

ANSI/CAN/UL/ULC 79:2024

JOINT CANADA – UNITED
STATES NATIONAL STANDARD

STANDARD FOR SAFETY

Power-Operated Pumps for Petroleum
Dispensing Products

SCC FOREWORD

National Standard of Canada

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UL Standard for Safety for Power-Operated Pumps for Petroleum Dispensing Products,
ANSI/CAN/UL/ULC 79

Eleventh Edition, Dated May 31, 2024

Summary of Topics

This new Eleventh Edition of ANSI/CAN/UL/ULC 79 dated May 31, 2024 is being issued as a new joint US/Canada Standard reflecting the latest ANSI and SCC approval dates and incorporating the proposal dated November 17, 2023 and March 15, 2024.

The new requirements are substantially in accordance with Proposal(s) on this subject dated November 17, 2023 and March 15, 2024.

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MAY 31, 2024

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ANSI/CAN/UL/ULC 79:2024

Standard for Power-Operated Pumps for Petroleum Dispensing Products

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This ANSI/CAN/UL/ULC Safety Standard consists of the Eleventh Edition.

The most recent designation of ANSI/UL 79 as an American National Standard (ANSI) occurred on May 31, 2024. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, Preface or SCC Foreword.

This Standard has been designated as a National Standard of Canada (NSC) on May 31, 2024.

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Preface

This is the Eleventh Edition of ANSI/CAN/UL/ULC 79, Standard for Power-Operated Pumps for Petroleum Dispensing Products.

ULSE is accredited by the American National Standards Institute (ANSI) and the Standards Council of Canada (SCC) as a Standards Development Organization (SDO). ULC Standards is accredited by the Standards Council of Canada (SCC) as a Standards Development Organization (SDO).

This Standard has been developed in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization.

This ANSI/CAN/UL/ULC 79 Standard is under continuous maintenance, whereby each revision is approved in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization. In the event that no revisions are issued for a period of four years from the date of publication, action to revise, reaffirm, or withdraw the standard shall be initiated.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

This Eleventh Edition joint American National Standard and National Standard of Canada is based on, and now supersedes, the Tenth Edition of UL 79.

Requests for interpretation of this Standard should be sent to ULC Standards. The requests should be worded in such a manner as to permit a “yes” or “no” answer based on the literal text of the requirement concerned.

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

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This Edition of the Standard has been formally approved by the Technical Committee (TC) on Power-Operated Pumps for Petroleum Dispensing Products, TC 79.

This list represents the TC 79 membership when the final text in this Standard was balloted. Since that time, changes in the membership may have occurred.

TC 79 Membership

Name	Representing	Interest Category	Region
M. Ebert	Fill-Right Company	Producer	USA
M. Kawate	UL Standards & Engagement	TC Project Manager – Non-voting	USA
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This Standard is intended to be used for conformity assessment.

The intended primary application of this Standard is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for this particular application.

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE.

INTRODUCTION

1 Scope

1.1 This Standard sets forth minimum requirements for electrically-, hydraulically-, or pneumatically-driven power-operated pumps for use with petroleum products in the following applications:

- a) Self-contained flammable liquid dispensing devices and submerged pumps used in storage tanks that provide the petroleum product to remote control flammable liquid dispensing devices. They are intended for operation at discharge pressures of 345 kPa (50 psig), or the marked maximum discharge pressure rating, when less, with the ambient and liquid temperature within the range of minus 29 °C (minus 20 °F) to 52 °C (125 °F).
- b) Flammable liquid dispensing systems to transfer the petroleum product from a tank or container to a vehicle or another container. They are intended for operation at the marked maximum discharge pressure, or less, with the ambient and liquid temperature within the range of minus 29 °C (minus 20 °F) to 52 °C (125 °F).
- c) Vapor recovery applications for flammable liquid dispensing devices. They are intended to operate under a vacuum at the inlet and a maximum discharge pressure of 50 psig (345 kPa), or marked discharge pressure, whichever is less.

