50.9 The spacing between uninsulated live terminals of the components in an electric-discharge lamp circuit and a deal metal part or enclosure shall be not less than 1/2 inch (12.7 mm) if the potential is 600 volts or less and not less than 3/4 inch (19.1 mm) if the potential is 601 – 1000 volts.

## 51 Low-Voltage Circuits

51.1 The following electrical spacing requirements apply to low-voltage circuits, as defined in 5.25.

51.2 A circuit derived from a source of supply classified as a high-voltage circuit, by connecting resistance in series with the supply circuit as a means of limiting the voltage and current, is not considered to be a low-voltage circuit as defined in 5.25.

51.3 The spacings for low-voltage electrical components which are installed in a circuit which includes a pressure-limiting device, motor overload protective device, or other protective device, where a short or grounded circuit may result in unsafe operation of the vender shall comply with the following:

a) The spacing between an uninsulated live part and the wall of a metal enclosure, including fittings for the connection of conduit or metal-clad cable, shall be not less than 1/8 inch (3.2 mm).

b) The spacing between field wiring terminals, regardless of polarity, and between the field wiring terminal and a dead metal part, including the enclosure and fittings for the connection of conduit, which may be grounded when the device is installed, shall be at least 1/4 inch (6.4 mm).

c) The spacing between uninsulated live parts, regardless of polarity, and between an uninsulated live part and a dead metal part, other than the enclosure, which may be grounded when the device is installed, shall be not less than 1/32 inch (0.8 mm) provided that the construction of the parts is such that spacings will be maintained.

51.4 The spacings in low-voltage circuits which do not contain devices such as indicated in 51.3 are not specified.

## 52 Alternate Spacings – Clearances and Creepage Distances

52.1 Except as specified in 52.2, the spacings requirements in UL 840, are applicable as an alternative to the specified spacings requirements in the following:

a) High-Voltage Circuits, Section 50; and

b) Low-Voltage Circuits, Section 51.

52.2 The spacings requirements in UL 840 shall not be used for spacings between field wiring terminals or between uninsulated live parts and a metal enclosure.

52.3 Items (a) – (f) shall be considered when evaluating an appliance to the requirements in UL 840:

a) Hermetically sealed or encapsulated enclosures are identified as pollution degree 1.

b) Coated printed wiring boards are identified as pollution degree 1 if they comply with one of the following:

1) Printed wiring board coating performance test of UL 840; or

2) Conformal coating requirements as outlined in UL 746E.

c) Indoor use appliances are identified as pollution degree 2.

d) Outdoor use appliances are identified as pollution degree 3.

e) Category II is the overvoltage category.

f) Printed wiring boards are considered as having a minimum comparative tracking index (CTI) of 100 unless further investigated for a higher CTI index.

52.4 Clearance B (Controlled Overvoltage) clearances as specified in UL 840 shall be achieved by providing an overvoltage device or system as an integral part of the vender.

## CARBONATION SYSTEM

### 53 General

53.1 Parts of a carbonation system shall comply with the strength test requirements in 83.10 – 83.13.

53.2 A high-pressure regulator or reducing valve for a carbonation system shall comply with UL 252 and be provided with a vender having such a system.

53.3 A pressure-relief valve shall comply with 59.2.1 and be installed in the carbonation system. There shall be no shutoff valve between the relief valve and any parts of the carbonation system under pressure.

53.4 Pressure relief valves in a pressurized product system shall be positioned, located, or baffled so that moisture discharged through the relief valve will not wet uninsulated live parts.

## PRODUCT LINES

### 54 General

54.1 Tubing, hoses, and fittings used for product lines operating under pressure shall comply with the Strength Tests, Section 83.

### 55 Thermoelectric Refrigerated Venders

55.1 A thermoelectric vender shall comply with requirements in this standard except for those specifically applying to vapor-compression refrigeration systems as specified in Sections 29.3, 56 – 59, 60.3, 69, 71, 73, 74, 82, 96, 97 and 30.1.5 – 30.1.7, 30.1.14, 63.1.3, 83.1 – 83.9, 101.4(d), 101.4(e), 101.5 – 101.8, 103.5, 103.13, 103.17 and 103.19.

