

APPROVED

Certificate of Compliance

This certificate is issued for the following:

Fire Safe Shutoff Valves

Model FS with Model FLPLT actuator
Sizes 1/2 and 3/4 inch NPS

Model ED50 with Model FLPMT actuator
Size 2 inch NPS

Model ED50 with Model FLPHHT actuator
Sizes 2-1/2, 3 and 4 inch NPS

Prepared for:

Bi-Torq Valve Automation
1N050 Linlar Drive, PO Box 309
LaFox, IL 60147
United States

FM Approvals Class: 7400, 7440

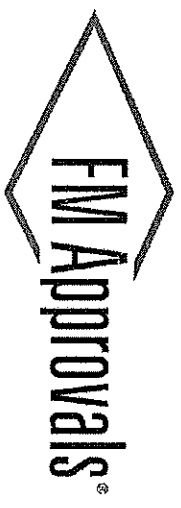
Approval Identification: 0003047896

Approval Granted: February 17, 2014

To verify the availability of the Approved product, please refer to www.approvalguide.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

Richard B. Dunne
Manager – Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062



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APPROVAL REPORT

Project No: 3047896
Class: 7400, 7440
Product Type: Fire Safe Shutoff Valves
Product Name: Model FS with Model FLPLT actuator
Sizes 1/2 and 3/4 inch NPS
Model ED50 with Model FLPMT actuator
Size 2 inch NPS
Model ED50 with Model FLPHT actuator
Sizes 2-1/2, 3 and 4 inch NPS
Name of Report Holder: Bi-Torq Valve Automation
Address of Report Holder: 1N050 Linlar Drive, PO Box 309
LaFox, IL 60147
United States
Customer ID: 125871-1
Customer website <http://www.bitorq.com>

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Date of Approval

February 17, 2014

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1 INTRODUCTION

- 1.1 Bi-Torq Valve Automation requested Approval of the fire safe shutoff valves listed in the Listing Attachment at the end of this Report for compliance with the standards listed in Section 1.3.
- 1.2 This Report may be freely reproduced only in its entirety and without modification.
- 1.3 **FM Approvals Standards**

Title	Number	Issue Date
Liquid and Gas Safety Shutoff Valves	7400	April 1998
Firesafe Valves	7440	May 1981

1.4 Listing

The fire safe shutoff valves will be updated in the Approval Guide, an on-line resource of FM Approvals, as detailed in an attachment at the end of this Report. Deletions from any current product listing are shown with strikethroughs and additions to the current Approval listing are shown in red text.

2 DESCRIPTION

- 2.1 The fire safe shutoff valve assemblies, discussed in this Report, operate when ambient temperature exceeds the temperature rating of the fusible link actuator. The fusible link will break causing the spring within the actuator to turn a lever which provides the force required to close the valve.
- 2.2 All valves discussed in this Report are ball valves with stainless steel (CF8M) valve bodies, stainless steel (304SS) valve stems and graphite body seals.
- 2.3 The Model FS fire safe shutoff valves discussed in this Report are supplied with NPT threaded end connections and have a rated working pressure of 2000 psi (13,790 kPa). The Model FS has a three-piece body with an RTFE valve seat.
- 2.4 The Model ED50 fire safe shutoff valves discussed in this Report are supplied with flanged end connections and have a rated working pressure of 275 psi (1,900 kPa). The Model ED50 has a three-piece body with a PTFE valve seat.
- 2.5 Model FS fire safe shutoff valves in sizes 1/2 and 3/4 inch NPS are considered FM Approved when supplied as an assembly with a Model FLPLT fusible link actuator.
- 2.6 Model ED50 fire safe shutoff valve in size 2 inch NPS is considered FM Approved when supplied as an assembly with a Model FLPMT fusible link actuator.
- 2.7 Model ED50 fire safe shutoff valves in sizes 2-1/2, 3 and 4 inch NPS are considered FM Approved when supplied as an assembly with a Model FLPHT fusible link actuator.
- 2.8 The fusible links for all actuators discussed in this Report are available with temperature ratings 135°F (57°C), 165°F (74°C), 212°F (100°C), 280°F (138°C) and 360°F (182°C). The subject fusible links were examined and Approved under Report ID 3035118 dated December 22, 2009.

3 EXAMINATIONS AND TESTS

- 3.1** Samples were submitted for examination and testing. The samples were considered to be representative of the product line and were examined, tested, and compared to the manufacturer's drawings. All data is on file at FM Approvals along with other documents and correspondence applicable to this program.
- 3.2** All testing and analysis considered appropriate was conducted and verified to be in compliance with the standards defined in Section 1.3.
- 3.3** Detailed analysis can be found as an attachment at the end of this Report.