1.2 Products covered by this Standard are intended to be installed and used in accordance with the applicable Codes and Regulations as determined by the Authority Having Jurisdiction (AHJ), such as, but not limited to:

a) In the United States:

- 1) Flammable and Combustible Liquids Code, NFPA 30;
- 2) Code for Motor Fuel Dispensing Facilities and Garages, NFPA 30A;
- 3) Liquefied Petroleum Gas Code, NFPA 58;
- 4) National Electrical Code, NFPA 70; and
- 5) Safety Requirements for the Storage and Handling of Anhydrous Ammonia, CGA G-2.1 (ANSI K61.1).

b) In Canada:

- 1) The National Fire Code of Canada;
- 2) Canadian Electrical Code, Part I Safety Standard for Electrical Installations, CSA C22.1; and
- 3) Provincial or other Regulations.

1.3 These requirements do not cover:

a) Oil burner pumps, which are evaluated in accordance with:

- 1) In the United States: The requirements defined in the Standard for Pumps for Oil-Burning Appliances, UL 343.
- 2) In Canada: The requirements defined in the Guide for the Investigation of Pumps for Oil-Burning Appliances, ULC/ORD-C343.

- b) Pumps for engine-powered automotive equipment.
- c) Pumps for marine use which are evaluated under the Standard for Mechanically and Electrically Operated Fuel Pumps for Marine Use, UL 1130.
- d) Pumps for use in chemical, petrochemical, or petroleum processing plants; utility power plants; petroleum production facilities; pipeline pump stations; pipeline or marine terminals; or bulk plant distribution and related facilities.
- e) Pumps used in mobile applications, such as on tank trucks, portable tanks, or portable containers mounted on vehicles.
- f) Pumps rated more than 600 volts.
- g) Pump assemblies also provided with a flammable liquid meter or electrically-operated shutoff valve, which are evaluated in accordance with:
 - 1) In the United States: The requirements defined in the Standard for Power-Operated Dispensing Devices for Petroleum Products, UL 87.
 - 2) In Canada: The requirements defined in Power-Operated Dispensing Devices for Flammable Liquids, CSA B346.

1.4 The pump assembly is not prohibited from being constructed such that it provides for the installation and use of a flammable liquid hose and hose nozzle valve.

1.5 "Petroleum Products," as used herein, means gasoline, gasoline/alcohol blends up to 15 % Ethanol or 15 % Methanol, diesel fuel, fuel oil, lubricating oil, and the vapors of these fuels. Other petroleum products are not prohibited from being used in the pump when the materials comply with the requirements in Materials, Section 7, when the pump is evaluated using the additional liquids, and the additional petroleum products are marked on the pump as indicated in 76.1(f).

1.6 For Power-Operated Pumps to be used with gasoline/ethanol blends with nominal ethanol concentrations above 10 %, refer to the Standard for Power-Operated Pumps for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 – E85), UL/ULC 79A, for additional requirements.

1.7 For Power-Operated Pumps to be used with biodiesel fuel, diesel/biodiesel blends with nominal biodiesel concentrations up to 20 % (B20), refer to the Standard for Power-Operated Pumps for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil, UL/ULC 79B, for additional requirements.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this Standard shall comply with the requirements for that component.

2.2 A component is not required to comply with a specific requirement that:

- a) Involves a feature or characteristic not required in the application of the component in the product covered by this Standard, or
- b) Is superseded by a requirement in this Standard.

2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

2.5 Electrical components, including motors and wiring, when incorporated by a manufacturer in an assembly with a pump, and including the means provided in the pump assembly for electrical connections, shall comply with the requirements for equipment for use in hazardous locations, Class I, Group D, NFPA 70, Articles 500 and 501 or CSA C22.1.

3 Units of measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Referenced Publications

4.1 Any undated reference to a code or standard appearing in the requirements of this Standard shall be interpreted as referring to the latest edition of that code or standard.

