

FLEXIBLE INTERMEDIATE BULK CONTAINERS SPECIFICATIONS

North America



FLEXIBLE INTERMEDIATE BULK CONTAINERS SPECIFICATION

Plant Requirements M or R	ASH	BAL	BFG3	BFG4	CA1	CA2	CA3	CTA	GEO	MARC
	M	NA	M	M	M	NA	NA	NA	NA	NA
	MRT	NWD	PRM	QUE	US1	US2	US3	US4	US5	US6
	NA	NA	NA	M	NA	M	NA	NA	NA	NA
	US7	US8	US9	Archi	DTM	GSTP	MT	Authors		
	NA	M	M	NA	NA	NA	NA	NA		
	Central Key Users									
	NA									

1. Purpose

The purpose of this specification is to establish the safety, quality, and dimensional requirements for Flexible Intermediate Bulk Containers (FIBC's) used by Michelin/BFG Plants in North America.

2. Scope and Responsibility

This specification applies to all suppliers of Michelin/BFG Plants in North America utilizing single trip FIBC's.

[IEC/ISO 61340-4-4:2005](#) is the international standard for FIBC's such as, labeling, performance, test methods, and test reports. It should be used in conjunction with this Michelin/BFG FIBC specification document.

ISO 16101, ISO 16103, ISO 16106, and ISO 16883 are standards which cover the transport packaging for dangerous goods

Responsibility for ensuring that FIBC's utilized by Michelin/BFG Plants in North America meet and maintain compliance with this specification rests with the **Individual Raw Material Buyers, and Plant Reception Personnel**. Technical assistance to the plants and the suppliers will be provided by **DTM/RF** (Product Specialists) and **CPSF-Z** (Process Specialists).

The chemical supplier is responsible for providing a product that is high quality, contamination free, and with consistent product form. The product must be supplied in a safe and suitable FIBC for the product. The FIBC type should be chosen based on the MIE of the product. The geometry of the FIBC should be selected based on product form and by utilizing the 'Choosing Appropriate Spout Diameter' chart. Products delivered with damaged FIBC's, will be rejected and returned unused, at the suppliers cost, due to safety and contamination risks. FIBC's are to be thoroughly inspected prior to filling by the chemical supplier. The FIBC's are designated for one specific product and supplier. The chemical supplier is responsible for obtaining approval of their FIBC prior to shipping product. Any deviations from this specification must be **prior approved in writing by CPSF-Z**.

4. Definitions

FIBC

An acronym for Flexible Intermediate Bulk Containers. These collapsible containers are normally made of woven polypropylene fabric and used for bulk shipments of non-liquid products.

Common names:

Super Sac and Big Bag.

MIE

The Minimum Ignition Energy is the lowest spark energy capable of igniting a sample when dispersed in the form of a dust cloud

5. Safety

5.1 MIE (Minimum Ignition Energy)

The MIE number is used to choose the correct type of FIBC that chemicals should go in. If the product can generate dust or fines of < 420 µm in size, the supplier must have the dust analyzed by a

certified lab. If the product is inert the MIE test is not required, examples include: talc, clay, and Zinc Oxide. If product is potentially explosible in dust form, the product must be tested to find MIE.

MIE testing should be followed in accordance with American Society for Testing and Materials (ASTM) E2019

5.2 Choosing the Correct FIBC Type

The MIE number is used to choose the correct type of FIBC. Use the chart below to determine what the appropriate type FIBC should be.

Choosing Type of FIBC	
MIE of Powder	Explosive Dust Atmosphere (zone 20*, 21**, or 22***)
Inert Powder	Type B
MIE > 3 mJ	Type B, C, D, or CD
0.14 mJ < MIE ≤ 3 mJ	Type C, D, or CD

Refer to Appendix A for different FIBC types.