55.2 Except as specified in 55.5, a thermoelectric vender in which the thermoelectric circuit is powered by:

a) An extra-low-voltage supply source shall not result in a risk of fire in accordance with 78.1.1 if no thermoelectric module cooling fan is provided or 78.1.2 if provided with thermoelectric module cooling fan(s).

b) A power source other than an extra-low-voltage supply shall not result in a risk of fire or electric shock when operated in accordance with 78.1.1 if no thermoelectric module cooling fan is provided or and 78.1.2 if provided with thermoelectric cooling fan(s). In addition, a vender shall comply with 78.1.3.

55.3 With reference to 55.2, a thermoelectric vender that uses a thermoelectric module cooling fan, other than one that is thermally protected in accordance with 29.2.1 (e), shall not develop temperatures exceeding 302°F (150°C) on the fan motor winding (open type) or on the fan motor enclosure (enclosed type) when tested in accordance with 78.3.1.

55.4 In reference to the nonmetallic material requirements in Sections 7 – 10, a semiconductor thermoelectric module powered by other than an extra-low-voltage circuit shall be considered an ignition source.

55.5 In reference to 55.2, a thermoelectric vender not complying with 78.1.1 – 78.1.3 shall comply with 78.1.4.

## REFRIGERATION SYSTEM

## 56 Refrigerant

56.1 A refrigerated vending machine shall not employ a refrigerant with a toxicity safety group classification exceeding Class A as described by ANSI/ASHRAE 34.

56.2 The refrigerant employed in the system shall:

a) Have flammability characteristics that have been evaluated in accordance with UL 2182; or

b) Be subjected to a compositional analysis to confirm a composition consistent with a refrigerant specified in ANSI/ASHRAE 34.

56.3 In reference to 56.2 (b), the chemical composition of the refrigerant, including the nominal composition (types and percentages) of a blended refrigerant, shall be determined by analytical testing in accordance with Section 94, Refrigerant Identification Tests, using:

a) Infrared spectroscopy for single component refrigerants; or

b) Gas chromatography for blended refrigerants.

## 57 Refrigerant-Containing Parts

### 57.1 General

57.1.1 Other than as specified in 57.1.2, parts of a vender subjected to refrigerant pressure shall withstand without failure the pressure specified in the Strength Tests, Section 83.

57.1.2 High side parts that do not comply with Strength Tests, Section 83 shall comply with the Fatigue Test in UL 207.

57.1.3 With reference to 57.1.1, if a high-side refrigerant containing part is subjected to the Fatigue Test, then the maximum abnormal or design pressure values required for this test shall be based on the maximum refrigerant pressures obtained on the refrigerant-containing part during the testing of the vender in accordance with this standard.

57.1.4 If the high-side design pressure marked on the equipment as described in 101.4 (e) equals or exceeds the critical pressure of the refrigerant, and if the Fatigue Test is conducted in accordance with 57.1.2, then the upper pressure for the high-side parts during the:

a) First cycle shall be the higher of either the equipment maximum abnormal or marked design pressure; and

b) Remaining cycles shall be not less than 95 percent of the higher of either the equipment maximum abnormal or marked design pressure.

57.1.5 With reference to 57.1.4, the lower pressure for all cycles shall not be greater than the saturated vapor pressure of the refrigerant at 40°F (4.4°C). For R744, this value is 553 psig (3.8 MPa).

57.1.6 With reference to 57.1.4, the critical pressure of R744 is 1,058 psig (7,295 kPa).

57.1.7 The parts of a vender subjected to refrigerant pressure shall be constructed of corrosion resistant material, such as copper or stainless steel, or shall be plated, dipped, coated, or otherwise treated to resist external corrosion.

57.1.8 Pressure vessels, as referred to in this standard, are any refrigerant-containing parts other than compressors, controls, evaporators each separate section of which does not exceed 1/2 cubic foot (0.014 $m^3$) of refrigerant-containing volume], headers, pipe, and pipe fittings.

