglable ou destiné à être utilisé avec un tel dispositif:

« Réglez le thermostat à la température la plus basse. »
3. Appareil à alimentation électrique externe:

« Coupez l'alimentation électrique de l'appareil. »
4. Fournir des instructions qui indiquent de ne pas tenter d'allumer la veilleuse de façon manuelle.
5. Si des panneaux ou des pièces de l'appareil doivent être retirés pour atteindre la commande d'admission du gaz, des instructions doivent indiquer la marche à suivre.
6. Des instructions, et une illustration, doivent être fournies pour la fermeture complète (position OFF) du robinet de l'admission du gaz.*
7. « Attendez cinq (5) minutes** pour laisser échapper tout le gaz. Reniflez tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si vous sentez une odeur de gaz, **ARRÊTEZ !** Passez à l'étape B des instructions de sécurité sur la portion supérieure (à gauche) de cette étiquette. S'il n'y a pas d'odeur de gaz, passez à l'étape suivante. »

* Lorsqu'une rotation est requise, les mots et symboles suivants doivent être utilisés pour indiquer le sens de la rotation.

sens horaire  sens antihoraire 

** Le fabricant peut spécifier un intervalle plus long.

8. Fournir des instructions pour l'ouverture (position ON) du robinet manuel de l'admission du gaz.

- | | |
|--|---|
| <p>9. If applicable, instructions to replace the gas control access panel(s) or other part(s).</p> | <p>9. Le cas échéant, fournir des instructions sur la réinstallation des panneaux ou pièces d'accès à la commande d'admission de gaz.</p> |
| <p>10. If applicable:
"Turn on all electric power to the appliance."</p> | <p>10. Le cas échéant :
« Mettez l'appareil sous tension. »</p> |
| <p>11. If applicable:
"Set thermostat to desired setting."</p> | <p>11. Le cas échéant :
« Réglez le thermostat à la température désirée. »</p> |
| <p>12. Instructions as to what to do next if the appliance fails to operate after following the above steps, and the following:

"If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier."</p> | <p>12. Fournir des instructions donnant les mesures à prendre si l'appareil ne fonctionne pas même si les instructions ci-dessus ont été respectées ainsi que l'énoncé suivant :

« Si l'appareil ne se met pas en marche, suivez les instructions intitulées « Comment couper l'admission de gaz de l'appareil » et appelez un technicien qualifié ou le fournisseur de gaz. »</p> |

Section 3

"TO TURN OFF GAS TO APPLIANCE"

1. If applicable:
"Set the thermostat to lowest setting."
2. If applicable:
"Turn off all electric power to the appliance if service is to be performed."
3. If applicable, instructions for gaining access to the gas control.
4. Instructions for turning the gas control manual valve to the full OFF position.*
5. If applicable, instructions to replace the gas control access panel(s).

* *Wherever rotation is required, the following words and symbols shall be used to indicate direction:*

clockwise  *counterclockwise* 

Section 3

« Comment couper l'admission de gaz de l'appareil. »

1. Le cas échéant :
« Réglez le thermostat à la température la plus basse. »
2. Le cas échéant :
« Coupez l'alimentation électrique de l'appareil s'il faut procéder à l'entretien. »
3. Le cas échéant, fournir des instructions sur la méthode à suivre pour atteindre la commande d'admission du gaz.
4. Fournir des instructions pour la fermeture complète (position OFF) du robinet manuel de l'admission du gaz.
5. Le cas échéant, fournir des instructions sur la réinstallation des panneaux d'accès à la commande d'admission de gaz.

* *Lorsqu'une rotation est requise, les mots et symboles suivants doivent être utilisés pour indiquer le sens de la rotation.*

sens horaire  *sens antihoraire* 

Exhibit C

Items Unique To The United States

In the U.S.A. the following electrical requirements apply.

C.1. Electrical Equipment And Wiring

The provisions of this section apply to all wiring and electrical components unless otherwise specified.

An appliance requiring an electrical supply in excess of 30 volts at the appliance shall be factory wired or supplied with wiring harness.* When an appliance is supplied with wiring harness, a connection diagram (See Part IV, Definitions) showing the exact arrangement of the wiring shall be included.

C.1.1

All electrical equipment, wiring and accessories built in or supplied by the manufacturer for direct attachment to the appliance shall be submitted for examination with the appliance.

C.1.2

Electrical equipment and line-voltage and safety-circuit wiring supplied for use with and as a part of the appliance shall be of approved types and shall be judged with respect to their suitability for the particular application, or shall be tested as an integral part of and with the appliance. All low-voltage wiring, except safety-circuit wiring, shall be suitable for the application and shall be not less than No. 18 AWG (0.82 mm²) with neoprene, thermoplastic or equally durable insulation having a minimum thickness of 0.012 in (0.305 mm).

Electrical equipment and wiring listed or certified by a nationally recognized testing agency qualified to certify or list electrical equipment or wiring shall be deemed to be an approved type.

C.1.3

When a service cord is provided on a free standing appliance, it shall consist of a three-conductor grounding type flexible cord of one of the types shown in Table, C-I, Maximum Allowable Rise above Room Temperature for Various Component Parts, or its equivalent, of at least 4 ft (1.22 m) free length terminating in a suitable approved attachment plug cap of the parallel blade grounding type, and constructed in accordance with the applicable section of the current Standard for *Wiring Devices – Dimensional Requirements, ANSI/NEMA WD6*.

Flexible cords shall be connected to devices and to fittings so tension will not be transmitted to joints or terminal screws.

C.1.4

If the appliance is designed for permanent attachment to the building structure, a suitable junction box shall be provided for the permanent connection of the line-voltage supply circuit. This box shall have provisions to accommodate fittings for metal-clad cable or conduit and shall be located on a part of the assembly that does not require movement for servicing.

* *Wiring Harness. The electrical wiring supplied by the appliance manufacturer as an integral part of the appliance. Appliances requiring assembly at the place of installation shall be supplied with wiring necessary to interconnect the appliance control assembly. Such wiring may be supplied as individual lengths or cabled together, with ends stripped or provided with means for attachment to control terminals, and identified to correspond with the manufacturer's electrical diagrams in the installation instructions.*

Unless the junction box is located so the temperature of the conductors within the box and surfaces of the box likely to be in contact with conductors will not exceed that specified for wire with a temperature limitation of 63°F (35°C) rise when the appliance is tested in C.1.39, the temperature rating of the wire required for installation shall be prominently displayed on the box by means of a Class V marking. During conduct of C.1.39, all unused openings shall be closed. Ventilation of boxes used for connection of field wiring is not permissible.

The size of a junction box in which field-installed conductors are to be connected by splicing shall not be less than that indicated in Table C-II, Free Space Per Conductor. A conductor passing through the box is counted as one conductor, and each conductor terminating in the box is also counted as one conductor. A field-furnished conductor for line-voltage circuits is considered to be not smaller than No. 14 AWG (2.1 mm²).

A junction box shall be fabricated in accordance with Table C-III, Minimum Average Thickness of Sheet-Metal Junction Boxes, except that steel shall not be less than 0.032 in (0.81 mm) thick [0.034 in (0.86 mm) thick if zinc coated] and nonferrous metal shall not be less than 0.045 in (1.14 mm) thick at points where conduit or metal-clad cable is to be connected.

C.1.5

Enclosures of listed devices which contain terminals for electrical connections need not comply with the free space specifications of C.1.4. However, the space provided shall be sufficient to provide ample room for the distribution of wires and cables required for the proper wiring of the device.

C.1.6

The general construction and assembly of electrical equipment and wiring shall be of a neat and workmanlike character. The wiring shall be positively located and supported. Electrical wiring shall be protected against damage from movable parts.

C.1.7

When within a burner, fan or similar compartment, factory wiring, involving line voltage of not more than 300 volts between parts attached to the same assembly with a predetermined fixed relationship one to the other, may be done with Type SJO, SJT or SPT-3 cord or appliance wiring material having neoprene, thermoplastic or equally durable insulation of a thickness no less than that specified in Group B of Table C-IV, Insulation Thickness of Factory Wiring Exposed in Burner or Fan Compartment, or Group A of the table when the wiring material is covered as specified in the footnote to Table C-IV, judged on temperature limitation and usage suitability as defined in the current *National Electrical Code, ANSI/NFPA 70*, provided:

- a. The compartment normally is closed, except circulating air openings are permitted;
- b. Wiring below openings located in other than vertical surfaces is protected;
- c. Openings in vertical surfaces will not permit the entrance of a $3^3/64$ in (13.1 mm) diameter rod where such straight rod may cause damage to the wiring; and
- d. Permitted openings, other than -a above, are at least 2 in (50.8 mm) above the bottom of the compartment, if the compartment contains a motor.

Cords and other wiring material permitted in the preceding paragraphs shall be arranged to avoid being mechanically damaged, such as by closely following surfaces, and shall be supported.

C.1.8

Factory wiring of a low-voltage safety circuit may be done with SP-2 cord having all neoprene insulation; SPT-2 cord; appliance wiring material having neoprene, thermoplastic or equally durable insulation of equivalent thickness [$3/64$ in (1.2 mm)]; or "Power Limited Circuit Cable," if such wiring is located in a cavity or compartment of the appliance and shielded from damage.

Thermoplastic or equally durable insulation having a minimum thickness of $2/64$ in (0.8 mm) shall be acceptable for millivoltage safety circuit wiring.

C.1.9

Line-voltage and safety-circuit wiring, which is part of the appliance and which is external to appliance jackets when all panels are in place, except the supply cord, shall be protected by metal conduit, metal-clad cable or raceways. "Power Limited Circuit Cable" need not be provided with the protection specified above if it is securely fastened to the appliance jacket and follows the contour of the appliance jacket. Thermoelectric circuit wiring is considered to be protected provided the wiring is routed in a reliable manner.

C.1.10

Splices in wiring shall be located only in accessible junction boxes. Splices shall be made mechanically secure, soldered and suitably insulated with tape, or suitable fixture-type splicing connectors shall be employed. Provision shall be made to prevent accidental mechanical strain on splicing devices. (Strain relief is not required when wiring is done in conduit, metal-clad cable or raceways).

C.1.11

Splicing devices and uninsulated live-metal parts having an electrical potential in excess of 30 volts shall be installed within an enclosure having a cover or access panel provided with means for firmly securing it in place.

Terminals in a low-voltage safety circuit external to the appliance to which wiring is connected shall be enclosed to the extent specified above when accidental shorting would result in an unsafe condition.

Terminals in a low-voltage safety circuit within the appliance compartment or cavity to which factory wiring is connected need not otherwise be enclosed if such terminals are recessed and located so the terminals are shielded from accidental shorting or damage.

C.1.12

Strain relief shall be provided for all conductors leaving an enclosure. For low-voltage wiring, strain relief at the point of exit from an enclosure is not required if, by wire location or support, protection is provided against accidental strain.

C.1.13

An enclosure for uninsulated live parts is acceptable if the probe shown in Figure 17, Accessibility Probe, cannot contact uninsulated high-voltage live parts. The probe shall be applied, (1) with a force of 2.5 lb (11.1 N), and (2) in any possible configuration and to any depth that the size of an opening will permit. The probe shall be rotated or angled to any possible position before, during or after insertion through the opening. If necessary, the configuration shall be changed after the probe has been inserted through the opening.

Such live-metal parts as indicated above shall not be located where contact could reasonably be made during normal servicing.

C.1.14

At points where conduit or metal-clad cable terminate, conductors shall be protected from abrasion unless the boxes or fittings are such as to afford such protection. In addition, an insulating bushing or its

equivalent shall be provided between the conductors and the metal cover of metal-clad cable. The connector or clamp by which metal-clad cable is fastened to boxes or devices shall be such that the insulating bushings or its equivalent will be visible for inspection.

C.1.15

Wire ways shall be smooth and entirely free from sharp edges, burrs, fins, etc., which may cause abrasion of the insulation on the wiring. In order to prevent abrasion of the insulation, openings in metal walls through which insulated wires not in wire ways pass shall be provided with smoothly rounded bushings or an acceptable metal grommet, or shall have smooth well-rounded surfaces as formed by rolling or extruding the metal around the opening. Bushing shall be phenolic, porcelain, hard fiber or other suitable material having a smoothly rounded surface.

C.1.16

Wiring shall be done with insulated conductors having current-carrying capacity,* voltage and temperature ratings consistent with their use. A conductor, other than an integral part of a component, shall be no smaller than No. 18 AWG (0.82 mm²).

C.1.17

Electrical connections which need to be broken to service controls shall be made in such a manner that they may be disconnected and reconnected without breaking a soldered connection and without breaking or cutting the wire(s).

