4.23.5

A refrigerator of other than the direct vent type for manufactured home (mobile home) or recreational vehicle installation shall also be accompanied by manufacturer's instructions specifying the use of an exterior access opening in the manufactured home (mobile home) or recreational vehicle adequate for lighting of the appliance.

4.23.6

A refrigerator of other than the direct vent type for manufactured home (mobile home) or recreational vehicle installation shall also be accompanied by manufacturer's instructions including easily understood diagrams, dimensioned where necessary, to clearly indicate the proper method(s) of installation. These instructions shall specify:

- a) that the refrigerator shall be installed using the combustion air kit supplied with the appliance;
- b) the proper manner of installing the combustion air kit;
- c) that the combustion air kit shall not be modified;
- d) that all areas at the front (sides, bottom, and top) and within the recess in which the refrigerator is installed shall be sealed so the resultant installation will isolate the appliance combustion system from the vehicle interior;
- e) the methods and type(s) of materials recommended for sealing the refrigerator from the vehicle structure;
- f) that an opening communicating with the outside atmosphere shall be provided at floor level of the refrigerator for ventilation of heavier than air gases. The size and location(s) of the opening shall also be specified.

4.23.7

A refrigerator for manufactured home (mobile home) or recreational vehicle installation shall be accompanied by manufacturer's instructions including easily understood diagrams, dimensioned where necessary, to clearly indicate the proper methods of removing and replacing the refrigerator for servicing.

These instructions shall specify:

- a) the proper manner of removing the appliance;
- b) that any gaskets or seals involved in the removal of the appliance be in the correct position during reassembly;
- c) the proper manner of replacing the refrigerator.

4.23.8

A refrigerator designed for installation in a mobile housing unit or a recreational vehicle convertible for use with natural gas or liquefied petroleum (propane) gases shall, in addition to the instructions specified above, have clearly defined, legible, and complete instructions for converting the appliance from the use of one gas to another.

4.23.9

An accessory ventilation kit shall be accompanied with instructions for its proper installation.

4.23.10

When a flexible service cord is provided to connect the refrigerator to a line-voltage electrical supply, the instructions shall also include the intent of the warning statement specified in Clause 4.24.3.

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4.23.11

A direct vent refrigerator and a direct vent kit shall also be accompanied by manufacturer's instructions including easily understood diagrams, dimensioned where necessary, to clearly indicate the proper methods) of installation. These instructions shall specify:

- a) that the refrigerator shall be installed using the vent/air intake system supplied with the refrigerator. Information shall be provided covering wall thickness and part numbers of vent/air intake systems if several systems are available for use with various ranges of wall thickness;
- b) the proper manner of installing the vent/air intake system; and
- c) that the vent/air intake system shall not be modified.

4.23.12

Also see Clauses <u>4.1.14</u>, <u>4.7.7</u>, <u>4.12.6</u>, <u>4.22</u>, <u>4.24.3</u>, <u>4.24.4</u>, <u>4.24.11</u>, and <u>4.24.13</u>.

4.24 Marking

4.24.1

Marking material shall be identified by class number and shall meet the following specifications. All metal marking materials shall be rustproof. All markings shall be suitable for application to surfaces upon which applied and shall demonstrate suitable legibility as specified under Clause <u>5.24</u>, Marking material and legibility. The designation of any class of marking shall not preclude the use of marking of a lower number class.

Class I. Integral Marking

Marking that is embossed, cast, stamped, or otherwise formed in the part. This includes markings baked into an enameled surface.

Class IIA-1. Permanent Plate

Shall be made of metal having a minimum thickness of 0.012 in (0.31 mm) and shall be securely attached by mechanical means.

Class IIA-2. Permanent Plate

Shall be made of metal having a thickness of 0.006 to 0.012 in (0.15 mm to 0.31 mm) and shall have mechanical attachment means at all corners with a maximum spacing of 6 in (152 mm) between mechanical fasteners.