5.3 Lifting Safety Factor And Weight Limits

Safety factor of 6/1 for a load of 1000kg (in accordance with US DOT)

5.4 Product Handling Information And Hazard Labels

A Product Handling Label / Hazard Label must be attached at the top of every FIBC entering a Michelin/BFG Plant in North America. The labels must be clearly visible, either in a separate data pouch, or permanently marked on the FIBC, **not on a label attached to the shrink wrap**. The label should have information about product handling, storage, first aid, spills, fires, HMIS rating, and instructions of how to ground the FIBC if applicable, as required by regulations (WHMIS, etc.). For type C FIBC the phrase, **“FIBC must be grounded prior to opening”** must be printed in big bold letters on two sides of the FIBC.

For all FIBCs, net weight must be mentioned.

6. FIBC Construction

6.1 Fabric

- Woven polypropylene with heat fused non-breathable polypropylene coating.
- Fabric Color should be white. (DO NOT USE BLACK OR BLUE)
- Leak proof seams. Product should not leak out of stitching seams.
- No loose threads.

Refer to Appendix B for different examples of leak proof seams.

6.2 Body Dimensions

- “C” Base - 1.0 m x 1.0 m (40 in. x 40 in.) maximum allowable.
- “D” Height - 1.75 m (70 in.) maximum allowable.

Supplier should minimize height to match bulk density and maximize weight per FIBC to optimize shipping expenses.

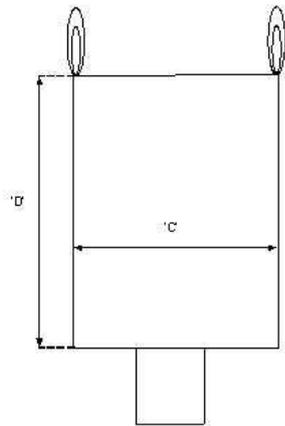
Note: SPECIAL APPLICATION US-2 ANDERSON S.C.

CBS, TBBS, and DCBS

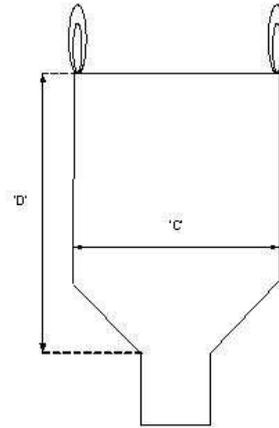
- “D” Height - 2m (80 in.) maximum allowable.

Carbon Black and Silica

- “D” Height - 2.1m (84in) maximum allowable.



Flat Bottom with Body Dimensions



Funnel Bottom with Body Dimensions

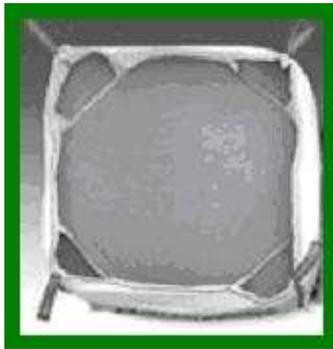
6.3 Bottom of Bag

Flat All FIBCs will be flat bottomed unless specified
SPECIAL APPLICATION: Sulfur and Insoluble Sulfur products will be funnel bottomed with a flap closure

Funnel 405 mm (16 in.) ± 1 in length (anti-bridge bottom).
 Refer to Appendix B for dimensional drawings of flat bottom with X- closure and funnel bottom with flap closure as well as pictures.

6.4 Baffles

- Baffles must be included if FIBC is over 70 inches in height
- Holes must be either cut with a hot knife or sewn to prevent loose threads



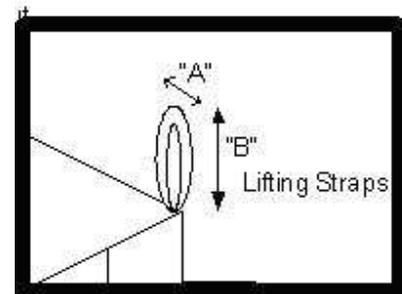
Top View of FIBC with Baffles



Picture of FIBC with Baffles

6.5 Lifting Straps

- The FIBC shall be fitted with 4 lifting straps, one fitted to each of the upper corners.
- "A" Width - 35mm to 75 mm (1.4 to 3.0 in.)
- "B" Height - 250 mm + 10 mm (10 in. + 0.5 in.). It is important that the 10 in loop is measured from the top of the FIBC not where the stitching ends on the side of the FIBC.



