UL 1478A

STANDARD FOR SAFETY

Pressure Relief Valves for Sprinkler Systems

UL Standard for Safety for Pressure Relief Valves for Sprinkler Systems, UL 1478A

First Edition, Dated May 20, 2013

Summary of Topics

This revision of ANSI/UL 1478A is being issued to update the title page to reflect reaffirmation of ANSI approval.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The requirements are substantially in accordance with Proposal(s) on this subject dated June 16, 2017.

The following table lists the future effective dates with the corresponding reference.

Future Effective Dates	References
May 20, 2015	Entire Standard

No Text on This Page

MAY 20, 2013
(Title Page Reprinted: August 4, 2017)

UL 1478A

Standard for Pressure Relief Valves for Sprinkler Systems

Prior to the first edition, the requirements for the products covered by this standard were included in the Outline of Investigation for Pressure Relief Valves for Sprinkler Systems, Subject 1478A.

First Edition

May 20, 2013

This ANSI/UL Standard for Safety consists of the First Edition including revisions through August 4, 2017.

The most recent designation of ANSI/UL 1478A as a Reaffirmed American National Standard (ANS) occurred on August 4, 2017. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

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

No Text on This Page

CONTENTS

INTRODUCTION

CONSTRUCTION

PERFORMANCE

MANUFACTURING AND PRODUCTION TESTS

MARKING

INSTRUCTIONS

INTRODUCTION

1 Scope

Section 1 effective May 20, 2015

1.1 These requirements cover pressure relief valves intended for use in sprinkler systems for fire protection service to relieve excessive pressures caused by thermal expansion, downstream of a pressure reducing valve or in valve trim.

1.2 Requirements for installation of these valves are included in the Standard for the Installation of Sprinkler Systems, NFPA 13.

2 Components

Section 2 effective May 20, 2015

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 recognized rating established for the intended conditions of use.

2.4 Specific components are recognized as being 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 for which they have been recognized.

3 Units of Measurement

Section 3 effective May 20, 2015

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

4 Glossary

Section 4 effective May 20, 2015

4.1 For the purpose of this standard the following definitions apply.

4.2 OPENING PRESSURE – The internal pressure at which the relief valve is intended to start to allow the flow of water.

4.3 RESEATING PRESSURE – The internal pressure at which the relief valve is intended to prevent the flow of water.

4.4 SET PRESSURE – The pressure value marked on the valve which represents the pressure at which the valve is intended to relieve pressure from a water supply system.

CONSTRUCTION

5 Sizes

Section 5 effective May 20, 2015

5.1 The inlet shall have a nominal 1/2-inch size or larger male or female NPT pipe thread in accordance with the Standard for Pipe Threads, General Purpose (Inch), ANSI/ASME B1.20.1 or other suitable means of connection such as a grooved end.

Exception: Valves with threaded fitting ends intended for use in installations where fittings incorporate pipe threads other than NPT type threads shall be permitted to be provided with pipe threads complying with a national pipe thread standard compatible with those fittings.

6 Use and Set Pressure

Section 6 effective May 20, 2015

6.1 A pressure relief valve shall have a fixed set pressure or adjustable pressure settings.

6.2 An adjustable pressure relief valve shall be provided with a means, such as a fastening nut, to secure the intended set pressure.

7 Materials

Section 7 effective May 20, 2015

7.1 The valve body and its internal operating parts shall be made of compatible materials having corrosion resistance equivalent to or exceeding that of brass, bronze or Series 300 stainless steel. An internal spring used in the pressure relief valve shall be made of material having corrosion resistance equivalent to or exceeding that of Series 300 stainless steel or phosphor bronze.

PERFORMANCE

8 General

Section 8 effective May 20, 2015

8.1 Representative samples of pressure relief valves are to be subjected to the tests described in these requirements.

9 Elastomeric Parts (Except Gaskets) Test

Section 9 effective May 20, 2015

9.1 An elastomeric part used to provide a seal shall have the following properties when tested as specified in the Standard for Gaskets and Seals, UL 157:

a) For silicone rubber (having poly-organo-siloxane as its constituent characteristic), a minimum tensile strength of 500 psi (3.4 MPa) and a minimum ultimate elongation of 100 percent.

b) For natural rubber and synthetic rubber other than silicone rubber, a minimum tensile strength of 1500 psi (10.3 MPa) and minimum ultimate elongation of 150 percent; or a minimum tensile strength of 2200 psi (15.2 MPa) and a minimum ultimate elongation of 100 percent.

c) Those properties relating to maximum tensile set; minimum tensile strength and elongation after oven aging; and hardness after oven aging, all as specified in UL 157. The maximum service temperature used to determine the oven time and temperature for oven aging is 60°C (140°F).

9.2 The Standard for Gaskets and Seals, UL 157, provides for the testing of either finished elastomeric parts or sheets or slab material. Sheet or slab material is to be tested when the elastomeric parts are O-rings having diameters of less than 1 inch (25.4 mm). The material tested is to be the same as that used in the product, regardless of whether finished elastomeric parts or sheet or slab material is tested.

