UL 1486

STANDARD FOR SAFETY

Quick Opening Devices for Dry Pipe Valves for Fire Protection Service

UL Standard for Safety for Quick Opening Devices for Dry Pipe Valves for Fire Protection Service, UL 1486

Third Edition, Dated January 8, 2004

SUMMARY OF TOPICS

This revision of ANSI/UL 1486 is being issued to reflect the reaffirmation of the ANSI approval of the Standard. No technical changes have been made to the document.

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 May 25, 2018.

No Text on This Page

JANUARY 8, 2004
(Title Page Reprinted: July 13, 2018)

UL 1486

Standard for Quick Opening Devices for Dry Pipe Valves for Fire Protection Service

First Edition – May, 1979
Second Edition – August, 1993

Third Edition

January 8, 2004

This ANSI/UL Standard for Safety consists of the Third Edition including revisions through July 13, 2018.

The most recent designation of ANSI/UL 1486 as a Reaffirmed American National Standard (ANS) occurred on July 13, 2018. 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

This page intentionally left blank.

INTRODUCTION

1 Scope

1.1 This standard covers quick opening devices intended for attachment to dry pipe valves to reduce the time delay in operation of the valve following opening of one or more sprinklers. The quick opening devices consist of accelerators and exhausters for use with a specific dry pipe valve design.

1.2 The products covered by this standard are intended for use in fire protection service as outlined by the Standard for Installation of Sprinkler Systems, NFPA 13.

2 Units of Measurement

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

3 Components

3.1 Except as indicated in 3.2, a component of a product covered by this standard shall comply with the requirements for that component.

3.2 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.

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

3.4 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.

4 Undated References

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.

CONSTRUCTION

5 General

5.1 Quick opening devices shall have a minimum working pressure of 175 pounds per square inch gauge (psig) (1.21 MPa).

5.2 When a quick opening device does not required the entrance and passage of water to function, it shall incorporate an antiflooding feature or be provided with an antiflooding device. See 5.6.

5.3 Clearances between moving parts constructed of metallic materials other than brass or metals having equivalent corrosion resistant properties shall be not less than 1/8 inch (3.2 mm).

5.4 Orifices shall be constructed of brass or of material having equivalent corrosion resistant properties.

5.5 A quick opening device generally consists of one of the following two constructions that are intended to reduce the time delay between the operation of the first sprinkler and the entrance of water into the sprinkler piping of a dry pipe system.

a) ACCELERATOR – A device intended to induce dry pipe system air into a chamber of a dry pipe valve to reduce the trip time.

b) EXHAUSTER – A device intended to discharge dry pipe system air directly to atmosphere.

5.6 For the purpose of these requirements, an "antiflooding device" is an automatic valve that is either an external or internal part of the quick opening device, and that allows system air to pass into the quick opening device then automatically closes to prevent the entrance of water or foreign matter into the device. See 9.2.1.

PERFORMANCE

6 General

6.1 Representative samples of the quick opening device are to be subjected to the tests described in these requirements. Additional samples of parts constructed of nonmetallic materials, such as rubber gaskets and diaphragms are required for physical tests.

7 Elastomeric Parts (Except Gaskets) Test

7.1 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 considered to be 60°C.

7.2 The Standard for Gaskets and Seals, UL 157, provides for the testing of either finished elastomeric parts or sheet 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.

8 10-Day Moist Ammonia Air Stress Cracking Test

8.1 After being subjected to the conditions described in 8.2 – 8.4, a brass part containing more than 15 percent zinc when examined using 25X magnification shall:

a) Show no evidence of cracking; or

b) Comply with the Operation Test, Section 9, and the Leakage Test, Section 11, when there is evidence of cracking.

8.2 Each test sample is to be subjected to the physical stresses normally imposed on or within a part as the result of assembly with other components. Such stresses are to be applied to the sample prior to and maintained during the test. Samples with threads, intended to be used for installing the product in the field, are to have the threads engaged and tightened to the torque specified in Table 8.1. Teflon tape or pipe compound are not to be used on the treads.

Table 8.1
Torque requirements for threaded connections

Nominal thread size, inches	Torque pound-inches (N·m)	
1	1200	(135.6)
1-1/4	1450	(163.8)
1-1/2	1550	(175.1)
2	1650	(186.4)
2-1/2	1750	(197.7)
3	1800	(203.4)

8.3 Three samples are to be degreased and then continuously exposed in a set position for ten days to a moist ammonia-air mixture maintained in a glass chamber approximately 12 by 12 by 12 inches (305 by 305 by 305 mm) having a glass cover.

