



Member of the FM Global Group

Approval Standard for Quick Opening Devices (Accelerators and Exhausters) for Dry Pipe Valves

Class Number 1031

May 1977

Foreword

The FM Approvals certification mark is intended to verify that the products and services described will meet FM Approvals' stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of Approval Standards is to present the criteria for FM Approval of various types of products and services, as guidance for FM Approvals personnel, manufacturers, users and authorities having jurisdiction.

Products submitted for certification by FM Approvals shall demonstrate that they meet the intent of the Approval Standard, and that quality control in manufacturing shall ensure a consistently uniform and reliable product. Approval Standards strive to be performance-oriented. They are intended to facilitate technological development.

For examining equipment, materials and services, Approval Standards:

- a) must be useful to the ends of property conservation by preventing, limiting or not causing damage under the conditions stated by the Approval listing; and
- b) must be readily identifiable.

Continuance of Approval and listing depends on compliance with the Approval Agreement, satisfactory performance in the field, on successful re-examinations of equipment, materials, and services as appropriate, and on periodic follow-up audits of the manufacturing facility.

FM Approvals LLC reserves the right in its sole judgment to change or revise its standards, criteria, methods, or procedures.

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I. INTRODUCTION

- 1.1 This standard covers quick opening devices (accelerators and exhausters) used with dry pipe valves in fire protection systems to hasten the operation of the valves when one or more sprinklers operate.
 - 1.1.1 Accelerators hasten the operation of differential dry pipe valves by reducing the differential across the clapper. Antiflooding devices are used with accelerators to prevent foreign matter from clogging internal orifices. This device may be a separate component or an integral part of the accelerator.
 - 1.1.2 Exhausters hasten the valve operation by aiding in venting dry pipe systems to atmosphere. They are normally used with mechanical dry pipe valves.
- 1.2 FM Approval is based upon satisfactory evaluation of the product and the manufacturer in three major areas:
 - Examination and tests of production samples are performed to evaluate (1) the suitability of the product, (2) the proper operation and performance of the product as specified by the manufacturer and required by FM Approvals and, as far as practical, (3) the durability and reliability of the product.
 - An examination of manufacturing facilities and quality control procedures is conducted to evaluate the manufacturer's ability to produce the product which is examined and tested.
 - Satisfactory field experience is the final test of Approval. Unsatisfactory field experience may result in withdrawal of FM Approval.
- 1.3 The requirements of this standard are guidelines reflecting current FM Approval tests and practices. Devices which do not conform to these requirements may be Approved if they meet the intent of this standard. Conversely, those that do conform may not be Approved if other conditions govern.

II. DESCRIPTION

- 2.1 Quick opening devices usually employ a two-chamber configuration with a diaphragm as the common boundary. Movement of the diaphragm effects movement of a clapper which holds back sprinkler system air pressure. A small orifice connects the two air chambers. It is used for adjustment purposes and to equalize chamber pressures in systems which are not air-tight.
- 2.2 The device is in the set position when both chambers are in equilibrium. When one or more sprinklers operate, air is vented from the system side of the quick opening device. Since the equalizing orifice cannot compensate for the excessive air loss, a pressure differential is created across the diaphragm which moves the clapper off its seat. System air is vented to atmosphere or, as in differential type dry pipe valves, redirected to the intermediate chamber to destroy the pressure differential and trip the dry pipe valve.

III PERFORMANCE REQUIREMENTS

3.1 Operation

- 3.1.1 The quick opening device shall trip the dry pipe valve within 30 s after the operation of one or more sprinklers at initial system air pressures ranging from 25 to 50 psi (172.4 to 344.7 kPa).
- 3.1.2 Quick opening devices shall remain functional when exposed to air and water supply pressures up to the rated working pressure of the dry pipe valve.
- 3.1.3 The anti-flooding component of the quick opening device shall not allow water or foreign matter to enter the accelerator.
- 3.1.4 The anti-flooding component of the quick opening device shall not interfere with the accelerator's normal operation.
- 3.1.5 Orifices shall be protected from clogging.
- 3.1.6 A gauge shall be provided to sense upper chamber pressure to facilitate the detection of a clogged pressure-equalizing orifice.

3.2 Maintenance

- 3.2.1 The anti-flooding component of the quick opening devices shall be designed to permit quick cleaning and maintenance without the use of special tools.
- 3.2.2 Provisions shall be made in the dry pipe valve trim for isolating the quick opening device in order that repairs can be made without affecting sprinkler system protection.

3.3 Materials

- 3.3.1 All materials used shall be suitable for their intended application. Components susceptible to malfunction due to corrosion shall be constructed of materials with at least the corrosion resistance equal to a bronze alloy with a minimum 80% copper content.
- 3.3.2 Special attention will be given to the possibility of corrosion being caused by galvanic action and the effects of such corrosion on reliable performance.

IV MARKINGS

- 4.1 The manufacturer's name or trademark, model or type designation, rated working pressure, year of manufacture and FM Approval Mark, if used, shall be cast on the body of the quick opening device or inscribed on a securely attached corrosion-resistant nameplate.
- 4.2 The inlet and outlet shall also be clearly identified.

V EXAMINATION AND TESTS

5.1 Preliminary Information

Prior to testing, the manufacturer shall provide general assembly drawings, detail drawings and material specifications for each part (ASTM designation, wherever applicable), expected performance data, and maintenance, operating and installation instructions with complete trim drawings. These shall be reviewed and compared with samples of the quick opening devices submitted for testing.

5.2 Operation

The quick opening device shall effect dry pipe valve operation within 30 s when subjected to rates of pressure drop from 10 psi/min (69 kPa/min) through 80 psi/min (552 kPa/min).

Note: To ensure that the velocity check will properly close when the accelerator operates, these components will be tested as a unit.

5.3 Clogging

The following tests will be conducted to ensure that the antiflooding device will adequately protect the accelerator from clogging due to foreign matter within the system:

- One tablespoon of organic matter, approximately the size and shape of sunflower seeds, will be placed in the accelerator's pipe lines to simulate loosened debris making its way through the system during operation of the dry pipe valve.
- The above procedure will be repeated using two tablespoons of wooden toothpick segments. The segments used shall be made by cutting a standard round pointed toothpick, approximately 0.1 in. (2.5 mm) in diameter, into approximately 0.13 in. (3.3 mm) lengths.
- Each test will be repeated four times. The above debris shall not pass through the antiflooding device in all cases.

5.4 Ease of Cleaning

Evaluation will be based on the time required to clean the antiflooding device of the debris left by the procedure outlined in Para. 5.3. A cleaning time of 20 minutes or less is satisfactory.

5.5 Operating Diaphragm

The operating diaphragm shall be subjected to twice the rated working pressure for five minutes. Sensitivity and operation shall not be adversely affected, subsequent to this test.

5.6 Strength

Quick opening devices and associated components, if any, shall withstand a hydrostatic pressure of four times the rated working pressure for five minutes without damage.

5.7 Other

At the discretion of FM Approvals, other tests may be performed to verify the integrity and reliability of an unusual design or material application.