4.2 The following publications are referenced in this Standard:

ASME B1.20.1, *Pipe Threads, General Purpose*

ASME B36.10M, *Welded and Seamless Wrought Steel Pipe*

ASTM B858, *Standard Test Method for Ammonia Vapor Test for Determining Susceptibility to Stress Corrosion Cracking in Copper Alloys*

ASTM D471, *Standard Test Method for Rubber Property – Effects of Liquids*

ASTM E28, *Standard Test Method for Softening Point of Resins Derived from Pine Chemicals and Hydrocarbons, by Ring-and-Ball Apparatus*

ASTM E230/E230M, *Standard Specification and Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples*

CGA G-2.1 (ANSI K61.1), *Safety Requirements for the Storage and Handling of Anhydrous Ammonia*

CSA B346, *Power-Operated Dispensing Devices for Flammable Liquids*

CSA C22.1, *Canadian Electrical Code, Part I Safety Standard for Electrical Installations*

CSA C22.2 No. 14, *Industrial Control Equipment*

CSA 22.2 No. 0.15, *Adhesive Labels*

CSA C22.2 No. 0.17, *Evaluation of Properties of Polymeric Materials*

CSA C22.2 No. 38, *Thermoset-Insulated Wires and Cables*

CSA C22.2 No. 66.1, *Low Voltage Transformers – Part 1: General Requirements*

CSA C22.2 No. 66.3, *Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers*

CSA C22.2 No. 75, *Thermoplastic-Insulated Wires and Cables*

CSA C22.2 No. 77, *Motors with Inherent Overheating Protection*

CSA C22.2 No. 100-04, *Motors and Generators*

CSA C22.2 No. 145, *Motors and Generators for Use in Hazardous Locations*

CSA C22.2 No. 153, *Electrical Quick-Connect Terminals*

CSA C22.2 No. 274, *Standard Adjustable Speed Drives*

CSA LTR No. E-013, *List of Technical Requirements for Motors and Generators for Use in Class I, Division 2, and Class II, Division 2, Hazardous Locations*

NFC, *National Fire Code of Canada*

NFPA 30, *Flammable and Combustible Liquids Code*

NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*

NFPA 58, *Liquefied Petroleum Gas Code*

NFPA 70, *National Electrical Code*

UL 44, *Thermoset-Insulated Wires and Cables*

UL/ULC 79A, *Power-Operated Pumps for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 – E85)*

UL/ULC 79B, *Power-Operated Pumps for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil*

UL 83, *Thermoplastic-Insulated Wires and Cables*

UL 87, *Power-Operated Dispensing Devices for Petroleum Products*

UL 101, *Leakage Current for Appliances*

UL 157, *Gaskets and Seals*

UL 310, *Electrical Quick-Connect Terminals*

UL 330, *Hose and Hose Assemblies for Dispensing Flammable Liquids*

UL/ULC 331, *Strainers for Flammable and Combustible Liquids, Anhydrous Ammonia and Non-Potable Water*

UL 343, *Pumps for Oil-Burning Appliances*

UL 353, *Limit Controls*

UL 508, *Industrial Control Equipment*

UL 674, *Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations*

UL 746A, *Polymeric Materials – Short Term Property Evaluations*

UL 746B, *Polymeric Materials – Long Term Property Evaluations*

UL 746C, *Polymeric Materials – Use in Electrical Equipment Evaluations*

UL 796, *Printed Wiring Boards*

UL 969, *Marking and Labeling Systems*

UL 1004-1, *Rotating Electrical Machines – General Requirements*

UL 1004-2, *Impedance Protected Motors*

UL 1004-3, *Thermally Protected Motors*

UL 1004-7, *Electronically Protected Motors*

UL 1130, *Mechanically and Electrically Operated Fuel Pumps for Marine Use*

UL 1836, *Outline of Investigation for Electric Motors and Generators for Use in Class I, Division 2, Class I, Zone 2, Class II, Division 2 and Zone 22 Hazardous (Classified) Locations*

UL 2111, *Overheating Protection for Motors*

UL/ULC 2586, *Hose Nozzle Valves for Flammable and Combustible Liquids*

UL 5085-1, *Low Voltage Transformers – Part 1: General Requirements*

UL 5085-3, *Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers*

UL 60335-1, *Safety of Household and Similar Appliances, Part 1: General Requirements*

UL 60730-1, *Automatic Electrical Controls – Part 1: General Requirements*

UL 61800-5-1, *Adjustable Speed Electrical Power Drive Systems – Part 5-1: Safety Requirements – Electrical, Thermal, and Energy*

ULC/ORD-C343, *Guide for the Investigation of Pumps for Oil-Burning Appliances*

5 Glossary

5.1 For the purposes of these requirements, the following definitions apply.

5.2 **AUTHORITY HAVING JURISDICTION (AHJ)** – The governmental body responsible for the enforcement of any part of this Standard or the official or agency designated by that body to exercise such a function.

