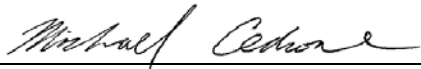


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# APPROVAL REPORT

**Project No:** 3054525  
**Supplements Project No:** 3046068  
**Class:** 2511  
**Product Designation:** Tiger Dam Perimeter Flood Barrier  
2-1 Stackable Configuration – 19" Diameter  
Single Tube Configuration – 19", 24", & 36"  
**Name of Listing Company:** US Flood Control Corp.  
**Address of Listing Company:** 505 8<sup>th</sup> Ave. SW, Suite 201  
Calgary, Alberta, T2P 1G1  
Canada  
**Customer ID:** 139658  
**Customer Website:** www.usfloodcontrol.com

**Prepared by**

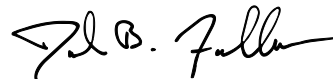


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**September 25, 2015**

**Date of Approval**

**INTRODUCTION**

1.1 US Flood Control 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
Approval Standard for Flood Abatement Equipment	2510	March 2013

**1.4 Listing**

The product(s) will be listed in the Approval Guide, an online resource of FM Approvals, as shown in the *Approval Guide Listing Appendix* attached to this report. Also included are modifications to the current listing for the previously Approved 42" Super Tiger Dam.

**2 DESCRIPTION**

2.1 The Tiger Dam perimeter barrier is a water-filled tubing-type structure designed to protect the area surrounding a building from flood waters. The barrier consists of tubing, straps, anchors to secure it in place, and poly (plastic) sheeting to mitigate seepage.

2.2 The Tiger Dam tubes are offered in a variety of diameters and lengths. The tubes are commonly supplied in standard 66 ft. (20 m) lengths which, after folding and end capping, result in a finished product length of about 50 ft. (15 m). The tubes may also be custom ordered to any length.

2.2.1 Nominal tube diameters of 19", 24", & 36" tubes are included in the scope of this Approval. The 48" tube diameter was previously Approved under PI 3046068. All tube diameters will be Approved in a single tube configuration. Additionally, the 19" diameter tubes will be Approved in a 2-1 configuration, comprised of 3 tubes arranged in a pyramid design with 2 tubes on the bottom and 1 tube on top.

2.3 Multiple tubes may be joined together to effectively create a continuous perimeter barrier. Free ends of the tubes are joined together using a patented fold method which prevents pressure inside the tube from exerting itself onto the fabric welds. Then, any remaining free ends are folded in a similar manner to form an end cap. Each end cap and joint is covered with sleeves of additional tubing material included with each Tiger Dam system. The folding, joining, and end capping process is completed prior to filling.

2.4 The following table defines the fill heights and maximum design water depths for each size Tiger Dam tube. Each tube features a fill valve and a port valve. The port valve is to remain open during the filling process to discharge any excess air inside the tube. A fill adapter is supplied by US Flood Control which may be used to connect a standard 1 1/2" fire hose to the fill valve. Filling time will vary depending on the water supply pressure at the location.

<b>Tube Nominal Diameter, in. (cm)</b>	<b>Fill Height, in. (cm)</b>	<b>Maximum FM Approved Design Water Depth, ft. (m)</b>
19 (48)	17 (43)	1.0 (0.3)
19 (48)*	33.5 (85)	2.0 (0.61)
24 (61)	21 (53)	1.5 (0.46)
36 (91)	32 (81)	2.25 (0.69)
48 (122)	42 (107)	3.0 (0.91)

\*2-1 configuration

- 2.5** After filling is complete, the Tiger Dam tubes are secured in place using straps and ground anchors. High tensile strength nylon straps are spaced roughly 5 ft. (1.5 m) apart and wrapped over the top of the tube water to dry side. The ends of the straps are fixed to the ground surface using different types of anchors, depending on the surface type and condition. An engineering study is required to determine number of anchors, type, and placement.
- 2.6** A poly (plastic) sheet is wrapped around the exterior of the tubing to mitigate seepage. The poly sheet is specified as 10 mil thick and reinforced with tensile strength polyester fibers tested to withstand up to 3 ft. (.9 m) of hydrostatic pressure.

