

November 2, 2012

1

UL 842B

OUTLINE OF INVESTIGATION

FOR

VALVES FOR DIESEL FUEL, BIODIESEL FUEL, DIESEL/BIODIESEL
BLENDS WITH NOMINAL BIODIESEL CONCENTRATIONS UP TO 20
PERCENT (B20), KEROSENE AND FUEL OIL

Issue No. 1

November 2, 2012

Summary of Topics

This is the first issue of the Outline of Investigation for Valves for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations Up to 20 Percent (B20), Kerosene and Fuel Oil, UL 842B.

These requirements are in effect except for Section 19, Moist Ammonia-Air Stress Cracking Test, which is effective July 31, 2013.

COPYRIGHT © 2012 UNDERWRITERS LABORATORIES INC.

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL



Documents
Document Sharing Hub

No Text on This Page

*UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL*



Documents

Document Sharing Hub

CONTENTS

INTRODUCTION

1 Scope	5
2 General	6
2.1 Components	6
2.2 Units of measurement	7
2.3 Undated references	7
3 Glossary	7

CONSTRUCTION

4 Assembly	8
4.1 All valves	8
4.2 Shutoff valves	8
5 Materials	9
5.1 Metallic materials	9
5.2 Nonmetallic materials	10
5.3 Casting impregnation materials	13
5.4 Internal parts	13
6 Bodies and Covers	13
7 Seals and Stuffing Boxes	14
8 Diaphragms	15
9 Springs	15
10 Operating Mechanisms	15

PERFORMANCE

11 General	16
12 Long Term Exposure Test	17
12.1 General	17
12.2 Samples	17
12.3 Method	17
12.4 Results	18
13 Deformation Test	18
14 External Leakage Test	19
15 Fire Test	20
16 Weak Section Strength Test	22
17 Endurance Test	22
18 Hydrostatic Strength Test	23
19 Moist Ammonia-Air Stress Cracking Test	1
20 Marking Adhesion Test	24
21 Shear Section Test	24

MANUFACTURING AND PRODUCTION TESTS

22 General	25
------------------	----

INSTALLATION INSTRUCTIONS

23 General	25
------------------	----

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL

 **Documents**
Document Sharing Hub

MARKING

24 General	25
------------------	----

SUPPLEMENT SA - Test Fluids

SA.1 Representative aggressive combustible test fuel mixtures	SA1
---	-----

Superseded requirements for the Outline of Investigation for Valves for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations Up to 20 Percent (B20), Kerosene and Fuel OilUL 842B, First Issue

19 10-Day Moist Ammonia-Air Stress Cracking Test	A1
--	----



INTRODUCTION

1 Scope

1.1 These requirements cover valves that are intended to be used for the control of fluids and their vapors, for the fluids indicated in 1.2. They are of the type commonly used in piping systems and in the assembly of motor fuel dispensing equipment. Valves covered by this outline are for use with flammable fluids which are handled at temperatures normally within the range of minus 29°C (minus 20°F) to 52°C (125°F).

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

- a) Diesel fuel and diesel/biodiesel blends with nominal biodiesel concentrations up to 5 percent (B0 – B5) formulated in accordance with the Standard Specification for Diesel Fuel Oils, ASTM D975;
- b) Diesel /biodiesel blends with nominal biodiesel concentrations from 5 percent up to 20 percent (B6 – B20) formulated in accordance with the Standard Specification for Diesel Fuel Oil, Biodiesel Blends (B6 – B20), ASTM D7467;
- c) Biodiesel (B99.9/B100) formulated in accordance with the Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels, ASTM D6751;
- d) Kerosene formulated in accordance with the Standard Specification for Kerosine, ANSI/ASTM D3699; or
- e) Fuel oil (heating oil) formulated in accordance with the Standard Specification for Fuel Oils, ASTM D396.

1.3 These requirements cover valves of the manually operated, pressure operated, or temperature operated types, or combinations of such to the exclusion of types operated wholly or partially by electricity. 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) Valves for handling liquids under cryogenic conditions.
- b) Valves for general refinery service, offshore and pipe line terminals, natural gas processing plants, gas distribution systems, petrochemical processing facilities, or the like.
- c) Constant-level oil valves and electrically operated valves.
- d) Relief valves and pressure regulators for liquefied petroleum gas (LP-Gas) service.
- e) Shutoff, emergency shutoff and check valves for liquefied petroleum gas (LP-Gas) in the liquid phase.
- f) Manually operated gas valves of the plug and body or rotating disc type which are evaluated under the Standard for Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves, ANSI Z21.15.