C.1.18

Connections from low-voltage electrical devices on the same appliance shall be made in such a manner as to be identifiable in the field.

C.1.19

The electrical circuit of low-voltage control equipment shall be free from and protected from grounds or short-circuiting when the accidental grounding of any circuit wiring could render any safety device inoperative.

C.1.20

A low-voltage circuit shall be supplied by an energy-limiting transformer or a combination of transformer and overcurrent protection device suitable for an NEC Class 2 circuit (See Article 725, Section 725-31, of the current *National Electrical Code, ANSI/NFPA 70*) or by a combination of transformer and fixed impedance having output characteristics suitable for a Class 2 circuit.

When an overcurrent protection device is used, it shall be an integral part of the transformer or be located at the point where the circuit to be protected receives its supply, shall not be of the automatic reclosing type, and shall be tip-free from any reclosing mechanism. The device shall be inaccessible to tampering, except for a replaceable fuse which is not interchangeable with a device of a higher current rating.

When a combination of transformer and fixed impedance is used, the electrical interconnection between the two shall be made with wiring materials suitable for Class 1 circuits, unless the two components are incorporated in a single enclosure and located in a normally closed compartment.

A low-voltage supply shall not be obtained from a power source above 30 volts by the use of voltage-dropping resistors.

* Current-carrying capacity can be determined from the ampacity tables appearing in Articles 310 and 400 of the current *National Electrical Code, ANSI/NFPA 70*.

C.1.21

Detachable plug connectors shall not be used in circuits when disconnection or connection of the circuit may allow unsafe operation of the appliance.

C.1.22

Unless supplied with insulation suitable for the highest voltage involved, insulated conductors of different circuits shall be separated by barriers or shall be segregated from each other, and shall in any case be so separated or segregated from uninsulated current-carrying parts connected to different circuits.

Segregation of insulated conductors may be accomplished by clamping or routing or equivalent means which provides for the permanent separation of insulated or uninsulated current-carrying parts from those of different circuits.

C.1.23

The electrical clearance resulting from the assembly of parts into the complete equipment, including clearances to grounded metal or enclosure, when assembled by the manufacturer and furnished as a part of the appliance, shall comply with the spacings specified in Table C-V, Electrical Clearances. Electrical clearances in motors and in components listed by a nationally recognized testing agency shall be deemed to comply with this provision.

C.1.24

Conductors or terminals for line voltage intended for connection to an external grounded supply conductor shall be identified (e.g. finished a white or grey color, given a metallic-plated coating substantially white in color, or ribbed). All other line-voltage conductors shall be finished in colors other than white or natural grey.

Any conductor intended solely for grounding purposes shall be identified by a covering finished a continuous green color or a continuous green color with one or more yellow stripes, unless it be bare. A conductor having such coloring shall not be used for other than grounding purposes when terminating within an enclosure used for field connections.

C.1.25

The appliance shall be constructed so the enclosure, frame and similar noncurrent-carrying metal parts are electrically continuous to the point of connection of the equipment grounding means. This provision shall be deemed met when the electrical resistance between the point of connection of the equipment grounding means and any noncurrent-carrying metal part is not more than 0.1 ohm.

Method of Test

The electrical resistance between the point of connection of the equipment grounding means and each noncurrent-carrying metal part shall be determined by either a Wheatstone bridge or by measuring the potential drop between the two points when an alternating current of 20 amperes, derived from a power supply of not more than 12 volts, is passed between the two points and dividing the measured potential drop by the current. The electrical resistance shall not be more than 0.1 ohm. (Insulating resistant finishes may be scraped from the test points).

C.1.26

Switches shall have current and voltage ratings not less than those of the circuit loads they control.

C.1.27

Single-pole switches of safety controls or protective devices shall not be connected in a grounded line.

C.1.28

A lamp holder, fuse holder, switch or similar device provided as part of the appliance shall be mounted securely and prevented from turning by means other than friction between surfaces.

C.1.29

High-tension terminals for transformers and wire leads shall provide protection against electrical shocks.

C.1.30

High-tension terminals on transformers shall be located on the appliance so as to be free from contact with metal parts during normal use of the appliance.

C.1.31

High-tension leads shall be fabricated from cable suitable for the purpose and conforming to a nationally recognized standard. Such leads shall be provided at each end with brass loops, eyes or other equivalent means to facilitate positive connections.

C.1.32

High-tension leads or cables shall be as short as possible, free from any sharp bends, and protected from rough usage, soakage with water or condensate, or abrasion.

C.1.33

Electrodes and bus bars of the uninsulated type shall be suspended away from metal parts and insulated and arranged so as to be free from arc-overs at any point throughout the assembly when an a.c. voltage 50 percent in excess of the maximum possible voltage to ground is impressed for 1 minute between the normal point of transformer connection and ground. Such tests shall be conducted both before and after the other performance tests specified herein.

C.1.34

Electrodes or bus bars supporting electrodes shall be designed so they may be readily locked into proper position and no adjustment of any mechanical nature shall be allowed in electrodes of this type.

C.1.35

Electrode tips shall be designed so extreme burning of the points will not result over a period of time.

C.1.36

Flexibility in electrodes at their outer ends may be permitted if designed to resist warping and accidental dislocation.

C.1.37

If electric ignition is used, the means for igniting the pilot gas shall be designed and located so as to eliminate the collection of carbon or other materials, or the dislocation, distortion or burning of parts as the result of normal conditions of heating or vibration of parts.

C.1.38

Insulators shall consist of high-grade porcelain or equivalent non-combustible insulating material. Such insulating material shall be glazed or otherwise made impervious to internal collection of moisture from the gas and shall be readily cleanable. Insulators shall not be used where carbon may accumulate.

C.1.39

Electrical equipment and wiring shall be suitable for the temperatures to which they are exposed and the service to which they are subjected. Maximum allowable temperature rises of some typical wires and components are shown in Column 1 of Table C-I, Maximum Allowable Rise Above Room Temperature for Various Component Parts.

Method of Test

The appliance shall be operated as specified in section 2.23, Wall, Floor and Ceiling Temperatures at normal inlet test pressure until equilibrium temperatures are attained.

Temperatures of electrical equipment, controls and wiring shall be determined for each component at points subjected to maximum temperatures by means of thermocouples not larger than No. 24 AWG (0.20 mm²) placed in good thermal contact with the material. At the option of the manufacturer, the temperatures of motor windings and coils may be measured by the resistance method. Observed temperatures shall not be in excess of those for which wires or components are approved.

C.1.40

The leakage current measured on an appliance tested in accordance with the following Method of Test shall not exceed the limits specified below.

Method of Test

When connected in the manner intended to a supply circuit of rated voltage and frequency, the appliance shall be operated as specified in section 2.23, Wall, Floor and Ceiling Temperatures, at normal inlet test pressure until equilibrium temperatures are attained.

At the conclusion of the operating period specified, and with continued application of rated voltage and frequency, leakage current between each of the supply terminals and all noncurrent-carrying metal parts (ungrounded) which might become energized shall be measured using the instrumentation specified in the current Standard for *Leakage Current for Appliances, ANSI/UL101*. The leakage current shall not exceed 0.5 milliamperes, except that for an appliance equipped with a capacitor-type motor leakage current shall not exceed 1.15 milliamperes.

C.1.41

Adequate dielectric shall be interposed between ungrounded current-carrying parts and those external surfaces which can be contacted.

Method of Test

When connected to a supply circuit of rated voltage and frequency, the appliance shall be operated as specified in 2.22.1 at normal inlet test pressure. At the conclusion of the operating period specified, the applicable dielectric test(s) specified below shall be conducted.

During conduct of the dielectric withstand tests, a 500 volt-ampere or larger transformer, having an essentially sinusoidal output voltage which can be varied, shall be used. The applied potential shall be increased gradually from zero until the required test voltage is reached and shall be held at that value for 1 minute. The use of a 500 volt-ampere or larger transformer is not necessary if the high potential testing equipment used maintains the specified high potential voltage at the appliance during the test.

- a. An appliance shall be capable of withstanding, for 1 minute without dielectric breakdown, the application of a 60 hertz potential between high-voltage live parts and dead-metal parts, and between live parts of high- and low-voltage circuits. The test potential shall be:

1000 volts plus twice rated voltage, except

1000 volts for motors rated at not more than $\frac{1}{2}$ horsepower (373 W) and not more than 250 volts.

When higher than rated voltage is developed in a motor circuit through the use of capacitors, the rated voltage of the appliance shall be employed to determine the dielectric withstand test potential, unless the developed steady-state capacitor voltage exceeds 500 volts, in which case the test potential for the parts affected shall be 1000 volts plus twice the developed voltage.

- b. A low-voltage circuit shall be capable of withstanding, for 1 minute without dielectric breakdown, a 60 hertz potential of 500 volts applied between low-voltage live parts of opposite polarity and between low-voltage live parts and dead-metal parts.

The dielectric withstand test between low-voltage parts of opposite polarity need not be conducted on the complete assembly if the components have been separately subjected to this test condition.

The arrangement of the test circuit shall be such that if the dielectric material breaks down, a positive signal shall be obtained, rather than depending upon a visual inspection of the material.

C.2. Electrical Diagrams

- a. Except when electrical equipment is limited to a simple series circuit, electrical diagrams (see Part IV, Definitions) on Class IV marking material applicable to all electrical circuits within the appliance shall be attached to the appliance in a location where they are accessible during servicing of the electrical components, in each of the following forms:
 - 1. A connection diagram to aid in locating components for field service; and
 - 2. A schematic diagram of the ladder form, in addition to the connection diagram and, when necessary for clarification, a cycle chart or printed sequence of switching action accompanying the schematic diagram.
- b. Electrical diagrams shall conform to the current Standard for *Electrical and Electronics Diagrams, ANSI Y14.15*. See Appendix A, Pertinent References to ANSI Y14.15, for reference to pertinent provisions of ANSI Y14.15. The wire color designations specified under 15-3.11 of ANSI Y14.15 are shown in Appendix B, Wire Color Designation.
- c. It is recommended that the usage of wire colors be as shown in Appendix C, Recommended Wire Color Usage.
- d. Unidentified graphical symbols used for electrical diagrams shall conform to the current Standard for *Graphic Symbols for Electrical and Electronics Diagrams (Including Reference Designation Class Designation Letters), ANSI/IEEE 315*. See Appendix D for preferred symbols of commonly used items, as extracted from ANSI/IEEE 315. Abbreviations for identified items shall be as shown in Appendix D, Preferred Graphic Symbols on Commonly Used Items, Extracted From Standard ANSI/IEEE 315, Graphic Symbols For Electrical And Electronics Diagrams, And Abbreviations For These Items.
- e. If wire other than that conforming to the temperature limitation of 63°F (35°C) rise has been specified for use on the appliance, the following statement shall appear on all electrical diagrams: "If any of the original wire as supplied with the appliance must be replaced, it must be replaced with type ____ wire or its equivalent."
- f. An appliance provided with a flexible service cord for connection to a line-voltage electrical supply shall bear a Class VI marking attached to the plug end of the cord, on which appears the follows:

WARNING
Electrical Grounding Instructions

This appliance is equipped with a three-prong (grounding) plug for your protection against shock hazard and should be plugged directly into a properly grounded three-prong receptacle. Do not cut or remove the grounding prong from this plug.

C.3. Motors And Blowers

C.3.1

Electrical motors shall be designed for continuous duty and shall be provided with overcurrent protection in accordance with the *National Electrical Code, ANSI/NFPA 70*, or *UL 2111, Overheating Protection for Motors*. Fractional horsepower motors may be protected with temperature- or current-sensitive devices or temperature- and current-sensitive devices which will prevent motor winding temperatures from exceeding those specified in Table C-VI, Maximum Allowable Motor Winding Temperatures. If the impedance of the motor windings is sufficient to prevent winding temperatures in open motors or enclosure temperatures on totally enclosed motors of over 302°F (150°C) with the rotor locked, no additional motor protection is required, but the motor shall bear a Class III marking indicating that it is impedance protected.

C.3.2

Motor, blower or fan bearings shall be either (a) permanently lubricated or (b) provided with accessible means for lubrication. (Also see 1.34.1-c3 and 1.34.9.)

C.3.3

It shall be possible to oil the motor, blower or fan bearings, which require that lubricant be added, without dismantling or removing any portion of the venting system.

C.3.4

It is permissible to disconnect the venting system for removal of the blower assembly.

C.3.5

Bearings of motors, blowers or fans shall be of a type suitable for the temperatures to which subjected in normal operation.

C.3.6

On belt-driven blowers or fans, means for adjusting belt tension shall be provided and shall be readily accessible.