57.1.9 Pressure vessels over 6 inches (152 mm) inside diameter shall be constructed, tested, and stamped in accordance with the 1992 American Society of Mechanical Engineers, (ASME) Boiler and Pressure Vessel Code, Section VIII for a working pressure in compliance with the Performance section of this standard.

57.1.10 Pressure vessels bearing the ASME Code "U" symbol complying with 57.1.9 are considered acceptable without tests.

57.1.11 Pressure vessels bearing the ASME Code "UM" symbol are to be tested to determine compliance with the Strength Test, Section 83. The manufacturer is to submit evidence of compliance of these vessels with the ASME Boiler and Pressure Vessel Code, Section VIII.

## 57.2 Refrigerant tubing and fittings

57.2.1 Except as specified in 57.2.2, copper or steel tubing used to connect refrigerant-containing components shall have a wall thickness not less that specified in Table 57.1.

**Table 57.1**
**Minimum wall thickness for copper, steel and aluminum tubing**

| Outside diameter | | Copper | | | | Steel | | Aluminum | |
|---|---|---|---|---|---|---|---|---|---|
| | | Protected[a] | | Unprotected | | Protected or unprotected[a] | | Protected or unprotected[a] | |
| inches | (mm) | inches | (mm) | inches | (mm) | inches | (mm) | inches | (mm) |
| 3/16 | (4.76) | 0.0245 | (0.622) | 0.0265 | (0.673) | 0.025 | (0.64) | 0.0350 | (0.89) |
| 1/4 | (6.4) | 0.0245 | (0.622) | 0.0265 | (0.673) | 0.025 | (0.64) | 0.0350 | (0.89) |
| 5/16 | (7.9) | 0.0245 | (0.622) | 0.0285 | (0.724) | 0.025 | (0.64) | 0.0350 | (0.89) |
| 3/8 | (9.5) | 0.0245 | (0.622) | 0.0285 | (0.724) | 0.025 | (0.64) | 0.0350 | (0.89) |
| 1/2 | (12.7) | 0.0245 | (0.622) | 0.0285 | (0.724) | 0.025 | (0.64) | 0.0350 | (0.89) |
| 5/8 | (15.9) | 0.0315 | (0.800) | 0.0315 | (0.800) | 0.032 | (0.81) | 0.0488 | (1.24) |
| 3/4 | (19.1) | 0.0315 | (0.800) | 0.0385 | (0.978) | 0.032 | (0.81) | 0.0488 | (1.24) |
| 7/8 | (22.2) | 0.0410 | (0.0410) | 0.0410 | (1.041) | 0.046 | (1.17) | 0.0650 | (1.65) |

NOTE – Nominal wall thickness of tubing may have to be greater than the specified thickness to maintain the minimum wall thickness.

[a] Within the product.

57.2.2 Copper or steel capillary tubing which is protected against mechanical damage by the cabinet or assembly shall have a wall thickness not less than 0.020 inch (0.51 mm).

57.2.3 Tubing shall be constructed of corrosion-resistant material, such as copper or stainless steel, or shall be plated, dipped, coated, or otherwise treated to resist external corrosion.

57.2.4 Tubing shall be connected by means of flare-type fittings with steel or forged brass nuts, by soldering or brazing, or by equivalent means. Flare-type fittings shall comply with SAE J513.

57.2.5 Tubing forming part of components, such as evaporators or condensers, where protection is afforded by inherent construction, shall be judged by the Strength Test, Section 83.

57.2.6 Where a special alloy or construction is used in components that contain refrigerant, including tubing with a wall thickness less than that specified in 57.2.1, the following factors shall be considered in the investigation to determine compliance of the alloy or construction:

a) Resistance to mechanical abuse;

b) Strength with respect to internal pressure;

c) Resistance to corrosion;

d) Protection from refrigerant contamination; and

e) Compliance with applicable safety codes such as ASHRAE 15 with respect to tubing of the minimum wall thicknesses specified in 57.2.1.