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL



Documents
Document Sharing Hub

g) Valves covered by the Standard for Gas Appliance Pressure Regulators, ANSI Z21.18; the Standard for Automatic Valves for Gas Appliances, ANSI Z21.21; or the Standard for Gas Appliance Thermostats, ANSI Z21.23.

h) Hose nozzles.

i) Valves covered by the Standard for Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 PSI (Sizes NPS 1/2 through NPS 2), ANSI/ASME B16.33 and Manually Operated Metallic Gas Valves for Use in Aboveground Piping Systems up to 5 PSI, ANSI/ASME B16.44.

j) Manually operated valves for LP-Gas, which are covered under the Standard for Valves for Flammable Fluids, UL 842.

k) Valves intended for use with gasoline or gasoline/ethanol blends, which are covered under the Outline of Investigation for Valves for Gasoline and Gasoline/Ethanol Blends With Nominal Ethanol Concentrations Up To 85 Percent (E0 – E85), UL 842A.

2 General

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.

2.2 Units of measurement

3.2.1 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

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

3.2 DIESEL/BIODIESEL BLENDS – Blended fuels composed of a diesel component and a biodiesel component. The numerical value corresponding to the biodiesel component determines the blend rating (such as B20 for 20 percent biodiesel, 80 percent diesel).

3.3 EMERGENCY SHUTOFF VALVES – Valves intended for installation at the inlet of remote control type flammable liquid dispensing devices. They are normally held open by a mechanical holding means. They incorporate a fusible element and close automatically in the event of exposure to fire or break-off resulting from severe impact. They are designed for an operating pressure of not less than 50 psi (345 kPa).

3.4 FUSIBLE LINK VALVES – Valves intended for use in lines conveying fuel gas or fuel oil which function to close when the temperature in the vicinity of the valve exceeds the fusing temperature of the fusible element.

3.5 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.

3.6 SEALS, STATIC – A seal that is not subject to mechanical movement or other applied forces other than compressing forces that are applied during installation and maintained during normal use conditions.

CONSTRUCTION

4 Assembly

4.1 All valves

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

4.1.2 When a valve requires the use of special pipe flanges, gaskets, bolts, or other special fittings or parts for making an installation, such parts shall be furnished by the manufacturer with each valve.

4.1.3 Two or more subassemblies intended to be assembled in the field as a unit shall be capable of being joined together without requiring any of the subassemblies to be cut, drilled, welded or otherwise altered.

4.1.4 When two or more valves or actuating devices, or both, are to be used together as one unit, the entire assembly is, for the purpose of these requirements, to be considered and tested as one valve.

4.1.5 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 Endurance Test, Section 17. The means to secure the disc shall not rely upon cement or adhesive.

4.1.6 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).

4.1.7 A valve with socket or butt weld ends shall be capable of being installed without damaging nonmetallic seats or seals. Required instructions for accomplishing this shall accompany each valve.

4.2 Shutoff valves

4.2.1 A shutoff valve shall not be equipped with a bypass or with a means to prevent it from closing completely.

4.2.2 The requirement in 4.2.1 does not apply to a feature provided to permit a take-off to recirculate fluid or to supply a pilot or other individually controlled outlet.

4.2.3 The appropriate operating positions or the direction of movement shall be clearly indicated for a manual operating lever or reset handle included in a nonself-closing type valve.

4.2.4 An automatic shutoff valve shall function as a shutoff regardless of the position of any damper or external operating lever or any reset device. The manipulation of a manual-reset device shall not cause the valve to function as an automatic-reset valve.

4.2.5 An automatic shutoff valve shall not be equipped with means for manually latching the valve in the open position in a manner which prevents the valve from functioning as a shutoff.

4.2.6 An automatic shutoff mechanism shall be guarded to prevent interference with the intended operation of the mechanism.

4.2.7 When a mechanically actuated indicator is provided to show whether the main valve is open or shut, it shall be visible from a distance of at least 5 feet (1.52 m).

4.2.8 An automatic shutoff valve shall close independently of the energy supplied by the medium flowing. The medium flowing is not prohibited from being used to exert supplementary forces on the valve seat.

5 Materials

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. See the Long Term Exposure Test, Section 12.

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.

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.

5.1.1.4 With reference to the above requirements, metallic parts include metallic materials used to form fluid confining parts as well as metallic coatings or plating that may be applied to a base material.

5.1.2 Atmospheric corrosion

5.1.2.1 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 (e.g. thermal links on a shear valve) shall be resistant to atmospheric corrosion. Ferrous materials of the thickness specified in the following items are acceptable for the preceding when uncoated:

- a) A casting having a wall thickness of not less than $\frac{1}{4}$ inch (6.4 mm) if shown by production test to be free from leakage;
- b) Standard pipe and fittings conforming to the Standard for Welded and Seamless Wrought Steel Pipe, ANSI/ASME B36.10M; and
- c) Fabricated sheet steel parts having a minimum wall thickness of 0.093 inch (2.36 mm).

5.1.2.2 A protective coating shall provide resistance against atmospheric corrosion to a degree not less than that provided by the protective coatings specified in 5.1.2.3.