Exhibit D

(Optional) Provisions For Listed Gas Appliance Conversion Kits

The following provisions are for use by manufacturers who wish to make available field conversion kits when provision is made for the simple conversion of an appliance from one approved gas to the other.

Listing of conversion kits is permitted provided they meet the following criteria:

D.1 Types Of Conversion Kits To Be Listed

Gas appliance conversion kits listed under these provisions may include, but are not limited to, the following:

1. Main burner orifices and pilot burner orifices;
2. New gas controls or kits for pressure regulators;
3. Primary air shutters, spoiler screws;
4. Ignition control(s);
5. Main burner(s);
6. Gas supply pressure switches;
7. Rating plates, labels, instruction;
8. Vent pressure switches, combustion air proving means switches;
9. NO_x control devices; and
10. Turbulators.

Conversion kits shall be listed only for appliances having listing for use with both natural and liquefied petroleum gases.

Conversions are not permitted which require:

- a. Modifications to baffles or draft diverters; or
- b. Use of any component that has not been tested and listed as part of the appliance.

D.2 Control Modifications

Conversions which require modifications to a control at the time of conversion are permitted with a listed conversion kit only if, at the time the conversion kit is submitted to the testing agency for purposes of listing, a letter from the control manufacturer agreeing with the specified control modifications accompanies the submittal.

D.3 Instructions

Each conversion kit shall be accompanied by clear, concise printed instructions and diagrams, stated in terms clearly understandable, adequate for the proper field assembly, installation, service and safe use of the conversion kit.

- a. Instructions that the conversion kit shall be installed by a qualified service agency.
- b. The following boxed warning in boldfaced type:

"WARNING

This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instruction is not followed exactly, a fire, explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit."

The warning shall be in letters having a minimum uppercase letter height of 0.120 in (3.05 mm) with a minimum vertical spacing between lines of 0.046 in (1.17 mm).^{*} Lowercase letters shall be compatible with uppercase letter size specification.

- c. Appliance model number or series of models acceptable for use with the kit.
- d. Complete parts list identifying all components provided in the kit.
- e. Identification of the gas to which the appliance is to be converted.
- f. Step by step instructions for converting the appliance. If necessary, these instructions shall provide illustrations of the pilot assembly, the manifold or the manifold and main burner assembly. Instructions shall state: "Caution the gas supply shall be shut off prior to disconnecting the electrical power, before proceeding with the conversion."
- g. Illustrations indicating the proper relationship of the igniter to the main burner with instructions to verify this relationship prior to completing the conversion.
- h. Procedures for proper leak testing of the converted appliance prior to placing it into operation.
- i. Manifold pressure of the converted appliance with instructions for checking and properly adjusting this gas pressure.
- j. Minimum and maximum inlet gas pressures with the instructions for checking the gas pressure.

^{*} This letter height and line spacing corresponds to 12 point type.

- k. The required input rating of the converted appliance.
- l. Details on adjustment for proper pilot and main burner flame appearance, including written instructions and pictorial illustrations.
- m. Details for verifying the input rate of the converted appliance.
- n. Instructions for placing all markings provided in the kit in the appropriate location on the converted appliance.
- o. Instructions for checking out the normal operating sequence of the ignition system.
- p. The instructions are to address derating at altitudes above 2000 ft (610 m).

D.3 Marking

Each conversion kit shall be provided with the following markings:

- a. All components provided with the kit must be marked or color coded so as to make them visibly distinguishable from the components they are replacing. This marking or color coding shall be identified in the instructions provided with the kit.
- b. All orifices provided with the kit must be permanently marked to indicate the orifice size. The orifice size shall be specified in the instructions accompanying the kit.
- c. A conversion plate on Class IIIA marking material, with explicit instructions to affix the conversion plate as close as possible to the existing rating plate. This plate shall include the following information or reference the information on the existing rating plate;
 1. Appliance model number or series models;
 2. The gas to which the appliance has been converted;
 3. Minimum and maximum inlet gas pressures of the converted appliance;
 4. Manifold pressure;
 5. Input rating; and
 6. Identification of the conversion kit by part number.
- d. The following Class IIIA marking, with explicit instructions to affix the label in a conspicuous location adjacent to the appliance:

“This appliance was converted on day-month-year to gas with Kit No. by (name and address of organization making this conversion), which accepts the responsibility that this conversion has been properly made.”
- e. If the entire control is not replaced when the appliance is converted, a separate Class IIIA marking shall be affixed on or near the gas control(s) stating:

“This control has been converted for use with ____ gas.”

- f. The following information marked on the exterior of the kit:
 - 1. Identification of the conversion kit by part number;
 - 2. Appliance model number or series of models acceptable for use with the kit; and
 - 3. Identification of the gas to which the appliance is to be converted.

Exhibit E

List Of Reference Standards

AMERICAN GAS ASSOCIATION

N. Capital Street NW, Washington, D.C. 20001

ANSI Z223.1-2009/NFPA 54-2009, National Fuel Gas Code

AMERICAN NATIONAL STANDARDS INSTITUTE

West 42nd Street, New York, New York 10036

ANSI Y14.15-1966 (R1988), and Supplements Y14.15a-1971, Y14.15b-1973, Electrical and Electronics Diagrams

AMERICAN SOCIETY OF HEATING, REFRIGERATION & AIR-CONDITIONING ENGINEERS, INC.

Tullie Circle N.E., Atlanta, Georgia 30329-2305

ANSI/ASHRAE 15-2004, Safety Standard for Refrigeration Systems

ANSI/ASHRAE 34-2007, Number Designation and Safety Classification of Refrigerants

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

United Engineering Center, 345 East 47th Street, New York, New York 10017

ANSI/ASME B1.1-2003, Unified Inch Screw Threads (UN and UNR Thread Form)

ANSI/ASME B1.13M-2005, Metric Screw Threads - M Profile

ANSI/ASME B1.20.1-1983 (R2001), Pipe threads, General Purpose (Inch)

ANSI/ASME B18.6.2-1998, Slotted Head Cap Screws, Square Head Set Screws and Slotted Headless Set Screws

ANSI/ASME B36.10M-2004, Welded and Seamless Wrought Steel Pipe

ANSI/ASME B94.11-M1993, Twist Drills

ANSI/ASME PTC 19.3-1974 (R1998), Performance Test Codes - Temperature Measurement

ASTM INTERNATIONAL

Barr Harbor Dr., West Conshohocken PA 19428-2959

ASTM A90/A90M-2007, Standard Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

ASTM A924/A924M-2007, Standard Specifications for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

ASTM B487-1985 (R2007), Standard Test Method for Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of a Cross Section

ASTM B499-1996 (R2002), Standard Test Method for Measurement of Coating Thicknesses by the Magnetic Method: Nonmagnetic Coatings on Magnetic Basis Metals

ASTM B504-1990 (R2007), Standard Test Method for Measurement of Thickness of Metallic Coatings by the Coulometric Method

IEEE/ASTM SI 10-2002, [Formerly ASTM E380-1993 (R1997)], Standard Practice for Use of the International System of Units (SI), the Modernized Metric System

CANADIAN GENERAL STANDARDS BOARD

Hull, Canada K1A 1G6

GCSB 4-GP-81MB-1990, Cotton, Cheesecloth for Type 2 cheesecloth (Commercial Designation 32 X 38) (withdrawn, April 2000)

CANADIAN STANDARDS ASSOCIATION

Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6

CSA B52-2005, Mechanical Refrigeration Code

CSA B228.1-1968, Pipes, Ducts, and Fittings for Residential Type Air Conditioning Systems (withdrawn)

CSA C22.1-2006, Canadian Electrical Code

CSA C22.2 No. 3-2001, Electrical Features of Fuel-Burning Equipment

CSA C22.2 No. 117-1970 (R2007), Room Air Conditioners

CSA C22.2 No. 199-2007, Combustion Safety Controls and Solid State Igniters for Gas and Oil Burning Equipment

CSA C22.2 No. 236-2005, Heating and Cooling Equipment

CAN/CSA Z234.1-2000 (2006), Canadian Metric Practice Guide

CAN/CSA Z240 MH-92 (2001), Mobile Homes

CAN/CSA Z240 RV-2008, Recreational Vehicles

CGA 9.1-M97 - ANSI Z21.15-1997 (R2003), CGA 9.1a-2001 (R2003) - ANSI Z21.15a-2001, Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves

CSA 6.3-2007 - ANSI Z21.18-2007, Gas Appliance Pressure Regulators

CSA 6.5-2005 - ANSI Z21.21-2005, Automatic Valves for Gas Appliances

CGA 6.14-M96 - ANSI Z21.66-1996 (R2006), Automatic Vent Damper Devices for Use with Gas-Fired Appliances

CSA 6.20-2005 - ANSI Z21.78-2005, CSA 6.20a-2007 - ANSI Z21.78a-2007, CSA 6.20b-2008 - ANSI Z21.78b-2008, Combination Gas Controls for Gas Appliances

CGA 6.23-2005 - ANSI Z21.77-2005, Manually-Operated Piezo-Electric Spark Gas Ignition Systems and Components

CSA/CGA 2.17-M91 (R2003), Gas-Fired Appliances for Use at High Altitudes

CAN1-2.28-M81 (R1996), Gas-Fired Appliances Equipped with Electrically Operated Automatic Vent Damper Devices Provided as Integral Components

CAN1-6.2-M81 (R2006), Draft Hoods

CAN1-6.4-M79 (R2006), Automatic Gas Ignition Systems and Components

CAN1-6.6-M78 (R2006), Gas Appliance Thermostats

CGA P.4.1-2002, Testing Method for Measuring Annual Fireplace Efficiency

CSA B149.1-2005, Natural Gas and Propane Installation Code

CSA AMERICA, INC.

East Pleasant Valley Road, Cleveland, Ohio 44131

ANSI Z21.12-1990 (R2005), ANSI Z21.12a-1993 (R2000), and Z21.12b-1994 (R2000), Draft Hoods

ANSI Z21.15-1997 (R2008) - CGA 9.1-M97, ANSI Z21.15a-2001 (R2008) - CGA 9.1a-2001, ANSI Z21.15b-2006 (R2008) - CGA 9.1b-2006, Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves

ANSI Z21.18-2007 - CSA 6.3-2007, Gas Appliance Pressure Regulators

ANSI Z21.20-2007, ANSI Z21.20a-2008, Automatic Gas Ignition Systems and Components

ANSI Z21.21-2005 - CSA 6.5-2005, Automatic Valves for Gas Appliances

ANSI Z21.23-2000 (R2005), ANSI Z21.23a-2003 (R2005), ANSI Z21.23b-2005, Gas Appliance Thermostats

ANSI Z21.66-1996 (R2007)- CGA 6.14-M96, Automatic Vent Damper Devices for Use with Gas-Fired Appliances

ANSI Z21.77-2005- CSA 6.23-2005, Manually-Operated Piezo-Electric Spark Gas Ignition Systems and Components

ANSI Z21.78-2005 - CSA 6.20-2005, ANSI Z21.78a-2007 - CSA 6.20a-2007, ANSI Z21.78b-2008 - CSA 6.20b-2008, Combination Gas Controls for Gas Appliances

INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS

Hose Lane, Piscataway, New Jersey 08855-1331

ANSI/IEEE 315-1975 (R1993), IEEE 315A-1986, Graphic Symbols for Electrical and Electronics Diagrams (Including Reference Designation Class Designation Letters)

NATIONAL CONFERENCE OF STATES ON BUILDING CODES AND STANDARDS

Huntmar Park Drive, Suite 210, Herndon, Virginia 20170

ANSI/NCSBCS A225.1/NFPA 501A-2009, Standard for Fire Safety Criteria for Manufactured Home Installations, Sites and Communities

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

N. 17th Street, Suite 1847, Rosslyn, Virginia 22209

ANSI/NEMA WD6-2002 (R2008), Wiring Devices - Dimensional Requirements

NATIONAL FIRE PROTECTION ASSOCIATION

Batterymarch Park, P.O. Box 9101, Quincy, Massachusetts 02269

NFPA 54-2009/ANSI Z223.1-2009, National Fuel Gas Code

ANSI/NFPA 70-2008, National Electrical Code

ANSI/NFPA 501A-2009, Fire Safety and Criteria for Manufactured Home Installations, Sites, and Communities

ANSI/NFPA 1192-2008, Recreational Vehicles

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Washington, D.C. 20410

Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280 [formerly the Federal Standard for Mobile Home Construction and Safety, Title 24, HUD (Part 280) 1975]

UNDERWRITERS LABORATORIES INC.