5.3 **COMPOSITE GASKET MATERIAL** – A material of one of the following types:

- a) Type I – Composite cork consisting of granular cork mixed in a binder other than rubber;
- b) Type II – Plant fiber consisting of different saturated grades of paper;
- c) Type III – Plant fiber and cork particles mixed in a binder other than rubber;
- d) Type IV – Granular cork and rubber compound mixed in a rubber binder; or
- e) Type V – Fibers such as Aramide, glass, and carbon mixed in a rubber or other binder.

5.4 **HAZARDOUS LOCATIONS** – Locations in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixture.

5.5 **INTRINSICALLY SAFE CIRCUIT** – A circuit incapable of releasing sufficient electrical energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture. Abnormal conditions include unintentional damage to any part of the equipment or wiring, insulation or other malfunction of electrical components, application of overvoltage, adjustment and maintenance operations, and other similar conditions.

5.6 **LINE-VOLTAGE CIRCUIT** – A circuit involving a potential of not more than 600 volts and having circuit characteristics in excess of those of a low-voltage circuit.

5.7 **LOW-VOLTAGE CIRCUIT** – A circuit involving a peak open-circuit potential of not more than 42.2 volts supplied by:

- a) A battery;
- b) A Class 2 transformer; or
- c) A combination of a transformer and a fixed impedance that, as a unit, complies with the performance requirements for Class 2 transformers in accordance with the following:
 - 1) In the United States:
 - i) UL 5085-1; and
 - ii) UL 5085-3.
 - 2) In Canada:
 - i) CSA C22.2 No. 66.1; and
 - ii) CSA C22.2 No. 66.3.

A circuit derived from a line-voltage circuit by connecting a resistance in series with the supply circuit as a means of limiting the voltage and current is not a low-voltage circuit.

5.8 **RAINPROOF ENCLOSURE** – An enclosure that prevents the entrance of a beating rain to the extent that there is no wetting of electrical parts and no water enters a compartment housing field installed wiring.

CONSTRUCTION

6 Assembly

6.1 The construction of a pump shall be such that parts can be assembled in the intended manner after being dismantled to the extent needed for replacement of parts or for other maintenance or servicing.

6.2 When a pump requires the use of special pipe flanges, gaskets, bolts, or other special fittings or parts for making connections, such parts shall be furnished as part of the pump assembly.

6.3 A product shall be formed and assembled so that it has the strength and rigidity required to resist the abuses to which it is subjected without resulting in the risk of fire, electric shock, or injury to persons due to total or partial collapse with:

- a) Resulting reduction of spacings;
- b) Loosening or displacement of parts; or
- c) Other defects.

6.4 A pump-motor assembly to be shipped from the manufacturer disassembled shall be provided with the marking described in [76.9](#).

7 Materials

7.1 A metal part to be used for bodies or closures shall be inherently resistant to the action of the liquid to be handled. Other parts in contact with the liquid to be handled shall be resistant to the action of such liquid when malfunction of the part results in leakage or a risk of injury to persons.

7.2 With reference to the requirement in [7.1](#), an elastomeric part used in contact with liquid or vapor shall have the following properties when tested as specified in UL 157:

- a) Those properties relating to minimum tensile strength and elongation after oven aging, as specified in UL 157. The service temperature used to determine the conditioning time and temperature for oven aging shall be 60 °C (140 °F), unless the product is designated for use at a higher temperature, or the temperature of the component measured during the temperature test is higher;
- b) Low temperature rating of minus 29 °C (minus 20 °F), except for composite elastomeric parts which are subjected to [7.8](#); and
- c) Volume change and extraction as specified in the requirements for UL 157, for end-use applications of gasoline, gasoline/alcohol blends up to 15 % Ethanol, gasoline/alcohol blends up to 15 % Methanol, diesel fuel, fuel oil, and lubricating oil. Other end-use applications, when marked on the pump, shall use the fluids marked for exposure.

Exception No. 1: Polytetrafluoroethylene (PTFE) is considered to comply with the requirements of this paragraph.