Pictures of Good Lifting Straps

Diagram of Lifting Straps

6.6 Fill Spout

- Located on top of FIBC as required to allow tight closure of the spout.
- One way FIBC's may use a fabric closure tied in a knot. This closure must be securely sewn to the FIBC and not have any loose threads or frayed ends.



Picture of Good Fill Spout

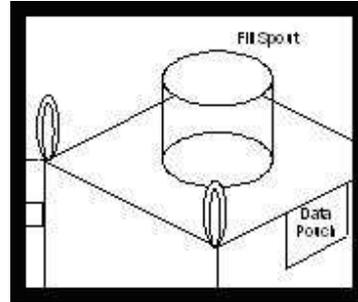


Diagram of Fill Spout

6.7 Discharge Spout

- Spout diameter: 406 mm (16 in.) or 510 mm (20 in.)
See "Choosing Appropriate Spout Diameter" chart below to determine appropriate diameter of spout.
- Spout length: 405 mm (16 in.).

Choosing Appropriate Spout Diameter		
16" Spout Diameter	20" Spout Diameter	20" Spout Diameter
Flat Bottomed	Flat Bottomed	Funnel Bottomed
X-Closure	X-Closure	Flap Closure
<ul style="list-style-type: none"> •Product flows well after settling in Big Bag for over 2 weeks •No bridging across spout opening •Product does not tend to re-agglomerate 	<ul style="list-style-type: none"> •Product does not flow well after settling in Big Bag for over 2 weeks •Product tends to bridge across spout opening •Product tends to re-agglomerate at higher temperatures •Example: Waxes 	<ul style="list-style-type: none"> •Product tends to compact once in Big Bag •Product tends to bridge •Product tends to re-agglomerate •Example: Sulfur, Zinc Oxide

***NOTE:** IF THE PROPERTIES OF PRODUCT CHANGE DEPENDING ON TEMPERATURE OR HUMIDITY, USE SUITABLE FIBC FOR WORST POSSIBLE CONDITION.

Refer to Appendix C for FIBC dimensional drawings of flat bottom with X- closure and funnel bottom with flap closure.

6.8 Discharge Spout Closure

- All discharge spouts will be closed using a Velcro strap
- Lifting strap material: 50 mm (2 in.) wide x 76.2 cm (2.5 ft) long
- Loop sewn in end of strap to allow for easy opening
- 2 Velcro strips: 50 mm (2 in.) wide x 12.7 cm (5 in.) length
- These strips are to be sewn to the strap to allow tight closure of the spout.
- The Velcro strips should be sewn to strap around all four sides
- Strap must be securely sewn to spout
- Placement of closure on discharge spout to be 305 mm (12 in.) from bottom of spout. This is critical for safe closure.
- The closure system must be easy to open, formed integrally with the FIBC and there must be no risk of it becoming detached (fully or partially) when opened.

Refer to Appendix C for FIBC dimensional drawings of Velcro strap

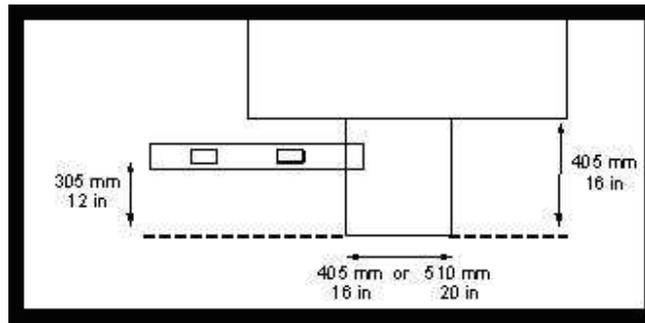


Diagram of Velcro Strap Placement

Clips are not to be used to tie/knot cord. Velcro straps will be used to avoid having to cut cords.