Pfingsten Road, Northbrook, Illinois 60062

ANSI/UL 62-2006, Flexible Cord and Fixture Wire

ANSI/UL 101-2002, Leakage Current for Appliances

ANSI/UL 484-2007, Room Air Conditioners

ANSI/UL 1995-2005, Heating and Cooling Equipment

Exhibit F

Outline Of Lighting Instructions For Appliances Equipped With Continuous Pilots

The following is a guide to aid in the writing of the lighting instructions label for an appliance equipped with a continuous pilot. The statements in quotes are to be worded as shown. For purposes of this Exhibit, the word "knob" is used. An actual label shall use the word knob, button, lever, switch, etc., as appropriate. If the action necessary to operate the control is other than stated below, modification of the sentence(s) is acceptable.

A sample of this label is shown in Figure F.

Section 1

"FOR YOUR SAFETY READ BEFORE LIGHTING"

The following warning shall be indented and boxed at the top of this section:

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life."

- "A. This appliance has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly."
- "B. BEFORE LIGHTING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor."

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department."
- "C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion."
- "D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water."

Section 2

"LIGHTING INSTRUCTIONS"

1. "STOP! Read the safety information above (to the left) on this label."
2. For an appliance equipped with or for use with an adjustable thermostat:
"Set the thermostat to lowest setting."
3. For an appliance which utilizes an external electrical supply:
"Turn off all electric power to the appliance."
4. For an appliance which requires removal of a panel(s) or other part to gain access to the gas control, instructions for gaining access to the gas control.
5. Instructions, with an illustration, for turning the gas control manual valve to the full OFF position.*
6. "Wait five (5) minutes** to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above (to the left) on this label. If you don't smell gas, go to the next step."
7. For an appliance which requires removal of a part(s) to gain access to the pilot, instructions for gaining access to the pilot.
8. Instructions for locating the pilot. Illustration of the pilot is required.
9. Instructions for putting the gas control into the PILOT position.*
10. Step by step instructions for lighting the pilot.
An indented statement relative to maloperation of the control such as:
 - If the knob does not pop up when released, stop and immediately call your service technician or gas supplier.
 - "If the pilot will not stay lit after several tries, turn the gas control knob to "OFF" and call your service technician or gas supplier."**

* Wherever rotation is required, the following words and symbols shall be used to indicate direction:

clockwise  counterclockwise 

** The manufacturer may specify a longer time.

- | | |
|--|--|
| <p>11. If applicable, instructions to replace the pilot access panel(s).</p> <p>12. Instructions for turning the gas control manual valve to the ON position.*</p> <p>13. If applicable, instructions to replace the gas control access panel(s) or other part(s).</p> <p>14. If applicable:
"Turn on all electric power to the appliance."</p> <p>15. If applicable:
"Set thermostat to desired setting."</p> | <p><u>Section 3</u></p> <p>"TO TURN OFF GAS TO APPLIANCE"</p> <p>1. If applicable:
"Set the thermostat to lowest setting."</p> <p>2. If applicable:
"Turn off all electric power to the appliance
"if service is to be performed."</p> <p>3. If applicable, instructions for gaining access to the gas control.</p> <p>4. Instructions for turning the gas control manual valve to the full OFF position.*</p> <p>5. If applicable, instructions to replace the gas control access panel(s).</p> |
|--|--|
-
- * *Wherever rotation is required, the following words and symbols shall be used to indicate direction:*
- clockwise  counterclockwise 

FOR YOUR SAFETY READ BEFORE LIGHTING

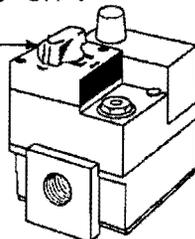
WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.
- B. **BEFORE LIGHTING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
WHAT TO DO IF YOU SMELL GAS
 - Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.
- If you cannot reach your gas supplier, call the fire department.

LIGHTING INSTRUCTIONS

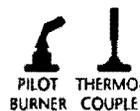
1. **STOP!** Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. Remove control access panel.
5. Push in gas control knob slightly and turn clockwise  to "OFF".

GAS CONTROL
KNOB SHOWN IN
"OFF" POSITION



NOTE: Knob cannot be turned from "PILOT" to "OFF" unless knob is pushed in slightly. Do not force.

6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Remove the pilot access panel located below and behind the gas control unit.
8. Find pilot — follow metal tube from gas control. The pilot is between the two burner tubes behind the pilot access panel.
9. Turn knob on gas control counterclockwise  to "PILOT".
10. Push in control knob all the way and hold in. Immediately light the pilot with a match. Continue to hold the control knob in for about one (1) minute after the pilot is lit. Release knob and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 5 through 10.
 - If knob does not pop up when released, stop and immediately call your service technician or gas supplier.
 - If the pilot will not stay lit after several tries, turn the gas control knob to "OFF" and call your service technician or gas supplier.
11. Replace pilot access panel.
12. Turn gas control knob counterclockwise  to "ON."
13. Replace control access panel.
14. Turn on all electric power to the appliance.
15. Set thermostat to desired setting.



TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove control access panel.
4. Push in gas control knob slightly and turn clockwise  to "OFF." Do not force.
5. Replace control access panel.

Figure F. Sample Lighting Instructions Label for an Appliance Equipped with a Continuous Pilot

Exhibit G

Outline Of Operating Instructions For Appliances Equipped With Intermittent Pilot Or Interrupted Pilot Systems

The following is a guide to aid in the writing of the operating instructions label for an appliance equipped with an intermittent pilot or interrupted pilot system. The statements in quotes are to be worded as shown. For purposes of this Exhibit, the word "knob" is used. An actual label shall use the word knob, button, lever, switch, etc., as appropriate. If the action necessary to operate the control is other than stated below, modification of the sentence(s) is acceptable.

A sample of this label is shown in Figure G.

Section 1

"FOR YOUR SAFETY READ BEFORE OPERATING"

"**WARNING:** If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life."

The following warning shall be indented and boxed at the top of this section:

- "A. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand."
- "B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor."

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department."
- "C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion."
 - "D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water."

Section 2

"OPERATING INSTRUCTIONS"

1. "STOP! Read the safety information above (to the left) on this label."
2. For an appliance equipped with or for use with an adjustable thermostat:
"Set the thermostat to the lowest setting."
3. For an appliance which utilizes an external electrical supply:
"Turn off all electric power to the appliance."
4. Instructions not to attempt to light the pilot by hand.
5. For an appliance which requires removal of a panel(s) or other part to gain access to the gas control, instructions for gaining access to the gas control.
6. Instructions, with an illustration, for turning the gas control manual valve to the full OFF position.*
7. "Wait five (5) minutes** to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above (to the left) on this label. If you don't smell gas, go to the next step."
8. Instructions for turning the gas control manual valve to the ON position.*
9. If applicable, instructions to replace the gas control access panel(s) or other part(s).
10. If applicable:
"Turn on all electric power to the appliance."
11. If applicable:
"Set thermostat to desired setting."
12. Instructions as to what to do next if the appliance fails to operate after following the above steps, and the following:

* Wherever rotation is required, the following- words and symbols shall be used to indicate direction:

clockwise  counterclockwise 

** The manufacturer may specify a longer time.

"If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier."

Section 3

"TO TURN OFF GAS TO APPLIANCE"

1. If applicable:
"Set the thermostat to lowest setting."
2. If applicable:
"Turn off all electric power to the appliance if service is to be performed."

3. If applicable, instructions for gaining access to the gas control.
4. Instructions for turning the gas control manual valve to the full OFF position.*
5. If applicable, instructions to replace the gas control access panel(s).

* Wherever rotation is required, the following words and symbols shall be used to indicate direction:

clockwise  counterclockwise 

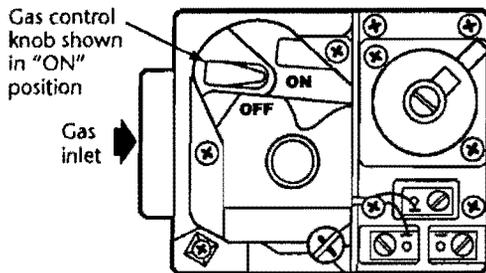
FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
- B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
 2. Set the thermostat to lowest setting.
 3. Turn off all electric power to the appliance.
 4. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
 5. Remove control access panel.
 6. Push in gas control knob slightly and turn clockwise  to "OFF."
- NOTE: Knob cannot be turned to "OFF" unless knob is pushed in slightly. Do not force.
7. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
 8. Turn gas control knob counterclockwise  to "ON."
 9. Replace control access panel.
 10. Turn on all electric power to the appliance.
 11. Set thermostat to desired setting.
 12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.



TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove control access panel.
4. Push in gas control knob slightly and turn clockwise  to "OFF." Do not force.
5. Replace control access panel.

Figure G. Sample Operating Instructions Label for an Appliance Equipped with an Intermittent Pilot or Interrupted Pilot System

Exhibit H

Outline Of Operating Instructions For Appliances Equipped With Direct Ignition Systems

The following is a guide to aid in the writing of the operating instructions label for an appliance equipped with a direct ignition system. The statements in quotes are to be worded as shown. For purposes of this Exhibit, the word "knob" is used. An actual label shall use the word knob, button, lever, switch, etc., as appropriate. If the action necessary to operate the control is other than stated below, modification of the sentence(s) is acceptable.

A sample of this label is shown in Figure H.

Section 1

"FOR YOUR SAFETY READ BEFORE OPERATING"

The following warning shall be indented and boxed at the top of this section:

"WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life."

- "A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand."
- "B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor."

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department."
- "C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion."
- "D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water."

Section 2

"OPERATING INSTRUCTIONS"

1. "STOP! Read the safety information above (to the left) on this label."
2. For an appliance equipped with or for use with an adjustable thermostat:
"Set the thermostat to lowest setting."
3. For an appliance which utilizes an external electrical supply:
"Turn off all electric power to the appliance."
4. Instructions not to attempt to light the burner by hand.
5. For an appliance which requires removal of a panel(s) or other part to gain access to the gas control, instructions for gaining access to the gas control.
6. Instructions, with an illustration, for turning the gas control manual valve to the full OFF position.*
7. "Wait five (5) minutes** to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above (to the left) on this label. If you don't smell gas, go to the next step."
8. Instructions for turning the gas control manual valve to the ON position.*
9. If applicable, instructions to replace the gas control access panel(s) or other part(s).
10. If applicable:
"Turn on all electric power to the appliance."
11. If applicable:
"Set thermostat to desired setting."
12. Instructions as to what to do next if the appliance fails to operate after following the above steps, and the following:
"If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier."

* Wherever rotation is required, the following words and symbols shall be used to indicate direction:
clockwise  counterclockwise 

** The manufacturer may specify a longer time.

Section 3

"TO TURN OFF GAS TO APPLIANCE"

1. If applicable:

"Set the thermostat to lowest setting."

2. If applicable:

"Turn off all electric power to the appliance if service is to be performed."

3. If applicable, instructions for gaining access to the gas control.
4. Instructions for turning the gas control manual valve to the full OFF position.*
5. If applicable, instructions to replace the gas control access panel(s).

* Wherever rotation is required, the following words and symbols shall be used to indicate direction:
clockwise  counterclockwise 

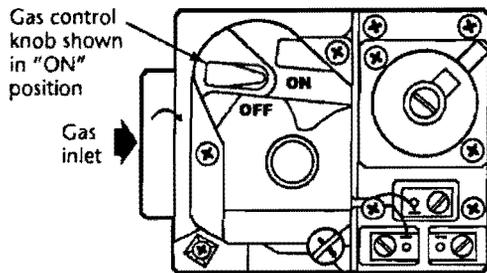
FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- WHAT TO DO IF YOU SMELL GAS**
- Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above on this label.
 2. Set the thermostat to lowest setting.
 3. Turn off all electric power to the appliance.
 4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
 5. Remove control access panel.
 6. Push in gas control knob slightly and turn clockwise  to "OFF."
- NOTE: Knob cannot be turned to "OFF" unless knob is pushed in slightly. Do not force.
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
 8. Turn gas control knob counterclockwise  to "ON."
 9. Replace control access panel.
 10. Turn on all electric power to the appliance.
 11. Set thermostat to desired setting.
 12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.



TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove control access panel.
4. Push in gas control knob slightly and turn clockwise  to "OFF." Do not force.
5. Replace control access panel.

Figure H. Sample Operating Instructions Label for an Appliance Equipped with a Direct Ignition System

Part III: Manufacturing And Production Tests

The following manufacturing and production tests are intended to provide the means for certifying agencies to uniformly apply quality control standards to all appliances certified as complying with the standard.

