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UL 2586A

OUTLINE OF INVESTIGATION

FOR

HOSE NOZZLE VALVES FOR GASOLINE AND GASOLINE/ETHANOL
BLENDS WITH NOMINAL ETHANOL CONCENTRATIONS UP TO 85
PERCENT (E0 – E85)

Issue Number: 3

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Summary of Topics

This third issue of the Outline of Investigation for Hose Nozzle Valves for Gasoline and Gasoline/Ethanol Blends With Nominal Ethanol Concentrations Up To 85 Percent (E0 – E85), UL 2586A is being issued to revise the conditioning requirements in 14.6(e)(1).

This outline is effective April 30, 2015. Prior to the effective date, the requirements for products covered in this outline are included in the ninth edition of the Standard for Valves for Flammable Fluids, UL 842.

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INTRODUCTION

1 Scope

1 effective April 30, 2015

1.1 These requirements cover hose nozzle valves that are intended to be used for the control of motor fuels as indicated in 1.2. They are of the type used in motor fuel dispensing equipment. Hose nozzle valves covered by this standard are for use with motor fuels which are handled at temperatures within the range of minus 29°C (minus 20°F) to 52°C (125°F) and an operating pressure of minimum 50 psi (350 kPa).

1.2 Hose nozzle valves covered by these requirements are intended for use with one or more of the following as applicable:

- a) Gasoline formulated in accordance with the Standard Specification for Automotive Spark-Ignition Fuel, ASTM D4814;
- b) Gasoline/ethanol blends with nominal ethanol concentrations up to 25 percent ethanol (E25), consisting of gasoline formulated in accordance with the Standard Specification for Automotive Spark-Ignition Fuel, ASTM D4814, when blended with denatured fuel ethanol formulated to be consistent with the Standard Specification for Denatured Fuel Ethanol for Blending With Gasolines For Use as Automotive Spark-Ignition Engine Fuel, ASTM D4806; or
- c) Gasoline/ethanol blends with nominal ethanol concentrations above 25 percent formulated in accordance with the Standard Specification in item (b) or formulated in accordance with the Standard Specification for Ethanol Fuel Blends for Flexible-Fuel Automotive Spark-Ignition Engines, ASTM D5798.

1.3 These requirements cover hose nozzle valves of the manually operated and automatic pressure operated type.

When they form a part of an assembly which provides for additional functions or service, the requirements are outside the scope of these requirements.

1.4 These requirements do not cover the following:

- a) Hose nozzle valves for handling liquids under cryogenic conditions.
- b) Hose nozzle valves for general refinery service, offshore and pipe line terminals, natural gas processing plants, gas distribution systems, petrochemical processing facilities, or the like.
- c) Hose nozzle valves operated wholly or partially by electricity or battery.

1.5 This outline does not cover hose nozzle valves for use with diesel, biodiesel, diesel/biodiesel blends, kerosene or fuel oil, which are covered under the Outline of Investigation for Hose Nozzle Valves for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends With Nominal Biodiesel Concentrations Up To 20 Percent (B20), Kerosene, and Fuel Oil, UL 2586B.

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1.6 This outline does not cover hose nozzle valves for use with liquefied petroleum gas (LP-Gas), which are covered under the Standard for Flow Control Valves for Anhydrous Ammonia and LP-Gas, UL 125.

1.7 Requirements for the installation and use of these dispensing devices are included in the Code for Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A.

2 General

2 effective April 30, 2015

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this outline shall comply with the requirements for that component.

2.1.2 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 outline, or
- b) Is superseded by a requirement in this outline.

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

2.1.4 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.

2.1.5 A hose nozzle valve with an integral swivel shall be additionally evaluated to the Electrical-Continuity and Operation Tests in the Outline of Investigation for Emergency Breakaway Fittings, Swivel Connectors and Pipe-Connection Fittings for Gasoline and Gasoline/Ethanol Blends With Nominal Ethanol Concentrations Up To 85 Percent (E0 – E85), UL 567A. The force is to be applied at the point on the swivel farthest from the joint. When necessitated by the swivel construction, this test is to be conducted on additional samples of the swivel with the load applied on the opposite side of the plane of rotation. See UL 567A, Figures 16.1 – 16.3 for examples.

2.2 Units of measurement

2.2.1 When a value for measurement is followed by a value in other units in parentheses, the first stated value is the requirement.

2.3 Undated references

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

3 Glossary

3 effective April 30, 2015

3.1 For the purpose of this outline the following definitions apply.

3.2 **BLENDING OPTION** – Dispensing devices may be provided with an option that blends two specific fuels into one fuel to be dispensed. This blending occurs at the dispenser level and can be in two forms:

- a) **Fixed blending** – Blending at the dispenser level that blends two specific fuels into one fuel to be dispensed, and that fuel to be dispensed is fixed. For example, fixed blending includes blend options where gasoline and denatured fuel ethanol can be blended to achieve E85, which is the actual dispensed fuel.
- b) **Variable blending** – Blending at the dispenser level that blends two specific fuels into the fuel to be dispensed, but the fuel to be dispensed can be any of a number of previously set points. For example, variable blending includes blend options where gasoline and E85 can be blended to achieve E40, E60, and E85 as the actual dispensed fuel.