8.4 Approximately 600 ml of aqueous ammonia having a specific gravity of 0.94 is to be maintained at the bottom of the glass chamber below the samples. The samples are to be positioned 1-1/2 in. (38.1 mm) above the aqueous ammonia solution and supported by an inert tray. The moist ammonia-air mixture in the chamber is to be maintained at atmospheric pressure and at a temperature of 93°F (34°C).

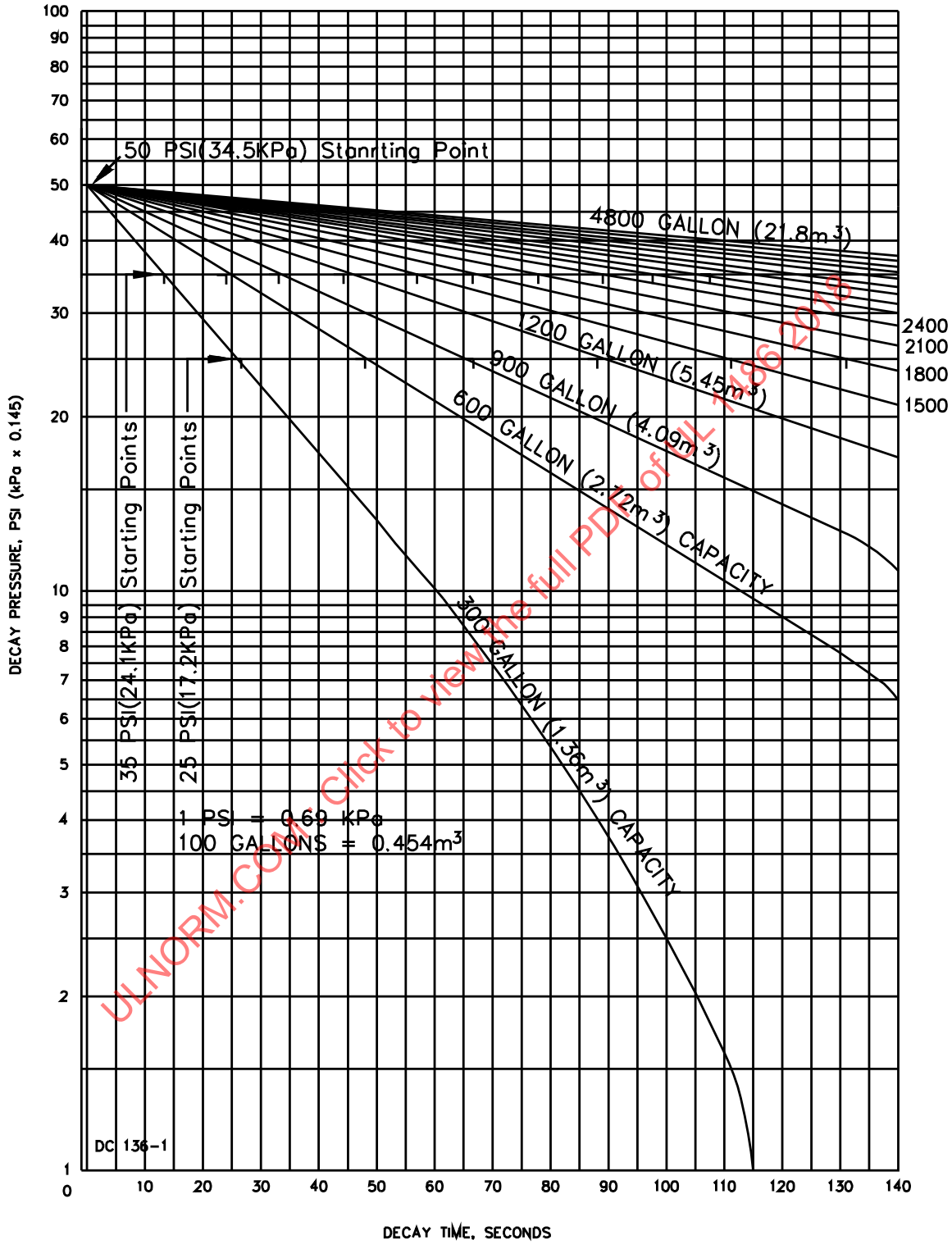
9 Operation Tests

9.1 Quick opening devices

9.1.1 A quick opening device shall operate before the pressure drop exceeds 5.0 psig (0.034 MPa) after the quick opening valve controlling the flow of air to the orifice is opened.