3.1

The manufacturer shall check, inspect and test the components and the assemblies of each appliance in the following manner:

- a. Inspect raw materials and purchased components using a sampling plan mutually acceptable to the manufacturer and the certifying agency.
- b. Test fire each burner and manifold and control assembly for proper burner and gas valve operation and verify the gas-tightness of the manifold and control assembly.
- c. Test each appliance to determine the electrical components function properly. This test shall be conducted on completely assembled appliances, when feasible. When not feasible, either:
 1. Subassemblies shall be tested separately; or
 2. When components are to be wired in the field, written assurance from the component manufacturers that operational tests have been conducted on their devices shall be kept on file.
- d. Conduct dielectric withstand tests on each factory assembled appliance incorporating high-voltage electrical circuits. If the appliance employs solid-state components which can be damaged by the dielectric potential, the test may be conducted before these components are electrically connected. The tests shall consist of the application of the 60-hertz potential between high-voltage current-carrying parts and the casing, frame and similar non-current-carrying parts of the appliance with any switch contacts both open and closed. The test potential shall be in accordance with the dielectric withstand test specified in Exhibit C, Items Unique to the United States, C.1.41, applied for 1 minute, or a potential of 120 percent of that value applied for 1 second.

3.2

Where applicable, using a sampling plan mutually agreeable to the manufacturer and the certifying agency, a completely assembled vented gas fireplace heater shall be tested to determine satisfactory operation with respect to:

- a. Burner operating characteristics;
- b. Ignition systems and pilot safety shutoff devices;
- c. Combustion (open room);
- d. Temperature at discharge air opening;
- e. Surface temperatures;
- f. Dielectric withstand with solid-state components connected (if not tested in 3.1-d). Under this sampling plan, the frequency of conducting the tests specified in (-a) through (-e) above need not be the same;
- g. Vent safety shutoff system;

- h. Combustion system leakage;
- i. Impact;
- j. Thermal shock;
- k. Impact of glazing; and
- l. Thermal shock of glazing.

If appliances are not shipped assembled from the factory, the manufacturer shall periodically assemble an appliance from production to check the compatibility of the subassemblies. The appliance shall be capable of ready assembly. It is suggested that one appliance be so checked for each 100 appliances produced, but not less than one for each week's production.

The manufacturer's test method(s) shall be capable of relating back to the test(s) specified in the standard.

The results of these tests shall be recorded and maintained by the manufacturer for review by the certifying agency.

Part IV: Definitions

ACCESSIBLE. That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel, door or similar obstruction (see ACCESSIBLE, READILY).

ACCESSIBLE, READILY. That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel, door or similar obstruction (see ACCESSIBLE).

AIR SHUTTER. An adjustable device for varying the size of the primary air inlet(s).

APPLIANCES - AUTOMATICALLY CONTROLLED. Appliances equipped with automatic devices which: (1) accomplish complete "turn-on" or "shut-off" of the gas to the main burner(s); or (2) graduate the gas supply to the burner(s) but do not effect complete shut off of the gas.

APPROXIMATELY CIRCULAR OPENING. Any air shutter opening of such shape that its area, when divided by the area of a circle having the same perimeter, is equal to or greater than 0.6.

AUTOMATIC GAS IGNITION SYSTEM TIMINGS.

1. **Purge Time.** The period of time intended to allow for the dissipation of an unburned gas or residual products of combustion.
 - a. **Per-purge Time.** The purge time which occurs at the beginning of an appliance operating cycle prior to initiating ignition.
 - b. **Inter-purge Time.** The purge time that takes place between the end of a trial for ignition period and reactivation of the ignition means on a multi-try system.
 - c. **Post-purge Time.** The purge time which occurs at the end of an appliance burner operating cycle.
2. **Flame Failure Re-ignition Time.** The period of time between loss of the supervised ignition source or the supervised main burner flame and attainment of the capability of the ignition means to ignite gas. During this time period, the main burner gas supply is not shut off.
3. **Flame Failure Response Time.** The period of time between loss of the supervised ignition source or the supervised main burner flame and the action to shut off the gas supply.
4. **Ignition Activation Period.** The period of time between energizing the main gas valve and deactivation of the ignition means during a trial for ignition period.
5. **Igniter Proving Time.** The period of time between energizing the igniter and achieving the proved igniter characteristic that allows gas flow.
6. **Igniter Failure Response Time.** The period of time between loss of the supervised proved igniter and the action to shut off the gas supply.
7. **Lockout Time.** The period of time between energizing the system and lockout, if proof of the supervised main ignition source or the supervised burner flame is not established.
8. **Pilot Flame Establishing Period.** The period of time between initiation of pilot gas flow and proof of the supervised pilot flame.

9. **Recycle Time.** The period of time between shut off of the gas supply following loss of the supervised ignition source or the supervised main burner flame and reactivation of the ignition means.
10. **Trial for Ignition Period.** The period of time between energizing and de-energizing the gas valve if proof of the supervised flame is not established.
11. **Valve Sequence Period.** The sum of all trial for ignition periods prior to lockout, if proof of the supervised ignition source or the supervised main burner flame is not established.

AUTOMATIC GAS IGNITION SYSTEM. A system designed to ignite and reignite an appliance burner(s). Such systems shall:

1. Automatically ignite gas at the main burner, or gas at the pilot burner, so the pilot can ignite the main burner;
2. Prove the presence of either the ignition source, the main burner flame, or both; and
3. Automatically act to shut off the gas supply to the main burner or to the pilot burner and the main burner, when the supervised flame or ignition source is not proved.

AUTOMATIC INTERMITTENT PILOT IGNITION SYSTEM. For the purpose of this standard, a system comprised of a pilot ignition device, pilot flame sensing means, control system and associated automatic valving for application to an existing pilot burner and designed to:

1. Ignite the pilot burner gas on a call for heat;
2. Prove the presence of the pilot and allow main burner gas to flow; and
3. Automatically act to shut off the gas supply to the main burner and pilot burner when the pilot is not proved.

AUTOMATIC RESTART. The automatic action to initiate another ignition sequence after a soft lockout occurs.

AUTOMATIC VALVE. (See VALVE.)

AUTOMATIC VENT DAMPER DEVICE. A device intended for installation in the venting system, in the outlet of or downstream of the appliance draft hood, of an individual automatically operated gas-fired appliance and which is designed to automatically open the venting system when the appliance is in operation and to automatically close off the venting system when the appliance is in a standby or shutdown condition.

Electrically Operated. An automatic vent damper device that employs electrical energy to control the device.

Thermally Actuated. An automatic vent damper device dependent for operation exclusively upon the direct conversion of the thermal energy of the vent gases into mechanical energy.

BAFFLE. An object placed in an appliance to change the direction of, or retard the flow of air, gas-air mixtures of flue gases.

BASE. The lowest supporting frame or structure of the appliance, exclusive of legs.

BLOCKED VENT SHUT-OFF SYSTEM. A system designed to interrupt appliance main burner gas flow if the appliance venting system is totally blocked.

BURNER. A device for the final conveyance of the gas, or a mixture of gas and air, to the combustion zone.

Injection (Bunsen) Type Burner. A burner employing the energy of a jet of gas to inject air for combustion into the burner and mix it with the gas.

Atmospheric Injection Burner. A burner in which the air at atmospheric pressure is injected into the burner by a jet of gas.

Yellow-Flame Burner. A burner in which secondary air only is depended on for the combustion of the gas.

Power Burner. A burner in which either gas or air or both are supplied at pressures exceeding for gas, the line pressure; and for air, atmospheric pressure; this added pressure being applied at the burner.

Pre-Mixing Burner. A power burner in which all or nearly all of the air for combustion is mixed with the gas as primary air.

Pressure Burner. A burner which is supplied with a gas-air mixture under pressure [usually from 0.5 to 14 inches water column (0.12 to 3.5 kPa) and occasionally higher].

Pan Burner. A burner where the combustion process of gas or gas-air mixture occurs on the surface of a distribution media (i.e. sand), that covers the burner ports.

BURNER HEAD. The portion of a burner beyond the outlet end of the mixer tube which contains the ports.

CIRCULATING WARM AIR FIREPLACE HEATER. An appliance of the simulated fuel effect fireplace type incorporating a gravity or booster fan air heating duct system attached to the air circulating chamber surrounding the firebox directing heated air to areas or locations other than directly in front of an directly above the fireplace.

CO-AXIAL. A vent/air intake system for a direct vent gas appliance consisting of combustion air passages and conduits, and flue gas passages and conduits where one is contained within the other.

CO-LINEAR. A vent/air intake system for a direct vent gas appliance consisting of combustion air passages and conduits, and flue gas passages and conduits where one is not contained within the other.

COMBINATION CONTROL. An assembly of two or more different functions, at least one of which conveys gas in a single unit without the use of pipe nipples, including the following:

1. Manually Operated Gas Valves;
2. Gas Appliance Pressure Regulator;
3. Automatic Valve;
4. Thermostat Other than Electric Type;
5. Ignition System Components; and
6. Automatic Gas Shut-off Device.

COMBUSTIBLE MATERIAL. As pertaining to materials adjacent to or in contact with heat producing appliances, vent connectors, gas vents, chimneys, steam and hot water pipes, and warm air ducts, shall mean materials made of or surfaced with wood, compressed paper, plant fibers, or other materials that are capable of being ignited and burned. Such material shall be considered combustible even though flame-proof, fire-retardant treated, or plastered.

COMBUSTION. The rapid oxidation of fuel gases accompanied by the production of heat, or heat and light.

COMBUSTION CHAMBER. The portion of an appliance within which combustion occurs.

COMBUSTION CHAMBER PRESSURE RELIEF DEVICE. A means by which to relieve pressure in an appliance during an abnormal increase in pressure.

COMBUSTION PRODUCTS. Constituents resulting from the combustion of a fuel gas with the oxygen of the air, including the inert gases, but excluding excess air.

CONDENSATE. The liquid which separates from a gas (including flue gases) due to a reduction in temperature.

CONTROLS. Devices designed to regulate the gas, air, water or electrical supplies to a gas appliance. These may be manual, semi-automatic or automatic.

CONVERSION KIT, LISTED GAS APPLIANCE. A kit made available by the appliance manufacturer for the purpose of converting a dedicated appliance, in the field, from one approved gas to the other. The conversion is to be performed by a qualified service agency.

CONVERTIBLE. An appliance designed by the manufacturer to be changed in service from use with either natural, manufactured or mixed gas to use with liquefied petroleum gases, and vice versa. The appliance is supplied from the factory with all components and instructions to convert the appliance from one gas to another.

CUBIC FOOT OF GAS. The amount of gas which would occupy 1 cubic foot when at a temperature of 60°F if saturated with water vapor and under a pressure equivalent to that of 30 inches mercury column.

DAMPER. The valve or plate which controls the flow through an automatic vent damper device.

DAMAGE. For the purpose of testing, damage is defined as an appliance condition which renders the appliance unsafe to operate and still capable of operation. Safe operation is defined as complying with the combustion tests of Section 2.4, Combustion, and the leakage tests of Section 2.34, Joints In Direct Vent Systems.

DEDICATED. An appliance supplied from the factory for use with one gas only. (See Exhibit D, Provisions for Listed Gas Appliance Conversion Kits.)

DRAFT HOOD. A device placed in, and made part of, the vent connector from an appliance, or in the appliance itself, which is designed to (1) provide for the ready escape of the products of combustion in the event of no draft, backdraft, or stoppage beyond the draft hood; (2) prevent a backdraft from entering the appliance; and (3) neutralize the effect of stack action of the chimney or gas vent upon the operation of the appliance.

Permanently Attached Draft Hood. A draft hood which is an integral part of the appliance or removable only by the use of special tools.

Detachable Draft Hood. A draft hood that is easily disconnected from the appliance without the use of special tools.

Recessed Draft Relief System: A permanently attached or detachable component, or combination thereof, that in conjunction with relief openings to the space it serves, and the cavity or enclosure into which the appliance is installed, forms a complete draft relief system. That recessed draft relief system may include trim panel assembly(s).

EXCESS AIR. Air which passes through the combustion chamber and the appliance flues in excess of that which is required for complete combustion.

ELECTRICAL DIAGRAMS.

Connection. A diagram which shows the connections of an installation or its component devices or parts. It may cover internal or external connections, or both, and contains such detail as is needed to make or trace connections that are involved. The Connection Diagram usually shows general physical arrangement of the component devices or parts.

Schematic. A diagram which shows, by means of graphic symbols, the electrical connections and functions of a specific circuit arrangement. The Schematic Diagram facilitates tracing the circuit and its functions without regard to the actual physical size, shape or location of the component device or parts.

Ladder Form of Schematic. A diagram drawn in the form of a vertical ladder. The outer vertical lines represent the electrical supply conductors. The horizontal steps represent each individual circuit with all component devices.

FLAME CHECK. A gauze, grid, or any other portion of the burner assembly used to avert a flash back.

FLAME SENSING MEANS. A means for sensing the presence or absence of a burner flame when used with a control module.