Class IIA-3. Permanent Plate

Shall be made of metal having a thickness less than 0.006 in (0.15 mm). Such plates shall be attached by means of non-water soluble adhesive which will comply with Clause 5.24, Marking material adhesion and legibility. These materials shall not be located on surfaces having temperatures exceeding 300°F (149 °C) as determined during the conduct of Clause 5.11, Wall, floor, and ceiling temperatures.

Class IIA-4. Permanent Plate

Shall be made of pressure sensitive metal foil requiring no solvent or activator, provided such plates comply with Clause <u>5.24</u>, Marking material adhesion and legibility. These materials shall not be located on surfaces having temperatures exceeding 300°F (149 °C) as determined during the conduct of Clause <u>5.11</u>, Wall, floor, and ceiling temperatures.

Class IIIA-1. Permanent Label

Shall be made of material not adversely affected by water, shall be attached by means of non-water soluble adhesive, and shall comply with Clause 5.24, Marking material adhesion and legibility. These

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materials shall not be located on surfaces having temperatures exceeding 300°F (149 °C) as determined during the conduct of Clause <u>5.11</u>, Wall, floor, and ceiling temperatures.

Class IIIA-2. Permanent Label

Shall be made of material not adversely affected by water, shall be attached by means of non-water soluble adhesive, and shall comply with Clause 5.24. Marking material adhesion and legibility. These materials shall not be located on surfaces having temperatures exceeding 175°F (79.5 °C) as determined during the conduct of Clause 5.11. Wall, floor, and ceiling temperatures.

Class IIIB. Waterproof Marking

Shall be printed directly on the part with waterproof marking not adversely affected by a temperature of 175°F (79.5 °C). This marking shall not be used on surfaces having temperatures exceeding 175°F (79.5 °C) as determined during the conduct of Clause 5.11, Wall, floor, and ceiling temperatures.

Class IIIC. Waterproof Label Shall be made of material not soluble in water, and may use water-soluble adhesive for attachment means.

Class IV. Semi-Permanent Label Shall be made of material that may be soluble in water, and may use water-soluble adhesive for attachment means.

Class V. Printed Marking

Shall be clear and prominent and may be applied directly by any printing means.

Class VI. Attached Tags

4.24.2 Rating plate(s)

Each refrigerator shall bear a plate, or a combination of adjacent plates, of Class IIIA material located on the main structure of the storage cabinet where it can be read from the front of the appliance without the use of tools for removal of panels. When an appliance complies with Clause <u>4.23.4</u>, the plate(s) may be located so that it can be read from the exterior access opening. The plate(s) shall not be located in the refrigerated space where it might accumulate food particles. The following information shall be recorded on the plate(s):

- a) the manufacturer's name and address;
- b) a model number;
- c) a serial number that will identify an individual refrigerator. It may be shown on a separate Class IIIA marking located where it can be easily seen when the appliance is in a normally installed position;
- d) the type of gas for which equipped: Nat., or LP (propane);
- e) type of refrigerant (designated according to the Standard for *Designation and Classification of Refrigerants,* ASHRAE 34;
- f) quantity of refrigerant;
- g) refrigerant test pressure or pressures applied;
- h) maximum permissible gas supply pressure to the refrigerator, for appliances equipped for gases other than liquefied petroleum gases;
- i) minimum permissible gas supply pressure for purpose of input adjustment, for appliances equipped for gases other than liquefied petroleum gases;
- j) manifold pressure;
- k) total hourly Btu input rating;
- I) electrical rating voltage, frequency (Hz) and total input in amperes;
- m) identification of this standard by indicating the edition of the standard, with the following marking:

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"CSA/ANSI Z21.19-(year) • CSA 1.4-(year) Refrigerator";

n) the symbol of the organization making the test for compliance with this standard.

4.24.3

A refrigerator 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 following:

WARNING

Electrical Grounding Instructions

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

The intent of this statement shall also be included in the manufacturer's installation instructions accompanying the appliance.