6.9 Bottom Closure

Flap Closure

- All funnel bottomed FIBCs will have a Flap Closure
- Full bottom flap with two strap type Velcro closures (Color White) and two metal "D" or "O" rings per drawing.
- Straps made from lifting strap material.
- Ring mounting areas to be adequately reinforced.

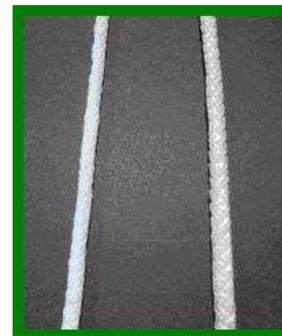
X-Closure

- All flat bottomed FIBCs will have a Petal or X Closure
- Edges rolled under and sewn to prevent loose threads
- Cord should be smooth round and tied using a slip knot. Round cord should not be twisted; this causes problems untying the slip knot.

Refer to Appendix B for FIBC dimensional drawings of flat bottom with X- closure and funnel bottom with flap closure.



Picture of Bad Cords: Twisted and Flat



Picture of Acceptable Smooth Braided Cords

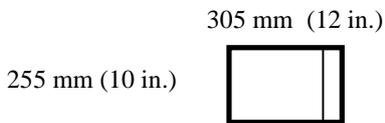
6.10 Product Markings

- Printing to be 50 mm (2 in.) high minimum.
- * Commercial product name
- * Michelin PG code or UGTM product code (as applicable)
- * Supplier name
- * Supplier lot number
- * Net weight

Example:	Zinc Oxide PG 00252 Zinc Chemical Co. Lot no. 12345 1000 kg. net.
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6.11 Data Pouches

- Clear plastic 255 mm (10 in.) long x 305 mm (12 in.) wide minimum, located at top of bag.
- Must be sewn to allow documents to be put in and taken out via a side entry.



Picture with Data Pouch and Product Handling Labels / Hazard Labels

6.12 Shipping

Pallets

- Plastic pallets only, strong enough to support the load (up to 1000kg)
- Pallets should be a light color, NOT BLACK OR BLUE
- Absolutely No Wood or Cardboard Pallets Allowed!

Recommended Pallet Suppliers in North America

- **Nelson**
- **K&K Services**

Trailers

- Trailers with wooden sides must be lined with non-splintering material to prevent contamination and damage to the FIBC (i.e. cardboard).



Cardboard Lined

Picture of Cardboard Lined Trailer with Wood Sides

No loose material on outside of FIBC or pallet (chemicals, etc.).

- **FIBC must never be double stacked.** This is a safety and production issue at receiving plant.

7. Reference Documents

None.

The electronic copy of this document in the central database is controlled. Control of printed copies is the responsibility of each facility.

Appendix A: FIBC Types

The conditions and procedures of tests used to demonstrate the absence of incendiary discharges are specified in IEC/ISO 61340-4-4.

FIBC TYPE

Type A

Bag made of non-conductive fabric and does not provide any protection against static electricity.

Type B

Bag made of non-conductive fabric (including the lining which is usually applied). They differ from FIBC Type A in that the breakdown voltage through the fabric, including the lining, shall be low enough to prevent electrostatic discharges, such as propagating brush discharges (< 4kV). Spark discharges may occur from the surface of FIBC Type B if they become contaminated by, or coated with, a conductive material (water, grease or oil, for example). Precautions must be taken to avoid such contamination and to avoid conductive objects such as tools or metal clamps being placed on the FIBC.

Type C

Bags made entirely of a conductive fabric or from a non-conductive fabric with interconnected conductive threads or filaments. The pattern of the conductive threads or filaments is either:

- A grid enclosing an area of non-conductive fabric no greater than 25cm²
- Or a 20mm strip, in which case each thread or filaments must be interconnected at two separate places (usually at the two extremities).

FIBC Type C must be equipped with a grounding connection to which all conductive panels, threads or filaments are electrically bonded. The resistance of the grounding point from anywhere on the conductive fabric and from the conductive threads and filaments must be less than 10⁸ Ω.