9.1.2 The inlet of a quick opening device, with separate or integral antiflooding mechanism, is to be connected to the air space of a pressure tank. The tank is to be calibrated so that air volumes of simulated sprinkler system capacities ranging from 300 to 1200 gallons (1.14 to 4.54 m^3) or more, in increments of 300 gallons (1.14 m^3), can be established. An orifice, controlled by a quick opening valve connected to the air space, is to be used as the method of dropping the air pressure in accordance with the pressure decay curves illustrated in Figure 9.1. A quick opening device rated for use in systems having a maximum volume of 750 gallons (2.84 m^3) is to be tested using a maximum volume of 1200 gallons. A quick opening device rated for use in systems having volumes in excess of 750 gallons is to be tested using a maximum volume of approximately 1.6 times the rated valve capacity. See Table 9.1.

Figure 9.1
Decay curves



SM662

Table 9.1
Decay curve reference for quick opening device rated 750 gallons or more

Maximum sprinkler system volume, gallons	(m^3)	Maximum volume test decay curve from Figure 9.1, gallons	(m^3)
750	(2.84)	1200	(4.54)
940	(3.56)	1500	(5.68)
1125	(4.26)	1800	(6.81)
1315	(4.98)	2100	(7.95)
1500	(5.68)	2400	(9.08)
1690	(6.40)	2700	(10.22)
1875	(7.10)	3000	(11.36)
2060	(7.80)	3300	(12.49)
2250	(8.52)	3600	(13.63)
2440	(9.24)	3900	(14.76)
2625	(9.94)	4200	(15.90)
2800	(10.60)	4500	(17.03)
3000	(11.36)	4800	(18.16)

9.1.3 Tank air space pressures of 50, 35, and 25 psig (0.34, 0.24, and 0.17 MPa) are to be established for simulated sprinkler system capacities of 300, 600, 900, and 1200 gallons (1.14, 2.27, 3.41, and 4.54 m^3). When the device is designed for capacities greater than 1200 gallons (4.54 m^3) the capacities are to be established in 300 gallon (1.14 m^3) increments. The pressure decay curves for the 50 psi starting pressure are to be as illustrated in Figure 9.1. Also, the starting points for tank air space pressures of 35 psi and 25 psi are to be as illustrated on the decay curves for each simulated sprinkler system capacity.

9.1.4 The quick opening valve controlling the flow of air to the orifice is to be opened and the pressure drop observed for each of the applicable pressures/capacities to verify compliance with 9.1.1.

9.2 Accelerator and dry pipe valve combination

9.2.1 Following the tests described in 9.1.1 – 9.1.4, an accelerator (and antiflooding device, if separate), when subjected to the tests specified in 9.2.2 and 9.2.3, in combination with a dry pipe valve, shall:

a) Comply with the requirements specified in 9.2.4 and 9.2.5, and

b) Cause the dry pipe valve to trip not more than 5 seconds after operation of the accelerator. The dry pipe valve shall operate in the intended manner, with no indication of water columning.

9.2.2 The device is to be pipe-connected to the dry pipe valve which, in turn, is to be connected to two pressure tanks serving as a source of pressurized water.

9.2.3 The water pressure is to be varied over the range of 20 to 175 psig (0.14 to 1.21 MPa) as specified in Table 9.2. At each pressure increment, the dry pipe valve and device combination is to be set, system air pressure is to be established in the system piping, and the main water supply valve is to be fully opened. Air is to be released from the system piping through a standard 1/2 inch (12.7 mm) orifice.

Table 9.2
Combination starting conditions

Water pressure,		Accelerator air pressure,	
psig	(MPa)	psig	(MPa)
20	(0.14)	15	(0.10)
45	(0.31)	30	(0.21)
90	(0.62)	40	(0.28)
130	(0.90)	45	(0.31)
175	(1.2)	55	(0.38)

9.2.4 During these tests, no water shall enter the differential chamber nor pass through a controlling orifice of the accelerator. Draining and venting between tests is capable of being performed when the method is described by a marking on the device. However, no cleaning or adjustment of the device shall be performed between tests.

9.2.5 Following the tests specified in 9.2.1 – 9.2.5, the tests specified in 9.1.1 – 9.1.4 are to be repeated on the device, except that the tests are to be only at minimum capacity/minimum air pressure and at maximum capacity/maximum air pressure.

10 Restricted Orifice Test

10.1 A quick opening device (and antiflooding device, when separate) having a restricted orifice (excluding unidirectional type) and holding chamber is to be connected to the pressure tank used in the operation test and the air pressure within the tank established at 50 psig (0.34 MPa). After air is admitted to the inlet of the test sample, the time to establish a pressure of 30 psig (0.21 MPa) in a pressure holding chamber shall not exceed 3 minutes. This test is to be conducted each time the Operation Test described in 9.1.1 – 9.1.4 is conducted.

11 Leakage Test

11.1 When in the set or ready condition, all internal valves of a quick opening device intended to retain system air pressure shall withstand a hydrostatic pressure of 350 psig (2.41 MPa) for 1 minute without leakage.