### **3 EXAMINATIONS AND TESTS**

- 3.1** Perimeter barrier performance testing of the 19" diameter 2-1 configuration was conducted at the US Army Corps of Engineers' Engineering and Research Development Center (ERDC) located in Vicksburg, MS. The testing was completed in February 2015 with successful results. All data is kept on file at FM Approvals.
- 3.2** Due to design similarities with the currently Approved 48" diameter single tube configuration (reference PI 3046068), it was deemed that a full test program would not be required on single tube configurations of smaller diameter. A limited test program for the 19" diameter single tube configuration was conducted. The limited program included overtopping, debris impact, current, and post-hydrostatic load tests. Based on the successful performance testing of 19" and 48" diameter single tube configurations, testing was deemed not required on intermediate diameters of 24" and 36". Regardless of size, all components of the Tiger Dam system are identical.
  - 3.2.1** The FM Approved design water depth of the 24" and 36" diameter tubes was determined by interpolating between the design depths of the 19" and 48" diameter tubes which had been performance tested.
- 3.3** Component 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.
- 3.4** All testing and analysis considered appropriate was conducted and verified to be in compliance with the standard(s) defined in Section 1.3.

#### 4 MARKING

4.1 The following information appears on all Tiger Dams identified within this report and meets standard requirements:

- Manufacturer's logo/trademark
- Model Designation
- Serial #
- Country of Manufacture (USA or Canada)
- Warnings and Contact Information
- The FM Mark of Approval ("FM Diamond")

#### 5 REMARKS

5.1 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 These Tiger Dam barriers have been evaluated for use in resisting riverine flooding conditions at water depths no greater than those specified in Section 2.4 of this report.

5.3 Installations shall comply with the latest edition of the manufacturer's installation manual.

#### 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

US Flood Control Corp.  
121 Kaylee Drive  
Hahnville, LA 70057

##### Manufacturing

US Flood Control Corp – Canada Mfg.  
12400 Vulcan Way  
Richmond, British Columbia, V6V 1J8  
Canada

US Flood Control Corp – USA Mfg.  
802 Short St. Bldg J  
Kenner, LA, 70062

## **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** 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.
- 7.3** The manufacturer is responsible for control of the product marking and installation instructions for the product.
- 7.4** The manufacturer shall provide installation, operating, and maintenance manual(s) with each product.
- 7.5** Certain post-production tests are required to be conducted by the manufacturer as part of the quality assurance program. At minimum, these tests shall include the following:

### **7.5.1** *Pressure Test*

1 in 25 tubes shall be pressurized with air until firm and then checked for any ruptures or leaks in the material welds and valve connections.

## **8 DOCUMENTATION FILE**

All documents pertinent to this Approval are outlined in the *Critical Document List* Appendix attached to this report.

## **9 CONCLUSION**

The products listed in Section 1.4 and described in Section 2 have met 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:** 3054525

**ATTACHMENTS:** Appendix I - Approval Guide Listings  
Appendix II - Critical Document List

## Appendix I – Approval Guide Listings

Building Materials → Flood Abatement Equipment → Temporary Perimeter Barriers

Additions are shown in **RED** and deletions are shown in ~~strikethrough~~.

### **Tiger Dam System – 2-1 Stackable Configuration – 19” Diameter**

<b>Product Designation</b>	<b>Barrier Type</b>	<b>Maximum FM Approved Design Water Depth</b>	<b>DIOM Manual</b>	<b>Notes</b>
Tiger Dam System – 2-1 Stackable Configuration – 19” Diameter	Water-Filled Tubing	2 ft.	<i>ASFPM Listed and FM Approved 19” 2-1 Configuration Tiger Dam Installation Procedure, Doc# TDIP19-2:1 012515, August 2015.</i>	The usage of straps, anchors, sandbags, and poly sheet are required to meet FM Approved installation.