FLUE. The general term for the passages and conduits through which flue gases pass from the combustion chamber to the outer air.

Appliance Flue. The flue passages within an appliance.

Chimney Flue. A conduit for conveying the flue gases delivered into it by a vent connector to the outer air.

Vent Connector. The conduit connecting an appliance with the chimney or gas vent.

FLUE COLLAR. A projection or recess provided to accommodate the vent connector.

FLUE GASES. Products of combustion plus excess air in an appliance flues or heat exchangers.

FLUE OUTLET (VENT). The opening provided in an appliance for the escape of the flue gases.

FREE-STANDING. An appliance which sits directly on the floor.

GAS CONTROL CIRCUIT. The system of components which controls the flow of gas to the pilot or main burner(s).

GAS VENTS. Factory-built piping and vent fittings, listed by a nationally recognized testing agency, that are assembled and used in accordance with the terms of listing for conveying flue gases to the outside atmosphere.

Type B Gas Vent. A gas vent for venting gas appliances with draft hoods listed for use with Type B gas vents.

Type BW Gas Vent. A gas vent for venting listed gas-fired wall furnaces.

HEATING VALUE (TOTAL). The amount of heat produced by the combustion at constant pressure, of a given volume of gas when the products of combustion are cooled to the initial temperature of the gas and air, when the water vapor formed during combustion is condensed, and when all the necessary corrections have been applied.

IGNITER. A device which utilizes electrical energy to ignite gas at a pilot burner.

IGNITER, PROVED. An igniter that is proven to be capable of igniting gas flow.

IGNITION DEVICE. A device for igniting gas at a burner. It may be a pilot or an igniter.

IGNITION DEVICE, DIRECT. An igniter utilized to ignite gas at a main burner.

IGNITION SOURCE.

Continuous. An ignition source which, once placed in operation, is intended to remain ignited or energized continuously until manually interrupted.

Intermittent/Continuous. An ignition source which is ignited or energized upon appliance user initiation of the operational cycle and which remains continuously ignited or energized during the appliance use cycle. The ignition source is extinguished or de-energized when the appliance use cycle is completed.

Intermittent. An ignition source which is automatically ignited or energized when an appliance is called on to operate and which remains continuously ignited or energized during each period of main burner operation. The ignition source is automatically extinguished or de-energized when each main burner operating cycle is completed.

Intermittent/Interrupted. An ignition source which is ignited or energized upon appliance user initiation of the operational cycle and which is extinguished or de-energized after the appliance use cycle has been initiated.

Interrupted. An ignition source which is automatically ignited or energized when an appliance is called on to operate and is automatically extinguished or de-energized during the Trial For Ignition Period.

IID. See Intermittent Ignition System.

INTERMITTENT IGNITION SYSTEM. A system in which the ignition source is automatically shut off when the appliance is in an off or standby condition.

INTERLOCK. A control to prove the physical state of a required condition and to furnish that proof to the safety shut-off device circuit.

LOCKOUT. The automatic action to end an ignition sequence.

- a. **Hard Lockout.** Reinitiating another ignition sequence requires a manual operation at the appliance or interruption of the main electrical power supply to the appliance.
- b. **Soft Lockout.** Reinitiating another ignition sequence is accomplished by manual or automatic means which may be remote from the appliance.

LOOSE BURNER MATERIAL. A non-combustible material, supplied by the appliance manufacturer, which is intended to be randomly applied to the burner and or flame according to the installation instructions. This material is not secured in position.

MANIFOLD. The conduit of an appliance which supplies gas to the individual burners.

MANUFACTURED HOME. Manufactured home means a structure, transportable in one or more sections, which in the traveling mode, is eight body feet or more in width or forty body feet or more in length, or, when erected on site, is three hundred twenty or more square feet, and which is built on a permanent chassis and designed to be used as a dwelling with or without a permanent foundation when connected to the required utilities and include the plumbing, heating, air-conditioning, and electrical systems contained therein. Calculations used to determine the number of square feet in the structure will be based on the structure's exterior dimensions measured at the largest horizontal projections when erected on site. These dimensions will include all expandable rooms, cabinets, and other projections containing interior space, but do not include bay windows.

MAXIMUM REGULATION CAPACITY. The high limit of flow below which is found acceptable regulating characteristics.

MIXER. The combination of mixer head, mixer throat and mixer tube.

Mixer Head. The portion of an injection (Bunsen) type burner, usually enlarged, into which primary air flows to mix with the gas stream.

Mixer Throat. The portion of the mixer which has the smallest cross-sectional area and which lies between the mixer head and the mixer tube.

Mixer Tube. The portion of the mixer which lies between the throat and the burner head.

MIXER FACE. The inlet end of the mixer head.

MOBILE HOME (Canada). Mobile housing includes all of the following structures:

Mobile home: a dwelling consisting of a vehicular portable structure built on a chassis, designed to be used with or without a permanent foundation and for connection to indicated utilities;

Mobile industrial or commercial structure: a structure not intended as a dwelling unit, towable on its own chassis and for use without a permanent foundation. Such a structure is built specifically for commercial or industrial use such as a construction office, bunk house, wash house, kitchen and dining unit, library, television unit, industrial display unit, laboratory unit, or medical clinic;

Multiple section mobile home: a single structure composed of separate mobile units each towable on its own chassis, each of which when towed to the site are coupled together mechanically and electrically to form a single structure. These are sometimes referred to as double-wide mobile homes, when only two units are joined together;

Swing out and expandable room section mobile home: a mobile home that can be telescoped when towed and expanded later for additional capacity.

MOBILE HOME (U.S.). A factory-assembled structure or structures equipped with the necessary service connections and made so as to be readily movable as a unit or units on its (their) own running gear and designed to be used as a dwelling unit(s) without a permanent foundation. The phrase "without a permanent foundation" indicates that the support system is constructed with the intent that the mobile home placed thereon will be moved from time to time at the convenience of the owner.

MULTI-FLAME PILOT. A pilot whose flame contour is substantially different under turndown conditions, when compared to full flame conditions, i.e. lack of continuous flame.

MULTI-TRY SYSTEM. An ignition system that allows for more than one trial for ignition period during the ignition sequence.

NORMAL INLET TEST PRESSURES. Those pressures specified for testing purposes at which adjustment of burner ratings and primary air adjustments are made.

OEM. Original Equipment Manufacturer.

OPERABLE DOOR. A panel or door that has readily accessible means of opening to the combustion chamber and can be opened during the operation without the use of tools and without interrupting the flow of gas to the main burner.

ORIFICE. The opening in an orifice cap, orifice spud, or other device whereby the flow of gas is limited and through which the gas is discharged.

ORIFICE SPUD. A removable plug or cap containing an orifice which permits adjustment of the flow of gas by substitution of a spud with a different size orifice.

PILOT. A gas flame(s) utilized to ignite gas at a main burner(s).

PORT. Any opening in a burner head through which gas or a gas-air mixture is discharged for ignition.

PRIMARY AIR INLET. The opening(s) through which primary air is admitted into the burner.

PROPANE HD-5. A special grade of liquefied petroleum gas composed of a minimum of 90 percent liquid volume of propane (C₃H₈) and a maximum of 5 percent liquid volume of propylene (C₃H₆).

PURGE. To free a gas conduit(s) of air or mixture of gas and air.

QUALIFIED AGENCY. Any individual, firm, corporation, or company which either in person or through a representative is engaged in and responsible for (a) the installation or replacement of gas piping, or (b) the connection, installation, repair or servicing of gas utilization equipment, who is experienced in such work, familiar with all precautions required, and has complied with all the requirements of the authority having jurisdiction.

RADIATION SHIELD. A separate panel or panels interposed between heating surfaces and jackets to reduce heat losses through radiation.

RECESSED. An appliance installed in an alcove or otherwise having enclosed back, sides and top, but may not be zero clearance.

REGULATOR, GAS APPLIANCE PRESSURE. A device for controlling a selected outlet gas pressure.

1. **Adjustable.**

Spring Type, Limited Adjustment. A regulator in which the regulating force acting upon the diaphragm is derived principally from a spring, the loading of which is adjustable over a range of not more than ± 15 percent of the outlet pressure at the midpoint of the adjustment range.

Spring Type, Standard Adjustment. A regulator in which the regulating force acting upon the diaphragm is derived principally from a spring, the loading of which is adjustable. The adjustment means shall be concealed.

2. **Convertible.**

A regulator for conversion between gases having different heating values whose adjustment means can be positioned from one pre-determined outlet pressure setting for one gas to another pre-determined outlet pressure setting for the other gas with no intermediate pressure settings and without addition, deletion or substitution of parts.

3. **Multi-Rate.**

A standard adjustment regulator, the multi-rate adjustment means of which is not concealed and which provides non-field adjustable high-, and non-field adjustable low-pressure settings for high-low rates on appliances.

4. **Non-adjustable.**

Spring Type, Non-adjustable. A regulator in which the regulating force acting upon the diaphragm is derived principally from a spring, the loading of which is not adjustable.

Weight Type. A regulator in which the regulating force acting upon the diaphragm is derived from a weight or combination of weights.

RELATIVE DENSITY. (Specific Gravity) As applies to gas, ratio of the weight of a given volume to that of the same volume of air, both measured at the same temperature and pressure.

SAFETY SHUT-OFF DEVICE. A device that will shut off the gas supply to the controlled burner(s) in the event the source of ignition fails. This device may interrupt the flow of gas to the main burner(s) only, or to the pilot(s) and main burner(s) under its supervision.

SECONDARY AIR. The air externally supplied to the flame at the point of combustion.

SEMI-AUTOMATIC VALVE. (See VALVE.)

THERMOCOUPLE, FAST-ACTING. A thermocouple type flame sensor and generator having an output voltage that will decay from its maximum to specified minimum in 30 seconds or less after flame is extinguished.

TOOLS, SPECIAL. Those tools that are not available on the open retail market.

UNSAFE OPERATION. For the purposes of evaluating the effects of field miswiring, a condition which results in any of the following:

1. Bypassing a safety control or safety function;
2. An unsafe change in the ignition system timings;
3. A change in the ignition system sequence;
4. The unsupervised flow of gas to the main burner(s); and
5. For appliances which require shutoff of the pilot burner gas, the unsupervised flow of gas to the pilot burner(s).

VALVE.

Appliance Main Gas Valve. A manually operated valve used as part of the appliance for turning the main burner gas (or main burner and pilot gas) on and off. The valve is turned on when the appliance is put into service and turned off to shut the appliance down.

Automatic. An automatic or semi-automatic device consisting essentially of a valve and operator that controls the gas supply to the burner(s) during normal operation of an appliance. The operator may be actuated by application of gas pressure on a flexible diaphragm, by electrical means, by mechanical means or by other means.

Burner. A manually or mechanically operated valve which permits control of the flow of gas.

Diaphragm Type Automatic. A device consisting essentially of an automatic valve actuated by means of the application of gas pressure upon a flexible diaphragm.

Electric Type Automatic. A device actuated by electrical energy for controlling the gas supply.

Equipment Shutoff Valve. A valve located in the piping system used to shut off individual equipment.

Manual Main Shutoff. A manually operated valve in the gas line for the purpose of completely turning on or shutting off the gas supply to the appliance, except to pilot(s) provided with independent shut-off valves.

Safety Shutoff. A valve that is automatically closed by the safety control system or by an emergency device. Such valve may be of the automatic or manually opened type.

Semi-Automatic. A valve that is opened manually and closed automatically, or vice versa.

VENT LIMITER. A means which limits the flow of air from the atmospheric diaphragm chamber of a gas pressure regulator to the atmosphere. This may be either a limiting orifice or a limiting device.

VENTED GAS FIREPLACE HEATER. A vented appliance which simulates a solid fuel fireplace and furnishes warm air, with or without duct connections, to the space in which it is installed. A vented gas fireplace heater is such that it may be controlled by an automatic thermostat. The circulation of heated room air may be by gravity or mechanical means. A vented gas fireplace heater may be freestanding, recessed, zero clearance, or a gas fireplace insert, and is further defined as:

Direct Vent Gas Fireplace Heater. Means a system consisting of (1) combustion air connections between the appliance and the vent-air intake terminal, (2) flue gas connections between the appliance and the vent-air intake terminal and (3) a vent-air intake terminal for installation outdoors, constructed such that all air for combustion is obtained from the outdoor atmosphere and all flue gases are discharged to the outdoor atmosphere. All of these components shall be supplied by the manufacturer.

Fan Type Vented Gas Fireplace Heater: A fan type vented gas fireplace heater equipped with an integral circulating air fan, the operation of which is necessary for satisfactory appliance performance.