Exception No. 2: When an elastomeric part does not comply with the requirements described in (a) – (c), the pump assembly shall be evaluated in accordance with [7.5](#).

Exception No. 3: Testing with methanol is only required when the product is specifically rated for methanol blend use.

7.3 An elastomeric part forming a part that is depended on for protection of electrical components from rain or submersion in water shall have the following physical properties when tested as specified in UL 157:

- a) Those properties relating to minimum tensile strength and elongation after oven aging, as specified in UL 157. The service temperature used to determine the conditioning time and temperature for oven aging is to be 60 °C (140 °F), unless the product is designated for use at a higher temperature, or the temperature of the component measured during the temperature test is higher.
- b) Low temperature rating of minus 29 °C (minus 20 °F).

7.4 UL 157 provides for the testing of either finished elastomeric parts, or sheet or slab material. Sheet or slab material shall be tested when the elastomeric parts are O-rings having a diameter of less than 25.4 mm (1 in). The material tested shall be the same as that used in the product, regardless of whether finished elastomeric parts, or sheet or slab material is tested.

7.5 When the limits for tensile strength and elongation, volume change or extraction, aging, or low temperature are exceeded, the gasket material may be retested in the complete pump assembly after conditioning as outlined below.

7.6 When the limits for tensile strength, elongation, volume change or extraction are exceeded, the complete assembly constructed with the gasket installed as intended shall be filled with the appropriate test fluid for 70 hours at room temperature, and then shall comply with the requirements for the Leakage Test, Section [45](#) and the Hydrostatic Strength Test, Section [51](#).

7.7 Where the oven aging results are not in accordance with [7.2\(a\)](#), the complete assembly with the gasket installed as intended, shall be placed in an air oven for the same duration and at the same temperature used when testing the gasket material, and then shall comply with the Leakage Test, Section [45](#), and the Hydrostatic Strength Test, Section [51](#), while at the test temperature.

7.8 A composite elastomeric part or when the low temperature results are not in accordance with [7.2\(b\)](#), the complete assembly with the gasket installed as intended, shall be placed in a cold chamber for 24 hours at the same temperature used when testing the gasket material, and then shall comply with the Leakage Test, Section [45](#), and the Hydrostatic Strength Test, Section [51](#), while at the test temperature.

7.9 A plastic part of a pump that comes in contact with fluid or vapor and whose malfunction of the parts results in the hazards specified in [7.1](#) shall comply with the requirements of the Dimensional Stability Test, Section [53](#).

7.10 Except as indicated in [7.11](#), liquid-confining parts, which under conditions of deterioration would result in external leakage of the fluid being confined, other than a valve disc or soft seat, a seal ring, a diaphragm, or a gasket, shall have a melting point (solidus temperature) of not less than 510 °C (950 °F) and a tensile strength of not less than 69 MPa (10,000 psi) at 204 °C (400 °F).

7.11 A brazing material used for joining liquid-confining parts of a pump shall have a melting point (solidus temperature) exceeding 538 °C (1000 °F).

7.12 Sand castings used in the construction of liquid-confining parts, failure of which will allow external leakage, shall be free from porosity leakage and shall have a design thickness of not less than that specified in [Table 7.1](#).

Table 7.1
Minimum Thickness of Liquid-Confining Sand-Castings

Material	Minimum wall thickness	
	mm	(in)
Cast iron	4.8	(3/16)
Malleable iron, ductile iron, or cast steel	3.2	(1/8)
Brass or bronze	2.4	(3/32)
Aluminum	4.0	(5/32)

7.13 When warping of a casting can affect the tightness of liquid-confining joints, or the necessary fit of parts, the casting shall be stress-relieved to reduce the possibility of warping.

7.14 When atmospheric corrosion of a part will interfere with the intended function of a pump or permit external leakage, the part shall be of corrosion-resistant material or be provided with a corrosion-resistant protective coating.

7.15 A coating as specified in [7.14](#) need not be provided on ferrous materials used for fluid-confining parts having the following thicknesses:

- a) Castings having a wall thickness of not less than 6.35 mm (1/4 in);
- b) Standard pipe and fittings conforming to ASME B36.10M, Schedule 40; and
- c) Fabricated sheet steel parts having a minimum wall thickness of 2.36 mm (0.093 in).