### **Tiger Dam System – Single Tube Configuration – 19” Diameter**

<b>Product Designation</b>	<b>Barrier Type</b>	<b>Maximum FM Approved Design Water Depth</b>	<b>DIOM Manual</b>	<b>Notes</b>
Tiger Dam System – Single Tube Configuration – 19” Diameter	Water-Filled Tubing	1 ft.	<i>ASFPM Listed and FM Approved Single 19” Tiger Dam Installation Procedure, Doc# TDIP19-012515, August 2015.</i>	The usage of straps, anchors, sandbags, and poly sheet are required to meet FM Approved installation.

### **Tiger Dam System – Single Tube Configuration – 24” Diameter**

<b>Product Designation</b>	<b>Barrier Type</b>	<b>Maximum FM Approved Design Water Depth</b>	<b>DIOM Manual</b>	<b>Notes</b>
Tiger Dam System – Single Tube Configuration – 24” Diameter	Water-Filled Tubing	1.5 ft.	<i>ASFPM Listed and FM Approved Single 24” Tiger Dam Installation Procedure, Doc# TDIP24-012515, August 2015.</i>	The usage of straps, anchors, sandbags, and poly sheet are required to meet FM Approved installation.

**Tiger Dam System – Single Tube Configuration – 36” Diameter**

<b>Product Designation</b>	<b>Barrier Type</b>	<b>Maximum FM Approved Design Water Depth</b>	<b>DIOM Manual</b>	<b>Notes</b>
Tiger Dam System – Single Tube Configuration – 36” Diameter	Water-Filled Tubing	2.25 ft.	<i>ASFPM Listed and FM Approved Single 36” Tiger Dam Installation Procedure, Doc# TDIP36-012515, August 2015.</i>	The usage of straps, anchors, sandbags, and poly sheet are required to meet FM Approved installation.

**Tiger Dam System – Single Tube Configuration – 48” Diameter**

<b>Product Designation</b>	<b>Barrier Type</b>	<b>Maximum FM Approved Design Water Depth</b>	<b>DIOM Manual</b>	<b>Notes</b>
42” Super Tiger Dam <sup>1</sup>	Water-Filled Tubing	3 ft.	<i>ASFPM Listed and FM Approved 42” Super Tiger Dam Installation Procedure, Doc# TDIP42092413, Sept. 2014.</i>	The usage of straps, anchors, sandbags, and poly sheet are required to meet FM Approved installation.

<sup>1</sup>US Flood Control designates the product as the 42” Super Tiger Dam. 42” refers to the fill height. The nominal tube diameter is 48”.

**~~42” Super Tiger Dam~~**

<b><i>Product Designation</i></b>	<b><i>Barrier Type</i></b>	<b><i>Maximum Design Water Depth</i></b>	<b><i>DIOM Manual</i></b>
<del>42” Super Tiger Dam</del>	<del>Water-Filled Tubing</del>	<del>3 ft.</del>	<del><i>ASFPM Listed and FM Approved 42” Super Tiger Dam Installation Procedure, Doc# TDIP42092413, August 2013.</i></del>

## Appendix II – Critical Document List

<b>Document No.</b>	<b>Revision Level</b>	<b>Document Title</b>
TDIP-2:1 012515	August 2015	ASFPM Listed & FM Approved 19" 2-1 Configuration Tiger Dam Installation Procedure
TDIP 19-012515	August 2015	ASFPM Listed & FM Approved Single 19" Tiger Dam Installation Procedure
TDIP 24-012515	August 2015	ASFPM Listed & FM Approved Single 24" Tiger Dam Installation Procedure
TDIP 36-012515	August 2015	ASFPM Listed & FM Approved Single 36" Tiger Dam Installation Procedure
TDIP 42092413	Sept. 2014	ASFPM Listed & FM Approved 42" Super Tiger Dam Installation Procedure
TDM 071615A	August 2015	Manufacturing and Production Manual – 19" Tubes
TDM 24-071615A	August 2015	Manufacturing and Production Manual – 24" Tubes
TDM 36-071615A	August 2015	Manufacturing and Production Manual – 36" Tubes