The lift loops of FIBC Type C must also contain conductive threads or filaments with a resistance to the grounding point of less than 10⁸ Ω.

FIBC Type C must also meet the requirements relating to the breakdown voltage of FIBC Type B (<4kV).

In order to avoid "spark" discharges, it is essential that the FIBC Type C is always securely grounded. A label must be attached to the FIBC stating the position of the grounding points and clearly outlining the grounding requirements during filling-in or emptying operations. The phrase, "**FIBC must be grounded prior to opening**" must be printed in big bold letters on two sides of the FIBC.

Type D

Bag made of a fabric which enables electrostatic charge to be dissipated without being grounded. The fabric of an FIBC Type D generally contains conductive threads or filaments which safely dissipate the charge through low energy "corona" discharges. Some FIBC Type D have a low resistivity lining, which can reduce the risk of incendiary discharges.

FIBC Type D are not required to be grounded.

The FIBC Type D must also meet the requirements relating to the breakdown voltage of the FIBC Type B (< 4 kV).

Ungrounded conductors, such as metal drums or persons in the vicinity of a FIBC Type D, can become charged. It is imperative to ensure that all conductors are grounded in the presence of explosive atmospheres.

"Spark" discharges may occur from the surface of the FIBC Type D if it is contaminated by, or coated with, a conductive material (water, grease or oil, for example). Precautions must be taken to avoid such contamination and to avoid conductive objects such as tools or metal clamps being placed on the FIBC.

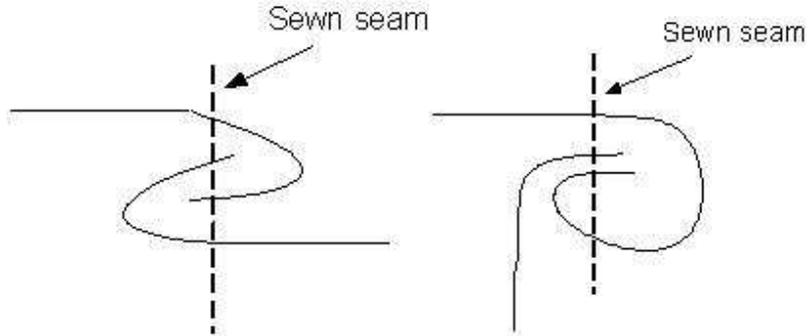
Type CD

A coating is sprayed on the outside surface allowing static to dissipate into its surroundings. They function like FIBC Type C if they are grounded, and like Type D if they are not ground.