4 MARKING

The following information appears on all fire safe shutoff valves identified within this Report and meets standard requirements:

- Manufacturer's logo/trademark
- Model (designation, heat number, etc.)
- Serial Number
- Pressure Rating
- The FM Mark of Approval

5 REMARKS

- 5.1** The FM Global Property Loss Prevention Data Sheets should be strictly adhered to when installing this product.
- 5.2** Installations shall comply with the latest edition of the manufacturer's instruction manual.

6 SURVEILLANCE AUDIT

The Bi-Torq Valve Automation facility in LaFox, IL is subject to follow-up audit inspections. The facilities and quality control procedures in place have been found to be satisfactory to manufacture product identical to that examined and tested as described in this Report. A Form 797 shall be submitted to FM Approvals for requesting any additional manufacturing facilities which are not listed below. The products discussed in this Report are FM Approved only when designed and manufactured in the following facilities:

Design

Bi-Torq Valve Automation
1N050 Linlar Drive, PO Box 309
LaFox, IL 60147
United States

Valve Manufacturing

Die Erste Industry Co., Ltd
5F-1, No.936, Sec.4, Wen-Sin Rd.
Taichung 406
Taiwan

**Actuator Manufacturing & Valve/Actuator Assembly
(Final Production Testing)**

Bi-Torq Valve Automation
1N050 Linlar Drive, PO Box 309
LaFox, IL 60147
United States

7 MANUFACTURER'S RESPONSIBILITIES

- 7.1 Documentation considered critical to this Approval is on file at FM Approvals and is listed in the Documentation File, Section 8, of this Report. No changes of any nature shall be made unless notice of the proposed change has been given and written authorization obtained from FM Approvals. The FM Approved Product Revision Report, Form 797, shall be forwarded to FM Approvals as notice of proposed changes.
- 7.2 The manufacturer is responsible for control of the product marking and installation instructions for the product.
- 7.3 The manufacturer shall provide installation, operating, and maintenance manual(s) with each system.

8 DOCUMENTATION FILE

All pertinent Report documents are outlined in the ATTACHMENTS list below.

9 CONCLUSION

The product(s) described in Section 2, as shown in the listing referenced in Section 1.4 meets FM Approvals requirements. Since a duly signed Master Agreement is on file for this manufacturer, Approval is effective the date of this Report.

PROJECT DATA RECORD: 3047896

ATTACHMENTS: Listing Sheet
Detailed Analysis
CDL Control Drawing Blueprint Report

LISTING SHEET

Ignitable / Flammable Liquid Equipment Firesafe Shutoff Valves Heat Actuated Valves

<i>Valve Designation</i>	<i>Actuator Designation</i>	<i>Nominal Pipe Size, in.(mm)</i>	<i>Max Rated Pressure, psi (kPa)</i>	<i>Remarks</i>
FS	FLPLT	1/2 (DN15)	2000 (13 790)	a, b, c, d, f
FS	FLPLT	3/4 (DN20)	2000 (13 790)	a, b, c, d, f
ED50	FLPMT	2 (DN50)	275 (1900)	a, b, c, e, f
ED50	FLPHT	2-1/2 (DN65)	275 (1900)	a, b, c, e, f
ED50	FLPHT	3 (DN80)	275 (1900)	a, b, c, e, f
ED50	FLPHT	4 (DN100)	275 (1900)	a, b, c, e, f

Remarks:

- a. Valve Body Material: Stainless Steel (CF8M)
- b. Valve Body Seal Material: Graphite
- c. Valve Stem Material: 304SS
- d. Valve Seat Material: RTFE
- e. Valve Seat Material: PTFE
- f. Link temperatures available: 135°F (57°C), 165°F (74°C), 212°F (100°C), 280°F (138°C), 360°F (182°C)

Company Name:	Bi-Torq Valve Automation
Company Address:	1N050 Linlar Dr, La Fox, Illinois 60147, USA
Company Website:	http://www.bitorg.com
New/Updated Product Listing:	Yes
Listing Country:	United States of America
Certification Type:	FM Approved

DETAILED ANALYSIS

Sample assemblies, considered representative of all products discussed in this report, were examined, tested, and compared to the manufacturer's drawings. All test data is on file at FM Approvals along with other documents and correspondence applicable to this program. The examination showed that the samples were constructed in accordance with the manufacturer's specifications. The sample assemblies and required testing are presented below:

Product	Size, inch NPS	Required Testing
FS	1/2	Operating Characteristics Valve Leakage Durability Pressure Fire Exposure Test
	3/4	Operating Characteristics Valve Leakage Pressure Fire Exposure Test
ED50	2	Operating Characteristics Valve Leakage Pressure Durability Fire Exposure Test
	2-1/2	Operating Characteristics Valve Leakage Pressure
	3	Operating Characteristics Valve Leakage Pressure
	4	Operating Characteristics Valve Leakage Pressure Fire Exposure Test

Table 1 – Test Matrix

Operating Characteristics

Sample valves as outlined in Table 1, considered representative of all products discussed in this report, were subjected to operational testing. The samples were tested with a hydrostatic pressure equal to 150% of the valves' rated working pressure. Each sample was actuated at the test pressure and there was no failure to close in any sample valve as a result of this test. These results are considered satisfactory.