Gravity Vented Gas Fireplace Heater. A vented gas fireplace heater consisting of an appliance constructed so all air for combustion is obtained from the room in which the appliance is installed and all flue gases are discharged to the outdoor atmosphere. The discharge of flue gases is by gravity forces.

Power Vented Gas Fireplace Heater. A vented gas fireplace heater equipped with mechanical means to either draw or force products of combustion through the combustion chamber and/or heat exchanger.

Gas Fireplace Insert. A vented gas appliance designed to be fully or partially installed in a solid fuel burning fireplace.

VENTING SYSTEM. The gas vent, chimney or single-wall metal pipe, and vent connector if used, assembled to form a continuous open passageway from the gas appliance to the outdoor atmosphere for the purpose of removing flue or vent gases.

WALL-MOUNT. An appliance which is attached directly to or abuts a wall.

ZERO CLEARANCE. An appliance designed to be installed within combustible construction where the sides, back and top of the appliance may come in contact with that construction.

Appendix A

Pertinent References to ANSI Y14.15

(This appendix is informative and is not part of the standard.)

The following sections of ANSI Y14.15 are pertinent to wiring diagrams for gas appliances accessories.

15-2.2	Schematic Diagrams
15-2.3	Connection Diagrams
15-2.4	Interconnection Diagrams
15-3.6.1	Representation of Contacts
15-3.7	Abbreviations
15-3.11	Wire Colors
15-9.2.5	Circuit Arrangements
15-10.3.1	Views-Conn. Diagrams
15-10.3.2	Wiring Views
15-10.3.3	Device Representation

Appendix B

Wire Color Designations

(This appendix is informative and is not part of the standard.)

WIRE COLOR	DESIGNATION SPECIFIED IN 15-3.11 OF ANSI Y14.15
Black	BK
Brown	BR
Red	R
Orange	O
Yellow	Y
Green	G
Blue	BL
Violet (Purple)	V (PR)
Gray (Slate)	GY (S)
White	W

Appendix C

Recommended Wire Color Usage

(This appendix is informative and is not part of the standard.)

Line Voltage Conductors

Single Phase				Three Phase		Three Phase/Single Phase	
	120v	240v	*120v/240v	208v		208v/120v*	240v/208v*
	208v	480v		240v		240v/277v*	
	277v			480v			
				(Alternative)		(Alternative)	
L ₂ (Hot)	Black	Black	Black	Black	Black	Black	Black
L ₂ (Neutral)	White	—	White	—	—	White	White
L ₂ (Hot)	—	Red	Red	Black	Red	Black	Red
L ₃ (Hot)	—	—	—	Black	Blue	Black	Blue

The equipment grounding conductor shall be Green, Green with Yellow stripe(s), or bare.

*120v, 208v, 277v circuits, — use Black & White

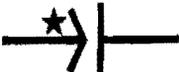
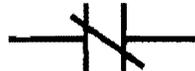
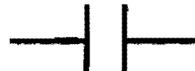
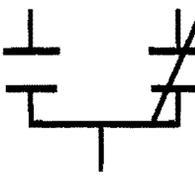
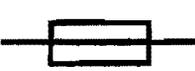
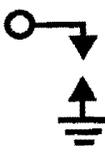
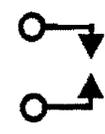
Line Voltage Component Leads

Capacitors		Brown
Single Phase Multi-Speed Motors	Common (208v, 240v, 480v)	Purple
	Common (120v, 277v) (Neutral)	White
	High Speed	Black
	Low Speed	Red
	Medium Speed	Blue

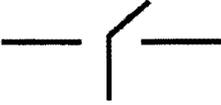
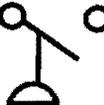
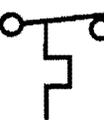
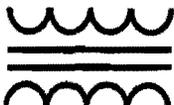
Appendix D

Preferred Graphic Symbols Of Commonly Used Items, Extracted From Standard ANSI/IEEE 315, Graphic Symbols For Electrical And Electronics Diagrams, And Abbreviations For These Items

(This appendix is informative and is not part of the standard.)

Item description	Abbreviation	Symbol	IEEE Standard 315 Section reference
Capacitor (*Closest To Grnd)	CAP		2.2.1
Coil, Relay	R		4.5
Contact, Normally Closed	N.C.		4.3.1
Contact, Normally Open	N.O.		4.3.2
Contact, Transfer Single Pole Double Throw	S.P.D.T.		4.3.3
Crossing of Paths (Conductors not Connected)	—		3.1.5
Fuse, General	FUSE		9.1.1
Ground (Direct Circuit Return to Earth)	GND		3.9.1
Igniter; Glow Bar, Glow Coil, Hot Wire	IGN		—
Igniter, Spark, Grounded	IGN		—
Igniter, Spark, Ungrounded	IGN		—

(Continued)

Item description	Abbreviation	Symbol	IEEE Standard 315 Section reference
Junction of Paths (Conductor or Cable)	—		3.1.6.3
Link, Fusible	FL		2.12.3
Motor, General	MOT		13.1.3
Resistor, Adjustable	RES		2.1.3
Resistor, Heating	RES		2.1.8
Resistor, Variable	RES		2.1.4
Switch, Double Throw General	S.P.D.T.		4.6.2
Switch, Normal Closed Time Delay Opening	N.C.SW		4.16.2
Switch, Normally Open Time Delay Closing	N.O.SW		4.16.1
Switch, Pressure or Vacuum Actuated (Closes on Rising Pressure)	N.O.SW		4.19.1
Switch, Single Throw General	N.O.SW		4.6.1
Switch, Temperature Actuated (Closes on Rising Temperature)	N.O.SW		4.20.1
Switch, Temperature Actuated (Opens on Rising Temperature)	N.C.SW		4.20.2
Transformer, Magnetic Core Nonsaturating	TRAN.		6.4.2.1

Appendix E

Table of Conversion Factors

(This appendix is informative and is not part of the standard.)

Quantity	U. S. Unit		Multiplying Factor		SI Units*	
	Name	Symbol	U.S. to SI	SI to U.S.	Symbol	Name
TORQUE	ounce-force-inch	ozf-in	7.061×10^{-3}	141.62	N·m	newton-meter
	pound-force-inch	lbf-in	1.129×10^{-1}	8.85	N·m	newton-meter
	pound-force-foot	lbf-ft	1.355	7.38×10^{-1}	N·m	newton-meter
LENGTH	inch	in	2.540×10^{-2}	39.37	m	meter
	inch	in	2.540×10	39.37×10^{-3}	mm	millimeter
	foot	ft	3.048×10^{-1}	3.281	m	meter
AREA	square inch	in ²	6.452×10^{-4}	1550	m ²	square meter
	square inch	in ²	6.452×10^2	1550×10^{-6}	mm ²	square millimeter
	square foot	ft ²	9.290×10^{-2}	10.76	m ²	square meter
VOLUME	cubic inch	in ³	1.639×10^{-5}	61.02×10^3	m ³	cubic meter
	cubic foot	ft ³	2.832×10^{-2}	35.31	m ³	cubic meter
	cubic foot	ft ³	2.832×10	35.31×10^{-3}	l	liter
	gallon	gal	3.785×10^{-3}	264.1	m ³	cubic meter
	gallon	gal	3.785	264.1×10^{-3}	l	liter
VELOCITY	foot/second	ft/s	3.048×10^{-1}	3.281	m/s	meter/second
	foot/minute	ft/min	5.080×10^{-2}	196.8	m/s	meter/second
	mile/hour	m/hr	4.470×10^{-1}	2.236	m/s	meter/second
	mile/hour	m/hr	1.609	6.214×10^{-3}	km/hr	kilometer/hour
ACCELERATION	foot/second ²	ft/s ²	3.048×10^{-1}	3.281	m/s ²	meter/second ²
FREQUENCY	cycle/second	c/s	1	1	Hz	hertz
MASS	ounce	oz	2.835×10^{-2}	35.27	kg	kilogram
	ounce	oz	2.835×10	35.27×10^{-3}	g	gram
	pound	lb	4.536×10^{-1}	2.204	kg	kilogram
	grain	gr	6.480×10^{-5}	15.43×10^3	kg	kilogram
MASS PER UNIT AREA	pound/foot ²	lb/ft ²	4.882	2.048×10^{-1}	kg/m ²	kilogram/meter ²
MASS PER UNIT VOLUME	pound/foot ³	lb/ft ³	1.602×10	6.243×10^{-2}	kg/m ³	kilogram/meter ³
SPECIFIC VOLUME	foot ³ /pound	ft ³ /lb	6.243×10^{-2}	1.602×10	m ³ /kg	meter ³ /kilogram
MASS FLOW RATE	pound/hour	lb/hr	1.260×10^{-4}	7.936×10^3	kg/s	kilogram/second
	pound/foot ² ·hour	lb/ft ² ·hr	1.356×10^{-3}	7.374×10^2	kg/m ² ·s	kilogram/meter ² ·second
	pound/inch ² ·hour	lb/in ² ·hr	1.953×10^{-1}	5.120	kg/m ² ·s	kilogram/meter ² ·second
VOLUME FLOW RATE	foot ³ /second	ft ³ /s	2.832×10^{-2}	35.31	m ³ /s	meter ³ /second
	foot ³ /second	ft ³ /s	2.832×10	35.31×10^{-3}	l/s	liter/second
	foot ³ /minute	ft ³ /min	4.719×10^{-1}	2.119 × 10 ³	m ³ /s	meter ³ /second
	foot ³ /minute	ft ³ /min	4.719×10^{-1}	2.119 × 10 ³	l/s	liter/second
	gallon/minute	gal/min	6.309×10^{-2}	1.585×10^4	m ³ /s	meter ³ /second
	gallon/minute	gal/min	6.309×10^{-2}	1.585×10^4	l/s	liter/second
	gallon/hour	gal/hr	1.052×10^{-1}	9.505×10^2	m ³ /s	meter ³ /second
	gallon/hour	gal/hr	1.052×10^{-1}	9.505×10^2	l/s	liter/second
PRESSURE	pound force/inch ²	lbf/in ²	6.895×10^3	1.450×10^{-4}	Pa	pascal
	pound force/foot ²	lbf/ft ²	4.788×10	2.088×10^{-2}	Pa	pascal
		inch H ₂ O (4°C)	2.491×10^2	4.014×10^{-3}	Pa	pascal
	atmosphere	inch Hg (0°C)	3.386×10^3	2.953×10^{-4}	Pa	pascal
		atm (std)	1.013×10^5	9.871×10^{-6}	Pa	pascal
	pounds/square inch***	psi	2.768×10	3.613×10^{-1}	iwc	inch water column
	pounds/square inch	psi	6.895×10	1.450×10^{-2}	mb	millibar
inch water column	iwc	2.491	4.015×10^{-1}	mb	millibar	
ENERGY, WORK, QUANTITY OF HEAT		Btu	1.055×10^3	9.478×10^{-4}	J	joule
		Btu	1.055	9.478×10^{-7}	kJ	kilojoule
	horsepower hour	hp·hr	2.685×10^6	3.724×10^{-7}	J	joule
	horsepower hour	hp·hr	2.685	3.724×10^{-1}	MJ	megajoule
	kilowatt hour	kWhr	3.6×10^6	2.777×10^{-7}	J	joule
	kilowatt hour	kWhr	3.6	2.777×10^{-1}	MJ	megajoule
POWER, HEAT FLOW RATE		Btu/hr	2.931×10^{-1}	3.412	W	watt
		Btu/hr	2.931×10^{-6}	3.412×10^3	kW	kilowatt
		hp	7.457×10^2	1.341×10^{-3}	W	watt
		hp	7.457×10^{-1}	1.341	kW	kilowatt
	ton refrigeration (12,000 Btu/hr)		3.516×10^2	2.844×10^{-4}	W	watt
	ton refrigeration (12,000 Btu/hr)		3.516	2.844×10^{-1}	kW	kilowatt
	Btu/hour	Btu/hr	2.929×10^{-6}	3.414×10^3	kW	kilowatt
Btu/hour·foot ²	Btu/hr·ft ²	3.155	3.1695×10^{-1}	W/m ²	watt/meter ²	
HEAT CAPACITY SPECIFIC	Btu/degree F	Btu/°F	1.899×10^3	5.265×10^{-4}	J/°C	joule/degree Celsius
	Btu/pound·degree F	Btu/lb·°F	4.187×10^3	2.388×10^{-4}	J/kg·°C	joule/kg·degree Celsius
	Btu/pound·degree F	Btu/lb·°F	4.187	2.388×10^{-3}	kJ/kg·°C	kilojoule/kg·degree Celsius
LATENT HEAT	Btu/pound	Btu/lb	2.326×10^3	4.299×10^{-4}	J/kg	joule/kilogram
	Btu/pound	Btu/lb	2.326	4.299×10^{-1}	kJ/kg	kilojoule/kilogram
VOLUME AT STD. CONDITIONS**	ft ³ (60°F, 30 inches Hg, sat)		.9826	1.0177	ft ³ (60°F, 30 inches Hg, dry)	
	" " " "		.02784	35.92	m ³ (15°C, 760 mm Hg, dry)	
	" " " "		.02832	35.31	m ³ (15°C, 760 mm Hg, sat)	
	" " " "		.02639	37.89	m ³ (0°C, 760 mm Hg, dry)	
	" " " "		.02655	37.66	m ³ (0°C, 760 mm Hg, sat)	
HEATING VALUE	Btu/cubic foot	Btu/ft ³	3.752×10^2	2.684×10	MJ/m ³	megajoule/meter ³

*SI Units (International System of Units) have been adopted by the International Gas Union for use within the gas industry. Where the same quantities have been defined by ISO (International Standards Organization), they are identical to the SI Units.