Appendix B: FIBC Construction

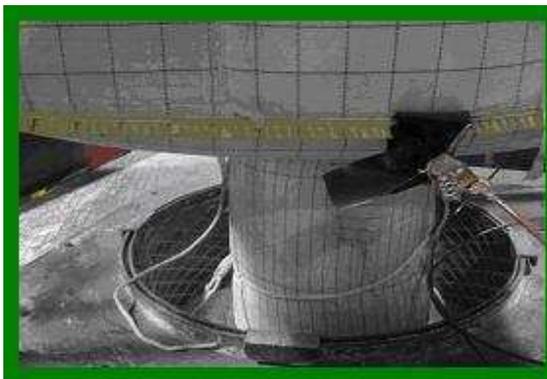
Note: Diagrams Not Drawn To Scale

Fabric

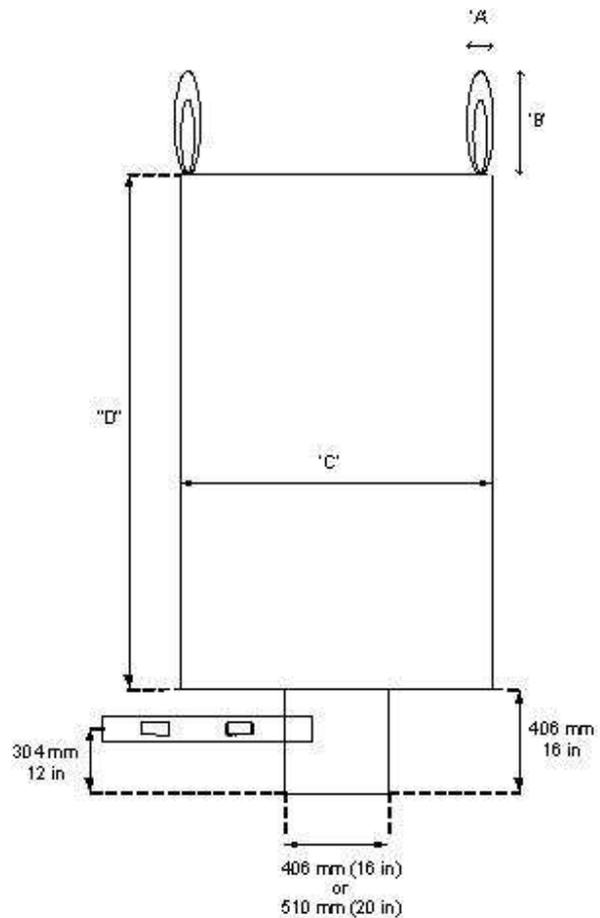


Two Examples of Leak Proof Seams

Flat Bottomed FIBC



Picture of Good Flat Bottomed FIBC

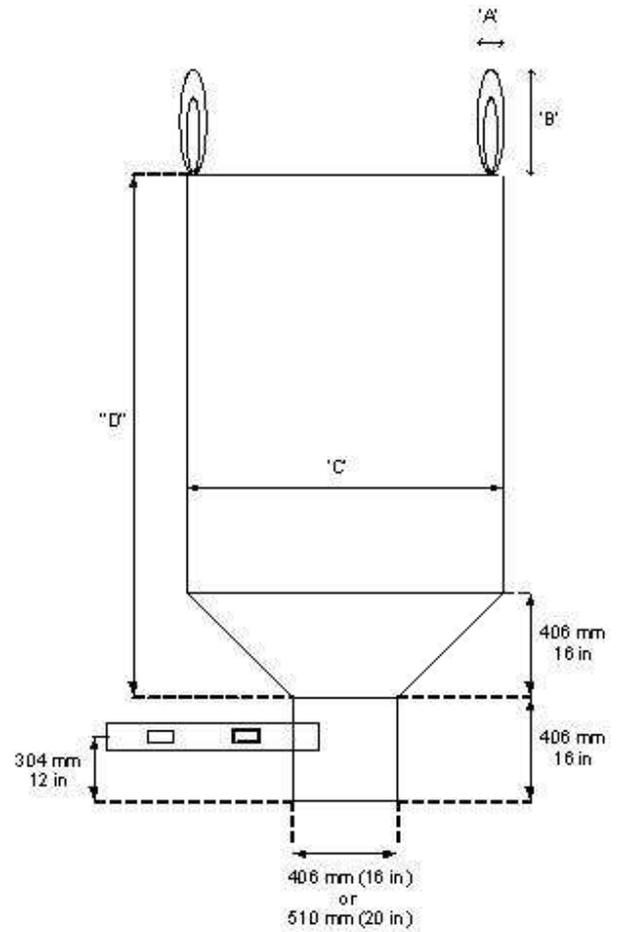


Flat Bottomed FIBC

Funnel Bottomed FIBC



Picture of Good Funnel Bottomed FIBC