Valve Leakage

Sample valves as outlined in Table 1, considered representative of all products discussed in this report, were tested for through-the-seat leakage. Through-the-seat leakage was measured at the valve outlet. The test was conducted at 10%, 100% and 150% of rated pressure while the valve was closed. There was no leakage observed during these tests. These results are considered satisfactory.

Durability

Sample valves with the actuator removed, as outlined in Table 1, considered representative of all products discussed in this report, was subjected to an endurance test of 20,000 cycles of operation at the rated working pressure. The sample exhibited normal operation and was leak tight at the conclusion of testing. These results are considered satisfactory.

Pressure

Sample valves as outlined in Table 1, considered representative of all products discussed in this report, were subjected to a pressure equal to two times the rated working pressure. There was no leakage or damage observed during these tests. These results are considered satisfactory.

Fire Exposure

Sample valves as outlined in Table 1, considered representative of all products discussed in this report, were subjected to a fire exposure test. Propane torches were utilized (with a test setup similar to the test setup for testing to API Standard 607) to maintain a temperature at the surface of each valve between 1600 and 1700 deg F for 15 minutes with the valve closed and internal pressure maintained at the valve's rated pressure. Leakage measured through the valve seat did not exceed 95 ml/min in any of the subject valves for the duration of this test. External leakage through the body seals did not exceed individual drops. These results are considered satisfactory.

CDL Control Drawing Blueprint Report

Original Project I.D. 3047896

<u>Drawing No.</u>	<u>Revision Level</u>	<u>Drawing Title</u>	<u>Last Report</u>
ED-211FF-FS 2-1/2	1.0	ED-211FF-FS 2-1/2"	3047896
ED-211FF-FS 2	1.0	ED-211FF-FS 2"	3047896
ED-211FF-FS 3	1.0	ED-211FF-FS 3"	3047896
ED-211FF-FS 4	1.0	ED-211FF-FS 4"	3047896
ED-211FF-FS BODY 2-1/2	1.0	ED-211FF-FS BODY 2-1/2"	3047896
ED-211FF-FS BODY 2	1.0	ED-211FF-FS BODY 2"	3047896
ED-211FF-FS BODY 3	1.0	ED-211FF-FS BODY 3"	3047896
ED-211FF-FS BODY 4	1.0	ED-211FF-FS BODY 4"	3047896
FL-HT-10-DWG-102609	1.B	Parts drawing for HT-Series fusible link	3047896
FL-HT-12-DWG-102609	1.B	Parts drawing for HT-Series fusible link	3047896
FL-HT-25-ED-10182013	1.A	Parts drawing for HT-Series Flanged Valve	3047896
FL-HT-30-ED-10182013	1.A	Parts drawing for HT-Series Flanged Valve	3047896
FL-HT-40-ED-DWG-10182013	1.A	Parts drawing for HT-Series Flanged Valve	3047896
FL-LT-05-DWG-102609	1.B	Parts drawing for LT-Series fusible link	3047896
FL-MT-07-BV-DWG-102609	1.B	Assembly and parts drawing for MT-Series fusible link	3047896
FL-MT-08-20-ED-DWG-10182013	1.A	Assembly and parts drawing for MT-Series NPT Valve	3047896
FL-MT-08-BV-DWG-102609	1.B	Assembly and parts drawing for MT-Series fusible link	3047896
FL-MT-09-BV-DWG-102609	1.B	Assembly and parts drawing for MT-Series fusible link	3047896
FLP-LT-05-DWG-10182013	1.A	Assembly and parts drawing for LT-Series NPT Valve	3047896
FLP-LT-07-DWG-10182013	1.A	Assembly and parts drawing for LT-Series NPT Valve	3047896
FMLABEL1-0507	1.A	Drawing for FM label for LT- and MT Series fusible link using 059 and 079 spring packs	3047896
FMLABEL2-08149	1.A	Drawing for FM label for MT-, HT, & BT Series fusible link using 089 thru 149X spring packs	3047896
FSB-370F BODY DN20	1.0	FSB-370F BODY DN20	3047896
FSB-370F BODY DN8-DN15	1.0	FSB-370F BODY DN8-DN15	3047896