3.3 **GASOLINE/ETHANOL BLENDS** – Blended fuels composed of a gasoline component and an ethanol component. The numerical value corresponding to the ethanol component determines the blend rating (such as E85 for 85% ethanol, 15% gasoline).

3.4 **HOSE NOZZLE VALVE, AUTOMATIC** – A hose nozzle valve which is held open during the entire filling operation. It may be held open by manual force or by an integral hold-open or latching device. It incorporates a mechanism that shuts off the flow of liquid during refueling operations to prevent overflow from the fill opening when liquid reaches a predetermined point on the spout.

3.5 **HOSE NOZZLE VALVES** – A self-closing device designed to control the flow of flammable and combustible liquids at an operating pressure of minimum 50 psi (345 kPa). It is intended for use at the outlet end of a hose for dispensing flammable liquids.

3.6 **HOSE NOZZLE VALVE, MANUALLY OPERATED** – A hose nozzle valve that is manually held open during the entire filling operation and closes only upon release of the manual force.

3.7 **HOSE NOZZLE VALVE, VAPOR RECOVERY** – A system constructed to capture vapors displaced during filling operations. The vapors are not processed during the course of this activity.

- a) **Assist Nozzle** – A vacuum or pump is used to draw the vapors back to tank.
- b) **Balance Nozzle** – Displacement of vapors from tank being fill forces the vapor back into the storage tank.

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3.8 SEALS, DYNAMIC – A seal that is subject to mechanical movement or other applied forces that result in movement or flexing of the seal under normal use conditions.

3.9 SEALS, STATIC – A seal that is not subject to mechanical movement or other applied forces other than compressing forces that are applied during installation, after which, the seal is held in place during normal use conditions.

CONSTRUCTION

4 Assembly

4 effective April 30, 2015

4.1 General

4.1.1 A hose nozzle valve shall include all of the components required for its intended function and installation.

4.1.2 A seat disc shall be attached to its poppet or holder or otherwise assembled so as to prevent it from becoming dislocated under service conditions as determined by the Hose Nozzle Endurance Test, Section 18. The means to secure the disc shall not rely upon cement or adhesive.

4.1.3 A brazing material used for joining liquid confining parts of a valve shall have a melting point (solidus temperature) of minimum 538°C (1000°F).

4.2 Hose nozzle valves

4.2.1 A hose nozzle valve shall be of the manually-operated or of the automatic type. A manually-operated valve requires the valve to be manually held open during the entire filling operation without the aid of hold-open devices or latches, but is capable of closing automatically. An automatic valve requires the valve to:

- a) Be manually opened, but is capable of being held open during the filling operation by a latch or other device; and
- b) Is provided with automatic closing features.

Exception: A hose nozzle valve for use in salt water or boat yard environments shall be of the automatic closing type without a latch-open device.

4.2.2 Automatic hose nozzle valves equipped with an integral hold open or latching device shall be so designed that, if left in the latched position after the flow has been stopped by means other than the automatic feature of the hose nozzle, it shall automatically unlatch when it is returned to the dispenser, See Automatic hose nozzle valve, 15.1.2.

NOTE: This includes hose nozzle valves that close with a no pressure/no flow mechanism, as well as interlock hose nozzles valves that unlatch when removed from car fill pipe or when hung on the dispenser.

4.2.3 A hose nozzle valve shall be of the normally closed type. It shall be self-closing upon the manual or automatic release of the operating lever.

4.2.4 A guard shall be provided to guide or protect the free end of an operating lever and to prevent opening of the valve or damage to an operating part if the valve is dropped. A guard shall be of such strength as to permit operation of the valve subsequent to its being subjected to mechanical strength tests. See the Hose Nozzle Valve Guard Strength Test, Section 14.

4.2.5 An operating lever shall possess the strength required to resist bending or breaking when tested in accordance with these requirements. See the Hose Nozzle Endurance Test, Section 18.

4.2.6 The closing action of a hose nozzle valve shall be in the direction of fluid flow. A seat seal or valve disc shall consist of resilient material and shall provide proper seating of a disc.

4.2.7 A hose nozzle valve shall be equipped with a spout not exceeding 12 inches (305 mm) in length. Nozzles shall be of corrosion resistant material, such as brass, aluminum, or stainless steel.

4.2.8 A sand casting employed as a pressure confining part of a hose nozzle valve shall have a wall thickness of minimum 0.094 inch (2.38 mm).

4.2.9 The means for attaching a spout to an automatic valve body shall permit ready replacement of a spout with the use of ordinary hand tools.