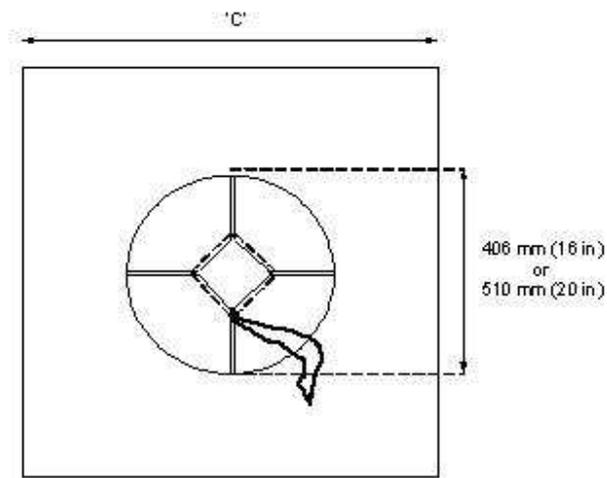
Funnel Bottomed FIBC

Appendix C: Closures and Spouts

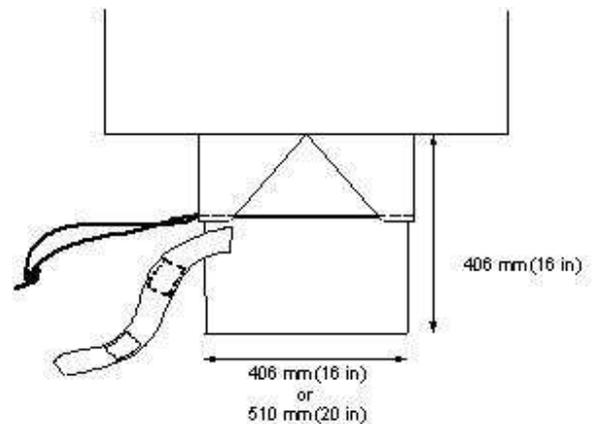
X-Closure (Flat Bottomed FIBC)



Picture of X-Closure



Bottom View of X Closure

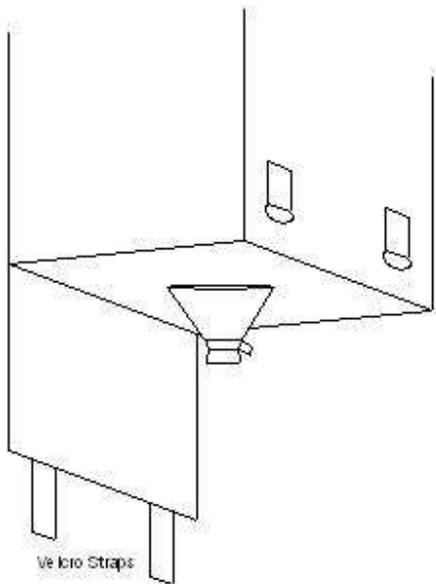


Side View of X Closure

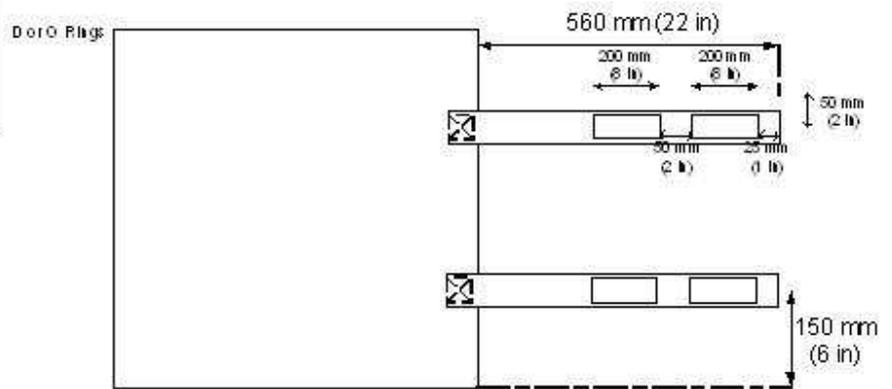
Flap Closure (Funnel Bottomed FIBC)