7.16 A protective coating as specified in [7.14](#) shall provide resistance against corrosion to a degree not less than that provided by the protective coatings indicated in [7.17](#).

7.17 Cadmium plating shall have a thickness of not less than 0.008 mm (0.0003 in) and zinc plating shall have a thickness of not less than 0.013 mm (0.0005 in). However, on parts where threads constitute the major portion of the area, the thickness of the cadmium or the zinc plating shall be not less than 0.0038 mm (0.00015 in) as determined by the Metallic Coating Thickness Test, Section [58](#).

7.18 A protective coating indicated in [7.16](#) or other coatings in contact with liquid shall be resistant to the action of the liquid, as indicated in the Coating Liquid Resistance Test, Section [59](#).

7.19 A pressure confining part made of drawn brass or machined from brass rod, and consisting of 15 % or more zinc content, shall withstand, without cracking, the Moist Ammonia-Air Stress Cracking Test, Section [56](#).

7.20 The reliability of a nonmetallic, pneumatic pressure confining part shall be determined for each application. Among the factors to be taken into consideration with the reliability of a nonmetallic material are:

- a) Mechanical strength;
- b) Resistance to impact;
- c) Resistance to distortion and creeping at temperature and pressures to which the material is subjected under conditions of intended use; and
- d) Dimensional stability.

Compliance with this requirement is determined by the tests of Sections [53](#), [70](#), [71](#), and [72](#).

7.21 An adhesive that is relied upon to reduce the risk of fire, electric shock, or injury to persons, or that is relied upon to maintain electrical spacings, shall comply with the requirements for adhesives in UL 746C.

7.22 The requirement in [7.21](#) also applies to an adhesive used to secure a conductive part, including a nameplate, which when loosened or dislodged is capable of:

- a) Energizing an accessible dead metal part;
- b) Making a live part accessible;
- c) Reducing spacings below the minimum values specified in [Table 33.2](#); or
- d) Short-circuiting live parts.

8 Bodies, Covers, and Heads

8.1 A pump body assembly shall withstand the deformation, leakage, and hydrostatic strength test requirements specified in [44.1](#), [45.1](#), and [51.1](#). These requirements do not apply to body sections of submersible type pumps intended to be immersed in the liquid.

8.2 Plugs and other parts, other than cap screws and bolts threaded into non corrosion-resistant ferrous parts of the pump, shall be of corrosion-resistant metal or provided with a protective coating when they are required to be removed for adjustment, repair, or other care of the pump.

8.3 A plug, cap, or other part threaded into or on the pump body shall engage with at least four full threads.

8.4 A bolt or a screw hole shall not extend through the outer walls of a pump body into a liquid-handling section.

9 Drive-Shaft Seals

9.1 A stuffing box or a seal shall comply with the requirements specified in the Endurance Test, Section [47](#).

9.2 An adjustable stuffing box, when guarded or not accessible, or when clearly visible to the operator, shall be provided with a spring-loaded follower gland or the equivalent.

9.3 An automatic spring take-up for a gland shall employ a spring made of corrosion resistant material or coated to retard corrosion.

9.4 The physical characteristics of a take-up spring shall be such that it advances the gland through not less than one-half its possible travel from its initial setting with the spring compressed.

9.5 The stuffing-box recess shall be such that packing material does not come into contact with screw threads.

10 Diaphragms

10.1 A metal part coming in contact with a diaphragm shall have no sharp edges, burrs, projections, and surfaces that are capable of chafing or abrading the diaphragm.

10.2 A pump, in which a flexible diaphragm, bellows, or similar construction constitutes the only fluid seal, shall be constructed such that the atmospheric side of the diaphragm or bellows is enclosed in a casing construction to reduce external leakage in the event of a diaphragm or bellows rupture, or shall have provisions for connection of a vent pipe or tubing intended to be routed to the outdoors or other location determined to be equivalent. See [76.8](#).

11 Springs

11.1 A spring shall be guided and arranged to reduce binding, buckling, or other interference with its free movement. When required, ends of a spring shall be closed and squared.