4.24.4 Instruction plate

Clearly defined, legible, and complete instructions for safely lighting and shutting down the refrigerator shall be provided on Class IIIA marking material on or adjacent to the controlling device, or in an equally conspicuous position where they can be easily read while lighting or shutting down the appliance. On an appliance having an input rate in excess of 3000 Btu per hour (879 W) and requiring manual ignition of the pilot or burner, the lighting instructions shall specify a 5 minute complete shut-off period before relighting the appliance.

4.24.5

For other than built-in type refrigerators, the minimum acceptable installation clearances shall be clearly marked on the rating plate or on a separate label of Class III-A marking material that can be easily read when the appliance is in a normally installed position.

An appliance that requires clearances from any type of construction for serviceability or proper operation shall bear a marking on Class III marking material, located on the surface(s) requiring such clearance, indicating the minimum distance required.

4.24.6

Each refrigerator shall bear a marking on Class VI marking material located on an exterior surface which will be visible at the time of installation stating, "This refrigerator shall be installed in accordance with local codes, if any; if not, follow the ______ " (see Clause <u>4.23.1</u> b) 1).

4.24.7

An unvented refrigerator or an unvented refrigerator for use with a direct vent kit shall have the following boxed warning label on a Class III-A marking material located where it can be easily read from the front of the refrigerator (door may be opened for viewing). The letters used on the warning shall be boldfaced type having a minimum uppercase letter height of 0.120 in (3.05 mm). The minimum vertical spacing between lines of type shall be 0.046 in (1.17 mm).* Lowercase letters shall be compatible with the uppercase letter size specification.

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This product can produce Carbon Monoxide. Carbon Monoxide has no odor and can kill you. The burner and flue system shall be kept clean. See Owner's Manual for instructions.

* This letter height and line spacing correspond to 12 point type.

4.24.8

A label of Class III-C marking material shall, when practical, be affixed to the refrigerator in a conspicuous location by the manufacturer. When not practical, this label shall be supplied by the manufacturer with explicit instructions to affix the label in a conspicuous location adjacent to the appliance. This label shall include the following information:

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.

4.24.9

A direct vent refrigerator shall incorporate on the rating plate, or on a separate plate of Class II-A marking material adjacent to the rating plate, a statement reading:

DIRECT VENT REFRIGERATOR

4.24.10

A refrigerator for manufactured home (mobile home) installation shall incorporate on the rating plate, or on a separate plate adjacent to the rating plate, a permanent and prominent marking, as follows:

FOR MANUFACTURED HOME (MOBILE HOME) INSTALLATION

A refrigerator for recreational vehicle installation shall incorporate on the rating plate, or on a separate plate adjacent to the rating plate, a permanent and prominent marking, as follows:

FOR RECREATIONAL VEHICLE INSTALLATION

When the refrigerator is for either manufactured home (mobile home) or recreational vehicle installation, these markings may be combined as follows:

FOR MANUFACTURED HOME (MOBILE HOME) OR RECREATIONAL VEHICLE INSTALLATION

4.24.11

A refrigerator for use with a combustion air kit shall incorporate on the rating plate, or on a separate plate of Class IIIA material adjacent to the rating plate, a statement reading:

"Install only with combustion air kit no(s) _____."

4.24.12

An unvented refrigerator for use with a direct vent kit shall incorporate on the rating plate, or on a separate plate of Class IIIA material adjacent to the rating plate, a statement reading:

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"May be installed with a direct vent kit no(s) _____."

4.24.13

A refrigerator convertible for use with natural gas and liquefied petroleum (propane) gases shall bear instructions on Class IIIA material for converting the appliance from one gas to the other.

4.24.14

A refrigerator for optional use with an accessory ventilation kit shall incorporate on the rating plate, or a separate marking of Class IIIB material adjacent to the rating plate, a statement reading:

"Also for use with ventilation kit no(s) _____."