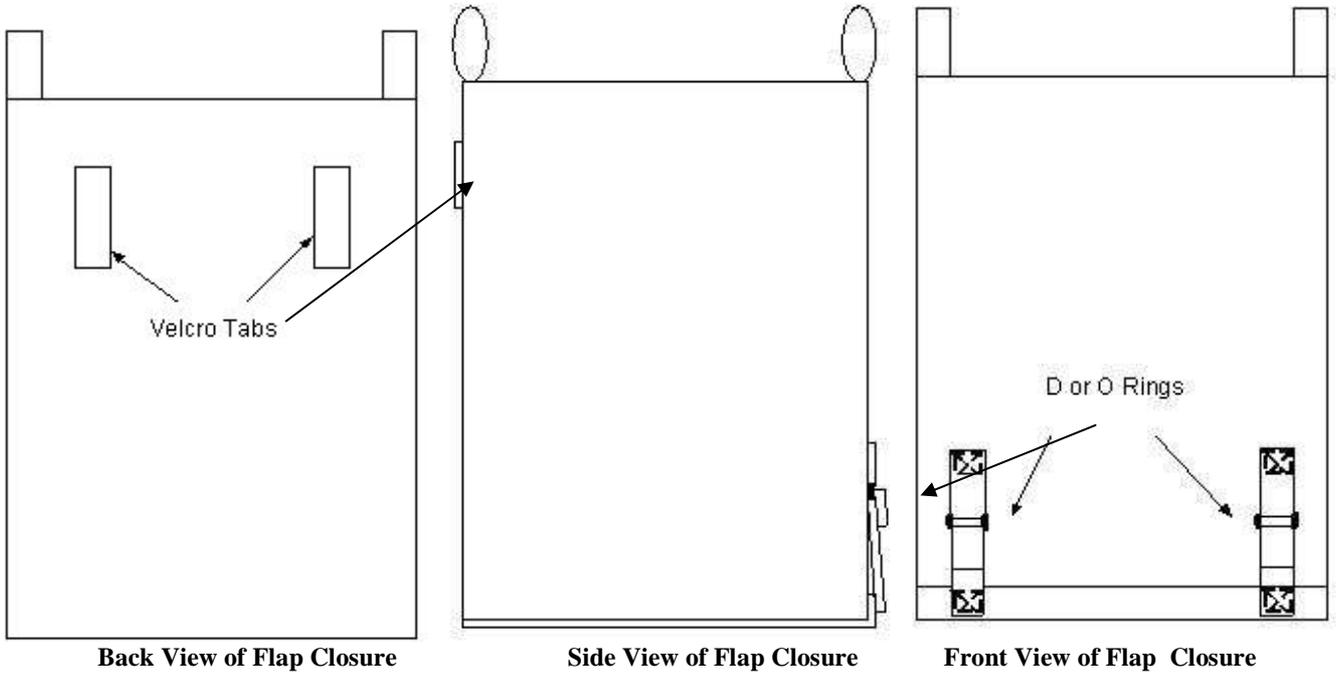
Picture of Good Flap Closure



Bottom View of Flap Closure

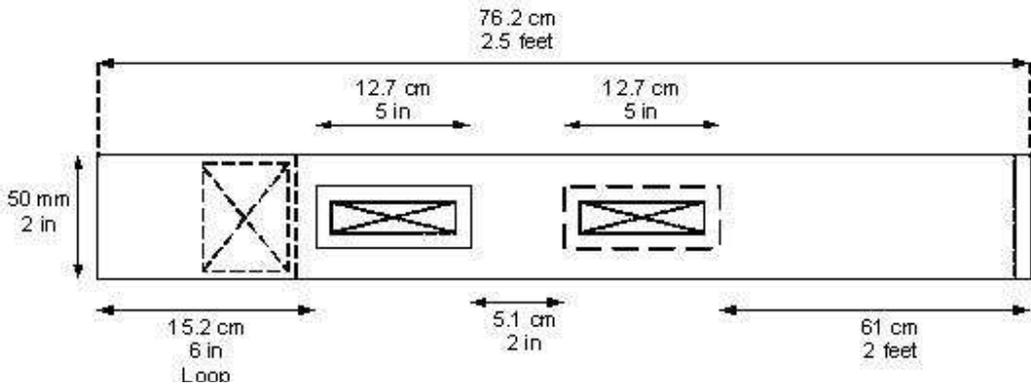


Velcro Tab Dimensions



Note: No finger loops on Velcro flap
 D or O Rings positioned to hold flap closure tight.
 Velcro tabs hold flap closure out of the way during discharge.

Spout



Velcro Discharge Spout Strap



Side View of Velcro Discharge Spout Strap