## 58 Pressure Limiting Devices

58.1 A pressure limiting device designed to automatically stop the operation of the compressor shall:

a) Be installed on all vending machines with a system containing more than 22 pounds-mass (10 kg) of refrigerant; and

b) Comply with 30.1.14(b) and 30.1.22.

c) *Deleted*

58.2 The adjustable cutout pressure setting of a pressure-limiting device shall not exceed one-third of the ultimate strength of high-side refrigerant-containing parts provided this setting does not exceed 90 percent of the setting of the pressure relief device.

58.3 There shall be no stop valves between the pressure limiting device and the compressor.

## 59 Pressure Relief

### 59.1 General

59.1.1 Each vender shall be so constructed that pressure due to fire, or other abnormal conditions, will be safely relieved. Pressure relief devices, fusible plugs, soldered joints, or special terminals may be employed for this purpose. See 59.3.1.

59.1.2 A pressure relief device is a pressure-actuated valve or rupture member designed to relieve excessive pressures automatically.

59.1.3 A vender with a pressure vessel over 3 inch (76 mm) inside diameter, but not exceeding 3 cubic feet (0.08 $m^3$) internal gross volume, shall be protected by a pressure relief device or a fusible plug.

59.1.4 A vender with a pressure vessel exceeding 3 cubic feet (0.08 $m^3$) internal gross volume shall be protected by a pressure relief device.

59.1.5 There shall be no stop valve between the pressure relief means and the parts protected.

59.1.6 Each pressure relief device shall be connected as close as practicable or directly to the pressure vessel or parts of the system protected. They shall be connected above the liquid refrigerant level, installed so that they are readily accessible for inspection and repair, and arranged so that they cannot readily be rendered inoperative.

59.1.7 Fusible plugs may be located above or below the liquid refrigerant level.

### 59.2 Relief valves

59.2.1 A pressure relief valve shall comply with the Pressure Vessels Section of the ASME Boiler and Pressure Vessel Code.

59.2.2 A pressure relief valve of 1/2 inch iron pipe size (ips) or larger shall bear the authorized Code "UV" symbol together with the set pressure and capacity. A relief valve of less than 1/2 inch ips shall be similarly marked.

*Exception No. 1: Where a name plate does not fit on the valve, omitting the code symbol is acceptable. If the symbol is omitted, the set pressure and capacity shall be stamped on the valve or on a metal plate attached to it.*

*Exception No. 2: A pressure relief valve is not required to be marked if upon investigation the valve is found to be equivalent to devices marked "UV."*

59.2.3 Pressure relief valves shall be sealed at a start-to-discharge pressure not exceeding the marked working pressure of the pressure vessel protected, or not exceeding one-fifth of the ultimate strength of pressure vessels which do not have a marked working pressure.

59.2.4 The marked discharge capacity shall be not less than the minimum required discharge capacity, as specified in 59.3.1.

### 59.3 Fusible plugs or rupture members

59.3.1 Calculation of the minimum required discharge capacity and the rated discharge capacity of a rupture member or fusible plug shall be in accordance with ASHRAE 15.

59.3.2 Fusible plugs and rupture members shall comply with UL 207, applicable to such devices.

59.3.3 Rupture members shall have a nominal rated rupture pressure not to exceed the design pressure of the parts of the system protected.

## PERFORMANCE

## 60 General

### 60.1 Test voltages

60.1.1 Unless otherwise specified, venders are to be tested with the potentials specified in Table 60.1, maintained at the unit supply connections.

**Table 60.1**
**Test voltages**

| Nameplate Voltage Rating | Normal Test voltage[a] | Overvoltage | Undervoltage |
|---|---|---|---|
| 110 to 120 | 120 | 132 | 102 |
| 208 | 208 | 229 | 177 |
| 220 to 240 | 240 | 264 | 204 |
| 254 to 277 | 277 | – | – |
| 440 to 480 | 480 | 528 | 408 |
| 550 to 600 | 600 | 660 | 510 |
| Other | Rated | 110 percent rated | 85 percent rated |

[a] These test voltages are nominal for the Condenser Fan Motor Failure Test and the Water Failure Test.

