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APPROVAL REPORT

Project No: 3059963
Class: 2510
Product Designation: Side-Deployed Flex-Wall
Product Type: Opening Flood Barrier
Name of Listing Company: ILC Dover LP
Address of Listing Company: One Moonwalker Rd.
Frederica, DE 19946
USA
Customer ID: 117950
Customer Website: www.ilcdover.com

Prepared by:

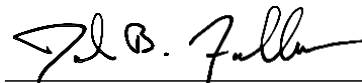


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October 23, 2018

Date of Approval

INTRODUCTION

1.1 ILC Dover LP requested Approval of the product(s) listed in Section 1.4 for compliance with the standard(s) listed in Section 1.3.

1.2 This Report may be freely reproduced only in its entirety and without modification.

1.3 Standards

1.3.1 FM Approvals Standards

| Title | Class Number | Issue Date |
|--|--------------|---------------|
| American National Standard for Flood Abatement Equipment | ANSI/FM 2510 | February 2014 |

1.4 Listing

1.4.1 The product(s) will be listed in the Approval Guide, an online resource of FM Approvals, as shown in the *Appendix I - Approval Guide Listing* attachment to this report.

2 DESCRIPTION

2.1 The Side-Deployed Flex-Wall is essentially a large flexible waterproof curtain that is pulled over and sealed against an opening in a structure for the purpose of protection from flood waters. This flood barrier product has been evaluated for opening barrier applications only. Perimeter barrier applications are outside the scope of this examination.

2.2 The flexible waterproof curtain consists of a waterproof membrane layer and a webbing structural layer. The waterproof membrane layer is a PVC coated polyester material. The webbing layer is a matrix of polyester (horizontal) and Kevlar (vertical) woven straps. This webbing layer is on the outside (dry side) of the flood barrier to provide structural support for the hydrostatic forces acting against the curtain.

2.3 All barrier components are contained on-site, at the opening which is being protected. There are two vertical containers pre-installed on and integrated in each side of the opening – one is the packing container and the other is the receiver. Upon deployment, the flexible curtain is unfolded from the packing container and horizontally deployed across the span of the opening. A winch and cable system is used to provide the flexible curtain with a track spanning across the top of the opening, at the height of the fabric, so that it can be supported while being deployed. The leading end of the flexible curtain is then secured to the receiver, so that the curtain is against the exterior wall structure. A clamp bar is installed and tightened with bolts to provide a compression seal. Multiple smaller clamp bars are used to compress the bottom edge of the fabric against the ground surface.

2.4 A closed-cell silicone sponge rubber gasket material is adhered to the flexible curtain along the perimeter of the bottom and sides of the flexible curtain. When compressed, this is what creates the watertight seal around the curtain. Since the gasket is installed on the dry side of the barrier against the exterior wall structure, greater hydrostatic forces provide additional compression to aide in sealing.

2.5 The scope of this examination includes the testing and Approval of the Side-Deployed Flex-Wall flood barrier for water design depths up to a maximum of 6 ft. (1.8 m).

Additionally, maximum opening width will be limited to that which was performance tested: 21.8 ft. (6.6 m).

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 standard(s) defined in Section 1.3.
- 3.3** Opening barrier water performance testing was performed at the ILC Dover LP facility in Frederica, DE. All tested products demonstrated compliance to FM Approval Standard 2510 leakage criteria, including after multiple debris impacts.

4 MARKING

- 4.1** The following information appears on all opening flood barriers identified within this report and meets standard requirements:
- Manufacturer's name and logo
 - Model designation
 - Configuration number (serial number)
 - Site Location ID
 - The FM Mark of Approval ("FM Diamond")

5 REMARKS

- 5.1** The applications of these flood barriers are subject to the limitations specified by the manufacturer and are subject to FM Global acceptance of plans prior to installation at FM Global insured properties.
- 5.2** FM Global Property Loss Prevention Data Sheets should be strictly adhered to when installing this product.
- 5.3** The subject flood barriers have been evaluated for use in opening barrier applications at water depths no greater than those specified in Section 2 of this report.
- 5.4** Installations shall comply with the latest edition of the manufacturer's installation procedure.

6 SURVEILLANCE AUDIT

The design and manufacturing facilities at the following location(s) shall be visited on a routine basis. The facility processes and quality control procedures in place have been determined to be satisfactory to manufacture product identical to that tested and Approved. A Revision Request form shall be submitted to FM Approvals for requesting to

manufacture product at any additional or alternate 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

ILC Dover LP
One Moonwalker Rd.
Frederica, DE 19946
USA

Manufacturing

ILC Dover LP
One Moonwalker Rd.
Frederica, DE 19946
USA

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 Revision Request form shall be forwarded to FM Approvals as notice of proposed changes.
- 7.2 FM Approvals requires assurance that subsequent equipment produced will present the same quality and reliability as the specified samples examined. The manufacturer must maintain a quality assurance program, which includes as a minimum: incoming, in process, and final inspection and testing, equipment calibration, and drawing change control.
- 7.3 In accordance with the Master Agreement, the manufacturer shall make full and immediate disclosure to FM Approvals of all information concerning any defect in, or potential hazard of, the product or service manufactured or provided by the Customer which is Approved by, or being examined by, FM Approvals. The manufacturer shall make all necessary arrangements for the investigation of complaints / anomalies applicable to this approval and shall keep records of all complaints / anomalies including actions taken.
- 7.4 The manufacturer is responsible for control of the product marking and deployment instructions for the product.
- 7.5 The manufacturer shall provide operation and maintenance manual(s) with each product.
- 7.6 The manufacturer is responsible for maintaining a file of post-installation checklists which are to be completed after each flood barrier installation.

8 DOCUMENTATION FILE

All documents pertinent to this Approval are on file with FM Approvals under PI 3059963, and are outlined in the *Appendix II - Critical Document List* attachment to this report.

9 CONCLUSION

The Side-Deployed Flex-Wall opening flood barrier described 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: 3059963

ATTACHMENTS: Appendix I - Approval Guide Listing
Appendix II - Critical Document List

Appendix I - Approval Guide Listing

Note: **Red font** represents additions while ~~strikethroughs~~ represent deletions.

The listing can be found under the following heading in the online Approval Guide:

Building Materials → Flood Abatement Equipment → Opening Barriers

Side-Deployed Flex-Wall

| Product | Function | Operation | Max Approved Water Depth, ft. (m) | Max Approved Width, ft. (m) | Design, Installation, Operation, Maintenance Manual |
|-------------------------|------------------------|------------------|--|------------------------------------|---|
| Side-Deployed Flex-Wall | Contingent/Demountable | Manual | 6.0 (1.8) | 21.8 (6.6) | INPRO-71600, Side Deployed Flex-Wall (Clamped) Operations & Maintenance Manual, Rev. B. |

Appendix II – Critical Document List

| Document Number | Revision Level | Document Title |
|-----------------|----------------|---|
| FMSFW-10000 | - | Factory Mutual Approved Flex-Wall, Side Deploy |
| FMSFW-10100 | - | Plate, Identification, Side Deploy Flex-Wall Factory Mutual Approved |
| FMSFW-71000 | - | Post Installation Checklist, Side-Deploy Flex-Wall, Factory Mutual Approved Systems |
| INPRO-71600 | B | Side-Deployed Flex-Wall (Clamped) - Operations & Maintenance Manual |