4.24.15

Each combustion air kit and each direct vent kit for use with a refrigerator shall bear a Class III-A marking on which appears the appliance manufacturer's name and identifying number, which can be made readily available for inspection with a minimum removal of panels or other parts when the kit is installed as specified in the manufacturer's installation instructions.

Each direct vent kit, each combustion air kit and each accessory ventilation kit shall bear a Class III-B marking stating:

"This kit shall be installed and used without modification."

4.24.16 Electrical diagrams

- a) Except when electrical equipment is limited to a simple series circuit, electrical diagrams (see Clause <u>3</u>) on Class IV marking material applicable to all electrical circuits within the refrigerator shall be supplied in each of the following forms:
 - i) a connection diagram to aid in locating components for field service; and
 - ii) 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.

If wire other than that conforming with a temperature limitation of 63°F (35 °C) rise is used on the refrigerator, the electrical diagram shall incorporate a statement to the effect that, "If any of the original wire as supplied with the refrigerator shall be replaced, it shall be replaced with wire or its equivalent."

- b) Electrical diagrams shall conform to the Standard for *Electrical and Electronics Diagrams,* ANSI Y14.15. See Annex <u>C</u> for reference to pertinent requirements of ANSI Y14.15. The wire color designations specified under 15-3.11 of ANSI Y14.15 are shown in Annex <u>D</u>.
- c) It is recommended that the usage of wire colors be as shown in Annex <u>E</u>.
- d) Unidentified graphical symbols used for electrical diagrams shall conform to the Standard for *Graphic Symbols for Electrical and Electronics Diagrams (Including Reference Designation Class Designation Letters),* ANSI/IEEE 315. See Annex <u>F</u> for preferred symbols of commonly used items, as extracted from the above Standard. Abbreviations for identified items shall be as shown in Annex F.
- e) The electrical diagrams specified in "a)" above shall be attached to the refrigerator in a location where they are available for servicing of the appliance from the front (except as provided for in Clause <u>4.2.1</u>). They may be on a detachable panel section of sufficient size or function that it is not likely to be left off in normal operation, or on a detachable plate, providing a means of securing the panel within the body of the appliance is provided such as by spring clips, slides, or similar devices.

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Some means of color, letter, or number coding corresponding to the appliance wiring shall be used in the diagrams to facilitate circuit identification.

4.24.17

A direct vent refrigerator shall bear a Class VI marking to indicate the minimum and maximum thickness of the wall through which it may be installed. If separate vent-air intake assemblies are necessary for different wall thicknesses, this marking shall also indicate either the part numbers of each of these assemblies or the location of this information. This marking may appear on a marking adjacent to the rating plate or on the vent terminal.

4.24.18

Also see Clauses <u>4.12.6</u>, <u>4.14.10</u>, <u>4.17.2</u>, <u>B.1.13</u>, <u>B.1.14</u>, and <u>4.22</u>.

5 Performance

Tests in this Standard are conducted at altitudes of less than 2,000 ft (600 m).

5.1 General

5.1.1

This Standard covers refrigerators for use with gases as specified in Clause 1.1.

5.1.2

A refrigerator submitted for examination under this Standard shall be tested with the type(s) of gas selected by the manufacturer.

5.1.3

When a thermocouple is specified for the measurement of air, flue, or vent gas temperatures, a thermocouple or an equivalent temperature measuring device complying with the *Standard for Thermowells,* ASME PTC 19.3, shall be used.

5.1.4

All accessories, including the vent limiter on a gas appliance pressure regulator, shall be in place throughout these tests, unless otherwise specified herein.

5.1.5

A direct vent refrigerator anticipated by this Standard is a design option of the manufacturer and is an essentially balanced flue appliance, with the air intake and vent outlet in proximity. Other direct vent designs shall be subjected to such additional tests as believed necessary at the discretion of the testing agency.

5.1.6

Direct vent refrigerators may take many forms, so that for their testing, principles must be established for the guidance of the testing agency in determining compliance with basic standards for safe operation and acceptable performance, without restricting their design to preconceived forms. With this in mind, the principles stated within this Standard are to be used by the testing agency in determining the acceptability of direct vent refrigerators.