### 60.2 Temperature measurements

60.2.1 Temperatures are to be measured using thermocouples consisting of wires not larger than 24 AWG (0.21 $mm^2$) and not smaller than 30 AWG (0.05 $mm^2$). The thermocouples and related instruments are to be accurate and calibrated in accordance with good laboratory practice. The thermocouple wire is to comply with the requirements specified in the Initial Calibration Tolerances for Thermocouples table in ASTM E230/E230M.

*Exception: When the temperature of a coil or motor winding is not obtainable using the thermocouple measurement method (e. g. encapsulated coils), the change-of-resistance method is to be used. See 63.1.4.*

60.2.2 Each thermocouple junction and adjacent thermocouple lead wires are to be securely held in positive thermal contact with the surface of the material whose temperature is being measured. In most cases, thermal contact will result from securely taping or cementing the thermocouple in place, but where a metal surface is involved, brazing or soldering the thermocouple to the metal may be necessary.

60.2.3 If thermocouples are used in the determination of temperatures in connection with the heating of electrical equipment, it is a standard practice to employ thermocouples consisting of 30 AWG (0.05 $mm^2$) iron and constantan wires and a potentiometer-type of indicating instrument. This equipment will be used whenever referee temperature measurements by means of thermocouples are necessary.

60.2.4 Except as specified in 60.2.5, during any test in which temperatures are measured, temperatures shall be monitored until maximum temperatures are attained. Thermal equilibrium is to be considered to exist when three successive readings indicate the same or decreasing temperatures. Readings shall be taken at the end of not less than three consecutive periods, the duration of each period being not less than 5 minutes.

60.2.5 In reference to 60.2.4, if temperatures on the component being monitored cycle between higher and lower temperatures due to the component cycling as part of the test (for example a load cycling on and off due to operation of a protective device), equilibrium is to be considered obtained when three successive peak temperatures indicate the same or decreasing temperatures.

60.2.6 In reference to 60.2.4 and 60.2.5, the recorded temperature shall be the highest of the three readings.

### 60.3 Pressure measurements

60.3.1 A pressure gauge is to be attached in such manner as to prevent leakage. Special fittings for direct connection to the system or minimum lengths of 1/8 inch (3.2 mm) outside diameter commercial capillary tubing may be employed for gauge connections. The volume of the pressure-measuring gauge and lines is to be held to a minimum. All joints in the gauge system are to be tested for leakage.

60.3.2 Opening of the gauge line valves shall not cause a significant change in the electrical input of the system. High-side gauges and lines may be heated above the saturation temperature corresponding to the expected pressure or may be precharged with a liquid refrigerant of the same type as used in the system to minimize the effect of opening the gauge line valves.

## 61 Leakage Current Test

61.1 The leakage current of a cord connected vender rated for a nominal 120 volt supply employing a standard attachment-plug rated 15 or 20 amperes, Designation 5-15P or 5-20P, when tested in accordance with 61.6 and 61.7 shall be no more than 0.75 milliamperes.

*Exception: Refrigerated venders are not required to comply with 61.1 if they comply with UL 101.*

61.2 Leakage current refers to all currents, including capacitively coupled currents, which may be conveyed between exposed conductive surfaces of a vender and ground or other exposed conductive surfaces.

61.3 Each exposed conductive surface is to be tested for leakage currents. The leakage currents from each surface is to be measured to the grounded supply conductor individually as well as collectively where simultaneously accessible and from one surface to another where simultaneously accessible. Parts are considered to be exposed surfaces unless guarded by an enclosure considered suitable for protection against risk of electric shock as defined in 13.3.13 – 13.3.17. Surfaces are considered to be simultaneously accessible when they can be readily contacted by one or both hands of a person at the same time. These measurements do not apply to terminals operating at voltages which are considered to be low-voltage as defined in 5.20.

61.4 If a conductive surface other than metal is used for the enclosure or part of the enclosure, the leakage current is to be measured using metal foil with an area of 3.9- by 7.8-inches (10- by 20-cm) in contact with the surface. If the surface is less than 3.9- by 7.8-inches (10- by 20-cm), the metal foil is to be the same size as the surface. The metal foil is not to remain in place long enough to affect the temperature of the vender.