**Standard cubic foot (SCF) measured @ 60°F and 30 inches Hg, Saturated. (U.S. Conditions)

Standard cubic meter (sm³) measured @ 15°C and 760 mm Hg, dry. (SI Conditions)

Normal cubic meter (nm³) measured @ 0°C and 760 mm Hg, dry.

***U.S. unit to U.S. unit.

Temperature Scales and Conversions

The unit of temperature in the International System of Units (SI) is the kelvin (K), but it is generally accepted practice to express temperature differences in terms of degrees Celsius ($^{\circ}\text{C}$) because the degree intervals are identical. The term "centigrade" was abandoned in 1948 by the General Conference on Weights and Measures but in fact is still in common use. The accepted abbreviation for centigrade is also $^{\circ}\text{C}$ and for all practical purposes the degree intervals of centigrade, Celsius and kelvin, are identical.

Many temperature measurements are still made in terms of degrees Fahrenheit ($^{\circ}\text{F}$). Although a formal definition of the Fahrenheit scale does not exist, it is based on:

- (a) The freezing (ice) point of water = 32°F
- (b) The boiling point of water under standard pressure conditions = 212°F
- (c) The formula for absolute temperature, $5/9 (^{\circ}\text{F}-32) = ^{\circ}\text{C}$
- (d) The formula for "temperature rise," $5/9 ^{\circ}\text{F} = ^{\circ}\text{C}$

$^{\circ}\text{C}$	$^{\circ}\text{F}$	$^{\circ}\text{C}$	$^{\circ}\text{F}$	$^{\circ}\text{C}$	$^{\circ}\text{F}$
-40	-40.0	25	77.0	70	158.0
-20	-4.0	30	86.0	80	176.0
0	32.0	35	95.0	90	194.0
10	50.0	40	104.0	100	212.0
15	59.0	50	122.0	110	230.0
20	68.0	60	140.0	120	248.0

Multiples and Submultiples of Basic Units

Factor by which the unit is multiplied	Prefix	Symbol
1 000 000 000 000 = 10^{12}	tera	T
1 000 000 000 = 10^9	giga	G
1 000 000 = 10^6	mega	M
1 000 = 10^3	kilo	k
100 = 10^2	hecto	h
10 = 10^1	deka	da
0.1 = 10^{-1}	deci	d
0.01 = 10^{-2}	centi	c
0.001 = 10^{-3}	milli	m
0.000 001 = 10^{-6}	micro	μ
0.000 000 001 = 10^{-9}	nano	n
0.000 000 000 001 = 10^{-12}	pico	p

Appendix F

Si (Metric) Symbols

(This appendix is informative and is not part of the standard.)

°C	degree celsius
°C/min	degrees celsius per minute
cm ³ /s	cubic centimeters per second
g	gram
g/m ²	gram per square metre
kg/m ³	kilogram per cubic metre
kg/mm	kilogram per millimetre
kJ/(kg°C)	kilojoule per kilogram per degree celsius
kPa	kilopascal
kW	kilowatt
m	metre
m ²	square metre
m ³	cubic metre
min	minute
MJ/m ³	megajoule per cubic metre
mm	millimetre
mm ²	square millimetre
m/s	metre per second
m ³ /s	cubic metre per second
Pa	pascal
s	second
W	watt
W/m ² /°C	watt per square metre per degree celsius

Appendix G

Delayed Ignition Test Using A Stoichiometric Gas/Air Mixture For Natural Gas Direct Vent Fireplaces

There shall not be glass breakage, expulsion of glass or debris into the living space, excessive flame flashback, or damage to the appliance when the fireplace and the vent are filled with stoichiometric gas/air mixture which is ignited at the location where ignition takes place during normal start up. Implosion of the glass front due to negative pressure in the combustion space does not constitute a failure provided the appliance is not "damaged."

For the purpose of testing, damage to the appliance is defined as a condition which renders the appliance unsafe to operate and still capable of operation. If following the delayed ignition test, the appliance is not capable of operation, the appliance shall be reset in accordance with the manufacturer's instructions, and tested to assure it provides safe operation. Safe operation is defined as complying with the combustion tests of Section 2.4, Combustion, and the leakage tests (for the combustion chamber only) of Section 2.34, Joints In Direct Vent Systems.

Method Of Test

The test equipment used in performing the test is shown in Figure G-1 which includes; gas orifice No. 53 DMS, air orifice No. 6 DMS, electronic ignition control, and a combustible gas meter.

A spark ignition control shall be connected to the igniter as installed in the appliance and to a manual switch for the purpose of initiating a continuous spark. Two solenoid valves shall be connected and individually energized by two independent switches. Gas-air sampling lines shall be installed to sample the mixture at the following points:

- (a) end of vent cap;
- (b) output from mixing chamber;
- (c) lowest point in appliance combustion chamber; and
- (d) air intake collar near the connection with the appliance.

Sampling lines shall be connected to gas analyzer through a valve selector manifold capable of selecting each of the four lines and air (to zero the instrument). The appliance shall be installed with the maximum vent length as specified by the manufacturer. The vent air intake pipe shall be sealed at the termination by a metal cap. A gap (approximately 1 in (25.4 mm)) shall be left between the air intake pipe and the vent pipe. A $\frac{1}{8}$ in iron pipe shall be installed at the vent sealing cap, connected as shown in Figure 13, Impact Test for Vent/Air Intake Piping. The burner orifices shall be removed to allow free flow of gas mixture through manifold.

With both regulators set up at 7 in wc (1.74 kPa), the gas/air mixture shall be adjusted to about 9.5 percent.

The flow of gas and air shall be initiated by turning on the two solenoid valves. The gas/air mixture shall be monitored at the outlet from the mixing chamber. If the gas/air ratio is between 9 percent and 10 percent, proceed with the test. Otherwise, the test shall be aborted, the regulators adjusted, and the gas/air

mixture rechecked. The flow shall be allowed to continue while the three sampling points in the appliance are regularly sampled, until all points show a stable condition with a concentration between 9 percent and 10 percent. The spark igniter shall then be energized and both solenoid valves deenergized after the gas mixture ignites.

The physical integrity of the appliance shall be observed. Resetting of a relief device is considered acceptable. Replacement is not considered acceptable.

If the glass front of the appliance implodes during the conduct of this test, the test shall be repeated with the vent sealing cap provided with a 2 in (50 mm) diameter flapper that opens inward but seals the cap when the pressure is applied inside. The purpose of the flapper is to prevent, for test purposes, an implosion of the glass in order that the combustion, and the combustion chamber leakage tests, can be performed.

For the purpose of this test flame flashback shall be considered excessive if a single layer of cheesecloth draped 12 in (300 mm) in front of the appliance is ignited. The cheesecloth shall be dry and shall conform to the Canadian Government Specifications Board Specification 4-GP-81, Cloth: Cotton, Cheesecloth, for Type 2 cheesecloth. (Commercial Designation 32 x 28). For type 2, the woven fabric count (yarns per inch) is not less than 30 in the warp and not less than 26 in the weft and the weight is not less than 1.0 oz/yd² (34 g/m²) and not more than 1.4 oz/yd² (48 g/m²).

Safety Precautions

Special care must be exercised in conducting this test. It is recommended that the test be conducted by experienced personnel only. The following lists some of the precautions to consider.

1. The appliance should be installed in a closed room and all doors locked by the technician performing the test while the test is being conducted.
2. The pipe connected to the end of the vent air intake pipe should be connected through a flame arrester to a pipe or hose routed outside the room to a well-ventilated area.
3. Switches to operate the solenoids and spark ignition system, valve manifold selector and gas analyzer should be installed outside the room.
4. Should the test have to be aborted for any reason, the gas solenoid valve should be closed, leaving the valve downstream from the mixing chamber open to purge the unit with air. The room should only be entered after the gas analyzer indicates it is safe.
5. At the end of the test, as a precaution, the gas/air ratio should be rechecked before re-entering the room.

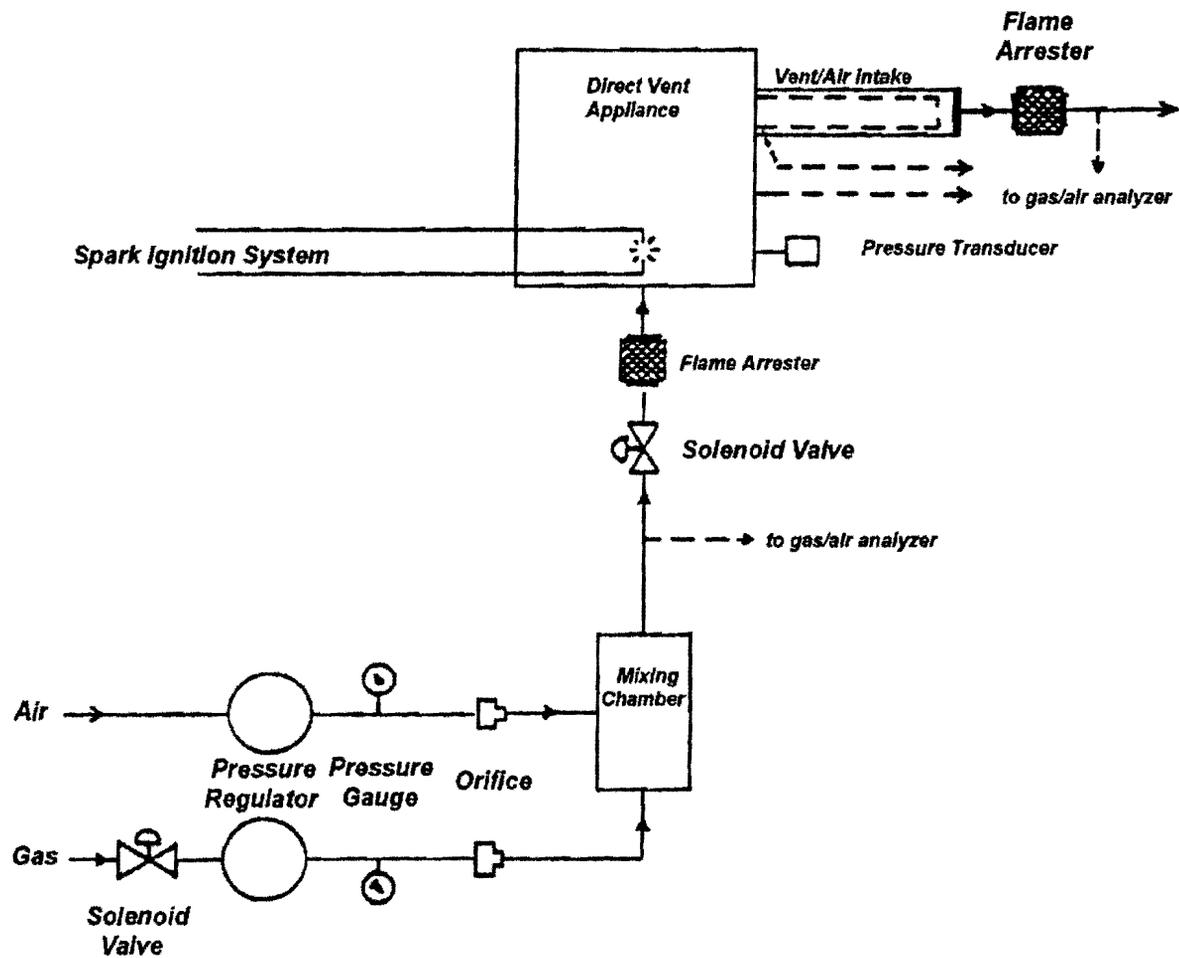


Figure G-1. Test Apparatus for Delayed Ignition Test, Using Stoichiometric Gas/Air Mixtures