10 Leakage Test

Section 10 effective May 20, 2015

10.1 A pressure relief valve shall withstand an internal hydrostatic pressure equal to 90 percent of the minimum and maximum set pressures for 1 minute without leakage past the seat.

10.2 The inlet of the valve is to be connected to a hydrostatic pressure source and subjected to a gradually increasing pressure until 90 percent of the set pressure is achieved and then held for 1 minute. Observations are to be made for leakage past the seat.

11 Hydrostatic Strength and Body Leakage Test

Section 11 effective May 20, 2015

11.1 An assembled valve shall withstand an internal hydrostatic pressure equal to four times the maximum set pressure of the valve, but not less than 700 psig (48 bar), without rupture, and 1.5 times the maximum set pressure of the valve, but not less than 250 psig (17 bar), without leakage.

11.2 The inlet of the valve is to be connected to a hydrostatic pressure source with the valve seat opened to allow the test pressure to be exerted on the entire valve assembly including the outlet portion of the valve. The valve assembly is to be vented of all entrapped air with the outlet plugged or capped. The inlet pressure is to be gradually increased to 1.5 times the maximum set pressure of the valve and then held for 1 minute. Observations are to be made for leakage through the body. The inlet pressure is then to be gradually increased until four times the maximum set pressure is achieved and then held for 5 minutes. Observations are to be made for cracking or rupture of the valve body.

12 Relief Valve Operation, Flow Capacity and Reseat Tests

Section 12 effective May 20, 2015

12.1 When the valve is adjusted to pressure settings encompassing the intended set pressure range, the pressure at which the relief valve opens shall not be less than 95 percent of the set pressure nor more than 105 percent of the set pressure. Additionally, the relief valve shall be capable of discharging at least 14 oz (414 ml) of water per minute at an inlet pressure not greater than 110 percent of the set pressure and then reseat at a pressure equal to or greater than 90 percent of the opening pressure.

12.2 Testing shall be conducted in both horizontal and vertical orientations if intended for use in both installation orientations.

12.3 Each size relief valve shall be subjected to these tests. Each valve is to be installed in a piping system that is equipped with a pressure gauge at the relief valve inlet and a flow measuring instrument. After the valve has been set in accordance with the manufacturer's instructions, the inlet pressure is to be increased until the valve opens. The inlet pressure is then to be further increased until 110 percent of the set pressure is achieved to determine that the flow through the relief valve is not less than 14 oz (414 ml) of water per minute. The pressure is then to be slowly decreased until the valve reseats. The reseat pressure shall be a minimum of 90 percent of the opening pressure. The inlet pressure at each of these test conditions is to be recorded.

13 Spring Cycling Test

Section 13 effective May 20, 2015

13.1 A spring mechanism of a relief valve shall cycle 500 times through its intended travel distance without malfunction.

13.2 The spring mechanism of the valve shall be tested in a manner so that it is moved to its maximum travel distance. Each cycle of operation is to consist of compressing the spring to its minimum intended operating length (maximum compression during operation) and then extending it back to its original length.

13.3 After cycling, a valve with the cycled spring is to be subjected to and demonstrate compliance with the Relief Valve Operation, Flow Capacity and Reseat Tests, Section 12 and the Relief Valve Leakage Test, Section 10.

14 Contaminated-water Cycle Test

14.1 After 100 cycles of operation using water that has been contaminated as described in 14.2, the opening pressure shall be maintained within 95 percent to 105 percent of the set pressure. Slight weeping not exceeding 20 milliliters per minute complies with the requirement when the opening pressure is maintained in this range.

Revised 14.1 effective May 20, 2015

14.2 The water used during the cycling specified in 14.1 is to consist of 15 gallons (0.06 m^3) of tap water into which has been mixed 1.584 kilograms of contaminants which sieve as described in Table 14.1. A relief valve provided with an integral means for flushing the seat shall be permitted to be flushed during this test if a leak develops at the seat as a result of the exposure to the contaminated water. The solution is to be continuously agitated during the test.

14.2 effective May 20, 2015

Table 14.1
Contaminant for contaminated-water cycling test

Table 14.1 effective May 20, 2015

Sieve designation [a]	Nominal sieve opening		Grams of contaminant (±5 percent)		
	inch	(mm)	Pipe scale	Top soil	Sand
No. 25	0.0278	(0.706)	-	456	200
No. 50	0.0117	(0.297)	82	82	327
No. 100	0.0059	(0.150)	84	6	89
No. 200	0.0029	(0.074)	81	-	21
No. 325	0.0017	(0.043)	153	-	3
	Total		400	544	640

[a] Sieve designations correspond with those specified in the Standard Specification for Wire-Cloth Sieves for Testing Purposes, ASTM E11. Cenco-Meinzer sieve sizes 25 mesh, 50 mesh, 100 mesh, 200 mesh, and 325 mesh, corresponding with the number designation in the table, have been found to comply with ASTM E11.