61.5 The measurement circuit for leakage current shall be as shown in Figure 61.1. The measurement instrument is defined in (a) – (c) and, unless it is being used to measure leakage from one part of the vender to another, the meter is to be connected between the accessible parts and the grounded supply conductor.

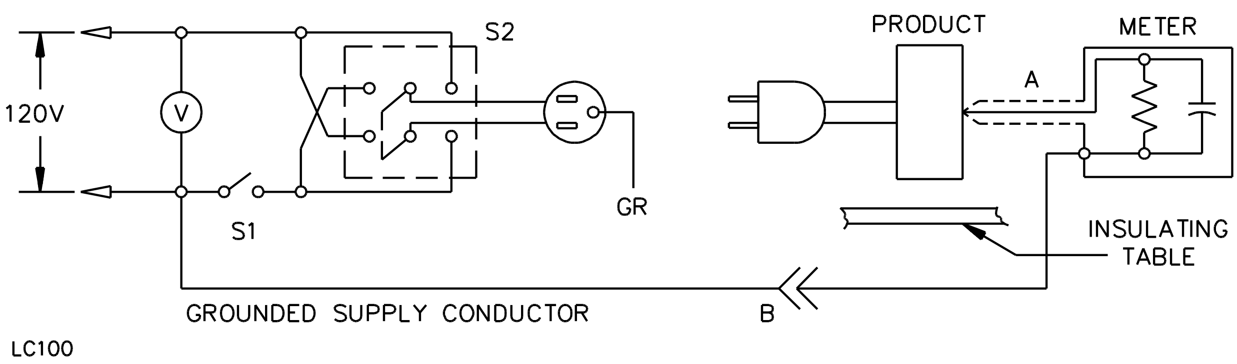
a) The meter is to have an input impedance of 1500 ohms resistive shunted by a capacitance of 0.15 microfarad.

b) The meter is to indicate 1.11 times the average of the full-wave rectified composite waveform of voltage across the resistor or current through the resistor.

c) Over a frequency range of 0 – 100 kilohertz, the measurement circuitry is to have a frequency response (ratio of indicated to actual value of current) that is equal to the ratio of the impedance of a 1500 ohm resistor shunted by a 0.15 microfarad capacitor to 1500 ohms. At an indication of 0.75 milliampere, the measurement is to have an error of not more than 5 percent.

**Figure 61.1**

**Leakage current measurement circuit**




Note:

A Probe with shielded lead.

B Separated and used as clip when measuring currents from one part of product to another.

61.6 A sample vender is to be prepared and conditioned for leakage current measurement as follows:

a) The sample is to be representative of the wiring methods, routing, components, component location, installation, and the like, of the production unit.

b) The grounding conductor is to be open at the attachment plug and the test unit isolated from ground.

c) The sample is to be conditioned in an ambient temperature of 21.1 – 26.7°C (70 – 80°F) and 50± 5 percent relative humidity for not less than 8 hours.

d) The test is to be conducted at the ambient conditions specified by item c)

e) The supply voltage is to be adjusted to 120 volts.

f) A vender which requires connection to a potable water supply, such as a carbonated drink vender, is to be filled with water.

g) A water-cooled vender is to be tested with water flowing through the condenser at a rate adequate for intended operation.

61.7 The leakage current test sequence, with reference to the measuring circuit Figure 61.1 is to be as follows. If during any of the following tests, the compressor stalls during positioning of switch S2, the test is to be conducted in its entirety in one polarity. The polarity is then to be reversed and the test repeated.

a) With switch S1 open, the vender is to be connected to the measurement circuit. Leakage current is to be measured using both positions of switch S2. All manual switching devices are then to be operated in their intended manner, and leakage currents measured using both positions of switch S2.

b) With the vender switching devices in their intended operating position, switch S1 is then to be closed, energizing the vender, and within a period of 5 seconds the leakage current is to be measured using both positions of switch S2. All manual switching devices are then to be operated in their intended manner, and leakage currents measured using both positions of switch S2.