4.2.10 A hose nozzle valve shall be constructed so as to provide electrical continuity from end to end across all joints so that when in use, continuity is provided for grounding of static charges. Such continuity shall be inherent in the construction and shall not be accomplished by a jumper wire. See the Electrical Continuity Test, Section 22.

4.2.11 A hose nozzle valve intended for use in salt water marine or boat yard environments shall be constructed so as to comply with the applicable construction and performance requirements except that the tests specified in Sections 14, 15, 17, 21, and 22 are to be conducted following exposure to a salt enriched atmosphere as described in 23.2 – 23.6.

Exception: A hose nozzle valve is not required to operate in accordance with the requirements of Section 15 when, due to accumulation of salt in the sensing port, the hose nozzle valve does not operate to deliver fluid.

5 Materials

5 effective April 30, 2015

5.1 Metallic materials

5.1.1 General

5.1.1.1 A metallic part, in contact with the fuels anticipated by these requirements, shall be resistant to the action of the fuel if degradation of the material will result in leakage of the fuel or if it will impair the function of the device. For all fuel ratings, see Corrosion due to fluid, 5.1.2.1. For products rated for gasoline/ethanol blends with nominal ethanol concentrations greater than 25 percent, see Metallic materials – system level, 5.1.3.

5.1.1.2 The exposed surfaces of metallic parts shall be resistant to atmospheric corrosion if this corrosion will lead to leakage of the fluid or if it will impair the function of the device. The material shall comply with the requirements in Atmospheric corrosion, 5.1.2.2. A hose nozzle valve intended for use in salt water marine or boat yard environments shall be resistant to corrosion so as to comply with the requirements of the Salt Spray Test, Section 23.

5.1.1.3 Metallic parts in contact with the fuels anticipated by these requirements shall not be constructed of lead, or materials that are substantially lead. In addition, no coatings or platings containing lead shall be used, such as terne-plated steel.

5.1.2 Metallic materials – material level

5.1.2.1 Corrosion due to fluid

5.1.2.1.1 All metallic materials used for fluid confining parts shall be resistant to corrosion caused by the fuels anticipated by these requirements. In addition, metallic materials, used internally in fluid confining parts, that are required to operate in some manner to address safety shall be resistant to corrosion caused by these fuels. Compliance is verified by the Long Term Exposure Test, Section 12.

5.1.2.1.2 A coating or plating, applied to a base metal, shall be resistant to the action of the fuels anticipated by these requirements as determined by the Long Term Exposure Test, Section 12.

5.1.2.2 Atmospheric corrosion

5.1.2.2.1 Metallic materials used for fluid confining parts shall be resistant to atmospheric corrosion. In addition, metallic materials that are required to operate to address safety shall be resistant to atmospheric corrosion. Ferrous materials of a thickness specified in the following items are acceptable for the preceding when uncoated:

- a) A casting having a wall thickness of not less than 1/4 inch (6.4 mm) if shown by production test to be free of leakage; and
- b) Fabricated sheet steel parts having a minimum wall thickness of 0.093 inch (2.36 mm).

5.1.2.2.2 A protective coating shall provide resistance against atmospheric corrosion to a degree not less than that provided by the protective coatings specified in 5.1.2.2.3.

5.1.2.2.3 Cadmium plating shall not be less than 0.0003 inch (0.008 mm) thick, and zinc plating shall not be less than 0.0005 inch (0.013 mm) thick, except on parts where threads constitute the major portion of the area in which case the cadmium or zinc plating shall not be less than 0.00015 inch (0.0038 mm) thick. Metallic parts are considered to comply with 5.1.2.2.1 when they are protected against atmospheric corrosion by:

- a) Hot dipped, mill galvanized sheet steel complying with the coating designation G90 in Table I of the Specification for Sheet Steel, Zinc Coated (Galvanized) or Zinc-Iron-Alloy Coated (Galvannealed) by the Hot Dip Process, ASTM A653/A653M; or
- b) Coatings which have been determined to be equivalent to G90 under the requirements of the Standard for Organic Coatings for Steel Enclosures for Outdoor Use Electrical Equipment, UL 1332.

5.1.2.2.4 A metallic material other than as described in 5.1.2.2.1 – 5.1.2.2.3 shall be painted or protected in a manner that has been determined to be equivalent.

5.1.3 Metallic materials – system level

5.1.3.1 Combinations of metallic materials in products rated for use with gasoline/ethanol blends with nominal ethanol concentrations greater than 25 percent shall be chosen to reduce degradation due to galvanic corrosion in accordance with 5.1.3.2 – 5.1.3.4.

5.1.3.2 Table 5.1 shows the galvanic series for metallic materials exposed to a conductive solution of sea water. The most active material in a given combination will experience increased levels of corrosion, while the most passive material in the combination will experience reduced levels of corrosion. The greater the separation of the materials in the galvanic series of Table 5.1, the more pronounced the effects would be. Table 5.1 serves as a guide in selecting the appropriate test conditions based on manufacturer specified material combinations.