12 Floats

12.1 A float constructed to actuate a mechanism shall have a buoyancy not less than 50 % greater than that required to operate the mechanism. See the Float Buoyancy Test, Section [52](#).

12.2 A hollow float shall withstand an external crushing pressure of not less than 241 kPa (35 psig). See the Float Test, Section [51](#).

12.3 A cork float shall be provided with a coating that is resistant to the action of the liquid with which it is in contact.

12.4 A float shall be secured to its corresponding lever, rod, or other part of the mechanism by a method that prevents the float from becoming detached under its intended conditions of operation.

12.5 A float constructed of nonmetallic materials shall comply with the requirements of the:

- a) Float Buoyancy Test, Section [52](#);
- b) Dimensional Stability Test, Section [53](#); and
- c) Weight Change Test, Section [54](#).

13 Air Separators

13.1 Air separators that are provided as an integral part of a pump assembly shall be provided with floats that comply with the requirements of Floats, Section [12](#).

13.2 The valve mechanism operated by the float shall be subjected to the endurance test described in [48.1](#). When the valve mechanism closes a vent to atmosphere, it shall also be subjected to the leakage test described in [45.6](#).

14 Strainers

14.1 A strainer integral with or provided as part of a pump assembly shall comply with the requirements in [14.2](#) – [14.5](#) and with the applicable requirements in UL/ULC 331.

14.2 A strainer shall enable the removal of foreign matter (sediment or dirt) without depositing the foreign matter in the outlet side of the strainer when the screen or filter element is removed for cleaning.

14.3 A strainer shall be installed and located so that removal and replacement of the strainer element is accomplished without breaking liquid lines or disturbing any part of the pump assembly. The location shall provide for the collection and removal of any spillage.

14.4 A drain opening shall be closed by a pipe plug made of corrosion resistant material or a steel pipe plug coated to resist corrosion, not smaller than 6.35 mm (1/4 in) pipe size (ASME B36.10M). A petcock or valve shall not be provided for drainage purposes.

14.5 The force necessary to open a strainer shall not permanently distort the assembly or piping to which the strainer is attached.

15 Outlet Pressure Regulation

15.1 A pump assembly for use with or in petroleum product dispensing devices shall incorporate means for the prevention of or the relief of pressures developed by the pump in excess of the maximum discharge pressure of 345 kPa (50 psig) or the marked maximum discharge pressure rating, whichever is less. A pump assembly for use with or in petroleum product dispensing systems shall incorporate means for the prevention of or the relief of pressures developed by the pump in excess of the maximum discharge pressure. See Blocked Outlet Test, Section [49](#).

15.2 To comply with the requirements in [15.1](#), a pump assembly is not prohibited from being equipped with:

- a) A bypass valve connected between the discharge and suction ports;
- b) A relief valve arranged to be connected between the discharge side and the supply tank through a separate return line. When the relief valve is not provided as part of the pump, it shall be marked as indicated in [76.6](#);
- c) A means to affect an automatic reduction in volumetric capacity upon an increase in pressure at the outlet; or
- d) An energy input incapable, because of power or speed, of developing a discharge pressure in excess of the maximum discharge pressure.

15.3 After the valve or other means for pressure regulation has been adjusted in accordance with the requirements in [15.1](#), it shall:

- a) Be capable of being sealed to discourage tampering;
- b) Be located within the pump body and require tools for access; or
- c) Be constructed so that the maximum adjustment obtainable does not result in a pressure in excess of the maximum discharge pressure under maximum output conditions.

16 Pressure Relief

16.1 A pump for use with or in petroleum product dispensing devices shall incorporate means for the relief of pressures developed by thermal expansion of the fluid in excess of the maximum discharge pressure of 345 kPa (50 psig). A pump assembly for use with or in petroleum product dispensing systems shall incorporate means for the relief of pressures developed by thermal expansion in excess of the marked maximum discharge pressure. Thermal expansion pressure shall anticipate a temperature rise of 27.8 °C (50 °F) in an ambient temperature of 24 °C (75 °F). See the Pressure Relief Test, Section [50](#).

16.2 To comply with the requirements in [16.1](#), a pump assembly is not prohibited from being equipped with:

- a) A bypass valve connected between the discharge and suction ports; and