c) The vender manual switching devices are then to be returned to their intended operating positions and the unit allowed to run until thermal equilibrium is obtained. Leakage current is to be monitored continuously. For this test thermal equilibrium is defined as that condition where leakage current is found to be constant or decreasing in value. Both positions of switch S2 are to be used in determining this measurement. Thermal equilibrium may involve cycling caused by an automatic control in the cooling and vending mode. This cycling is to be observed in both positions of switch S2.

d) Immediately following the above test, any single pole switch or thermostat in the vender is to be opened, and the leakage current monitored until constant or decreasing values of leakage current are recorded. Readings are to be taken in both positions of switch S2.

## 62 Input Test

62.1 The measured ampere input to a vender shall not exceed the total rating (s) marked on the nameplate by more than 10 percent when tested as described in the Temperature and Pressure Tests, Section 63.

*Exception: For a battery-operated vender, the input is to be measured with the vender in the charging mode during the Temperature and Pressure Test after operating for five minutes. The battery is to be fully discharged in accordance with the battery manufacturer's instructions at the start of the test.*

62.2 The measured ampere input employed in applying this requirement to a nonautomatic vender is the input measured during an operating cycle. See 63.1.12. For an automatic vender, the measured ampere input is the total of the input measured during an operating cycle plus the input to the vending mechanism. Any loads that may occur concurrently during the test sequence may be determined individually. The maximum ampere input to the vender is considered to be the largest total of all individual loads that may occur concurrently. The power input of all accessories is to be included when establishing the minimum marked rating of the vender if the accessories derive power from the vender.

62.3 If an accessible 15 or 20 ampere receptacle is provided on a vender, the vender measured ampere input shall be increased by an amount equal to 80 percent of the receptacle rating.

## 63 Temperature and Pressure Tests

### 63.1 General

63.1.1 The temperature rises measured on the electrical components of a vender tested as described in 63.1.4 – 63.1.12 shall not exceed those specified in Table 63.1.

63.1.2 The temperature of relay insulating materials and coils shall not exceed the temperature limitations specified in Table 63.1 when tested as described in 63.1.4 – 63.1.12.

63.1.3 The maximum pressure in the refrigeration system is to be used as a basis for the Strength Test, Section 83 requirements.

**Table 63.1**
**Maximum temperature rises**

| Device or material | °C | °F |
|---|---|---|
| A. Motors | | |
| 1. Insulation systems on coil windings of alternating-current motors having a frame diameter of 7 inches (178 mm) or less (not including hermetic motor-compressors)[a,b] | | |
| Class A insulation systems | | |
| a. In open motors – | | |
| Thermocouple or resistance method | 75 | 135 |
| b. In totally enclosed motors– | | |
| Thermocouple or resistance method | 80 | 144 |
| Class B insulation systems | | |
| a. In open motors – | | |
| Thermocouple or resistance method | 95 | 171 |
| b. In totally enclosed motors– | | |
| Thermocouple or resistance method | 100 | 180 |
| 2.Insulation systems on coil windings of alternating-current motors having a frame diameter of more than 7 inches (178 mm) (not including hermetic motor-compressors)[a,b] | | |
| Class A insulation systems | | |
| a. In open motors – | | |
| Thermocouple method | 65 | 117 |
| resistance method | 75 | 135 |
| b. In totally enclosed motors – | | |
| Thermocouple method | 70 | 126 |
| resistance method | 80 | 144 |
| Class B insulation systems | | |
| a. In open motors – | | |
| Thermocouple method | 85 | 153 |
| resistance method | 95 | 171 |
| b. In totally enclosed motors – | | |
| Thermocouple method | 90 | 162 |
| resistance method | 100 | 180 |
| B. Components | | |
| 1. Capacitors | | |
| a. Electrolytic type[d] | 40 | 72 |
| b. Other types[e] | 65 | 117 |
| 2. Field wiring | 35 | 63 |
| 3. Fuse bodies | 65 | 117 |

**Table 63.1 Continued on Next Page**