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A direct vent refrigerator is for permanent attachment to or incorporation in the structure of a building, mobile home, or recreational vehicle and may be partly or entirely enclosed in combustible construction. The manufacturer having designed for this condition, it is proper that the refrigerator shall be tested when installed in accordance with the manufacturer's published instructions and with commonly observed practice.

A direct vent refrigerator shall be tested with the vent/air intake system in place. Unvented refrigerators for use with direct vent kits shall be tested with and without the vent/air intake system in place.

5.1.7

Before the refrigerator is tested, it shall be given a "run-in" period of at least 24 hours to thoroughly mix the refrigerant charge. The "run-in" may be made at any convenient room temperature with the temperature control device at its coldest setting and the refrigerator door closed. The refrigerator is a continuous operating type of refrigerator and, therefore, should be operated continually, as long as possible, during tests on any one test gas.

5.1.8

For refrigerators requiring an external electrical power supply, the voltage during test shall be the nominal voltage specified by the manufacturer.

5.1.9

The refrigerator shall be in a level position throughout the tests specified herein, unless otherwise noted. Levelness shall be checked as recommended by the manufacturer.

5.1.10

The enclosure for testing refrigerators for mobile housing or recreational vehicle installation shall be as described above, except that the combustion air kit provided with the refrigerator by the manufacturer for supplying outside air and for venting flue gases shall be installed as specified in the manufacturer's installation instructions.

5.1.11

During tests for which an ambient room temperature is specified, the test enclosure shall be located in a controlled temperature test room in such a manner that the test enclosure temperature will only be affected by the room air and the refrigerator.

The room cooling or heating equipment and any test room windows shall be located or shielded so as to prevent radiation to the refrigerator and enclosure. Uniformity of room temperature, determined as specified in Clause 5.1.14, shall be obtained by controlling the air circulation in the test room. The refrigerator under test shall be shielded from forced air currents having a velocity greater than 50 ft/min (0.25 m/s).

5.1.12

During all tests for compliance with this Standard, the refrigerator shall be built-in or located in an alcove-type enclosure at the minimum inch clearances consistent with:

- a) the manufacturer's installation instructions;
- b) the appliance clearance markings; and
- c) the outer surfaces, or legs and spacers if provided, of any built-in or recessed part of the appliance, including the vent-air intake assembly of a direct vent refrigerator.

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A refrigerator that may be supplied with an optional accessory ventilation kit or combustion air kit (see Clause <u>3</u> Definitions) shall be tested both with and without such kit(s) installed in accordance with the manufacturer's installation instructions. The extent of testing with a kit installed shall be at the discretion of the testing agency. The test enclosure shall be constructed of nominal 1 in pine boards or 3/4 in plywood with the inside surfaces finished in dull black. An alcove-type enclosure shall be 24 in (610 mm) deep and have the vertical walls and ceiling set at 90 degree (1.57 rad) angles.

5.1.13

The enclosure for testing a direct vent refrigerator shall be as described in Clause 5.1.12, except that the wall through which the vent-air intake system passes shall be constructed with nominal 2 in studs spaced 16 in (406 mm) on center covered on both sides by 3/4 in plywood finished in dull black. The width of the studs shall provide a total wall thickness as specified by the manufacturer. The vent-air intake system shall be installed through this wall in accordance with the manufacturer's instructions.

Any portion of the vent-air intake system which would be exposed to possible contact by combustible materials such as materials within spaces capable of being used as or converted into cabinets shall be enclosed by 3/4 in plywood finished in dull black in contact with that portion of the vent-air intake system which is exposed.

5.1.14

Test-room temperatures shall be recorded at points located 3 ft (914 mm) above the enclosure floor and 10 in (254 mm) from the middle of each side of the test enclosure and 10 in (254 mm) in front of the refrigerator. The temperature at each point shall be maintained within \pm 1°F (\pm 0.5 °C) of the specified values. This condition shall be maintained during stabilization periods as well as during actual tests. The temperature gradient in any foot of vertical distance from the enclosure floor to a height of 7 ft (2.13 m) shall not exceed 0.5°F per foot (0.3 °C per 305 mm).

Temperatures specified herein shall be measured with bead-type thermocouples not greater than 24 AWG (0.20 mm²) located as specified for the individual tests.

5.1.15

Special performance requirements applicable to refrigerators for manufactured home (mobile home) installation are specified in Clauses 5.2 c), and 5.19, Wind tests.

5.1.16

Special performance requirements applicable to refrigerators for recreational vehicle installation are specified in Clauses 5.2 c) and 5.19. Wind tests.

5.1.17

Special performance requirements applicable to direct vent refrigerators are specified in Clauses <u>5.1.4</u>, <u>5.1.13</u>, <u>5.19</u>, <u>5.20</u>, Direct vent systems, and <u>5.23</u>, Dual sources of energy test.

5.2 Test gases

In conducting the performance tests specified herein, gases with characteristics approximately as shown in Table <u>5</u>, Characteristics of test gases shall be used.

a) A refrigerator for use with natural gas shall have tests specified herein conducted with Test Gas A.
 Additional tests for these appliances shall be conducted with Test Gas D only at a normal test pressure of 7.0 inches w.c. (1.74 kPa), with no change whatever in the natural gas adjustments, and shall comprise those tests specified in Clause <u>5.5</u>, Burner and pilot operating characteristics, and

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Clause <u>5.6</u>, Ignition systems. Under conditions of these tests, yellow-tipped flames are considered acceptable as long as carbon is not being deposited. Resonance encountered during conduct of burner operating characteristics tests with Test Gas D is not to be considered cause for rejection. Compliance with these supplemental tests does not imply that the refrigerator has been examined under this Standard for use with Butane-Air.

- b) A refrigerator for use with liquefied petroleum (propane) gases shall have the tests specified herein conducted with Test Gas C. The tests specified in Clauses <u>5.5</u>, <u>5.6.1</u>, <u>5.6.4</u>, and <u>5.6.5</u> shall also be conducted with Test Gas B with no change whatever in burner equipment.
- c) A refrigerator for manufactured home (mobile home) or recreational vehicle installation convertible for use with natural gas and liquefied petroleum (propane) gases shall be tested with Test Gases A and D, as specified in Clause <u>5.2</u> a), and with Test Gases B and C, as specified in Clause <u>5.2</u> b).
- d) When use with more than one type of gas is desired, the tests specified in Clauses <u>4.18.4</u> and <u>4.18.5</u> and Clause <u>5.11</u>, Wall, floor, and ceiling temperatures through Clause <u>5.20</u>, Direct vent systems, need to be conducted with only one test gas, provided there are no changes in the refrigerator or input ratings for the different gases which, in accordance with the judgement of the testing agency, would affect the results of these tests.

Table 5 Characteristics of test gases (See Clause 5.2.)

	Heating value (Btu/ft ³)	MJ/m ³	Specific gravity (Air = 1.0)
Gas A (Natural)	1075	40.1	0.65
Gas B (n-Butane)	3200	119.2	2.00
Gas C (Propane HD-5)	2500	93.1	1.55
Gas D (Butane-Air)	1400	52.2	1.42

5.3 Test pressures and burner adjustments

5.3.1

Unless otherwise stated, each test specified herein shall consist of a series of three tests: one at normal inlet test pressure, one at reduced inlet test pressure, and one at increased inlet test pressure as shown in Table <u>6</u>, Inlet test pressures. These test pressures shall be applied ahead of all controls.

When the manifold pressure at increased inlet test pressure is not greater than the manifold pressure at normal inlet test pressure, tests at increased inlet test pressure need not be conducted. However, tests at normal inlet test pressure shall be conducted whenever tests at increased inlet test pressure are specified.