

# Vacuum In Use

BFM® fittings are often used in applications where they are operating in negative vacuum situations. Typically these installations are where the plants are drying or processing dry powdered type products and need the plant and equipment to be under a slight negative pressure to keep the internals of the buildings clean from leaking dust out of machinery.

The BFM® fitting works and seals perfectly in almost all negative pressure applications. Typically, these installations are plants equipped to dry or process a powdered product. In order to ensure a low-leak operation (for clean building internals), pipe internal pressure is kept below atmospheric pressure.

It is important when specifying a connector for use in negative pressure situations that the amount of movement, environment, temperature and nature of the pressure are all taken into account.

## CONNECTOR LENGTH

As a general rule on vacuum, the **maximum length of the BFM® connector should be no longer than its diameter** without support rings. For instance a 100mm diameter BFM should be no more than 100mm long. This is because the vacuum will pull the connector walls inwards, which will eventually close the connector.

## BFM® CONNECTORS WITH SUPPORT RINGS

Stainless Steel Support (SS) rings can be used to negate the effects of length. For instance, a 400mm long connector will hold as much vacuum as a 100mm long connector if it has three support rings (100mm apart). The rings also help keep the connector walls open and away from the product flow (see adjacent photo).

Plastic support rings can also be used for metal detection applications.



## BFM® TR CONNECTORS

BFM® manufactures a range of connectors where the cuff has a stronger seal in the spigot, and requires a tool to release the connector. The cuff on the TR connectors is far more difficult to release and this can provide an element of added security.

Although the BFM® connector will not release from the spigot when using a TR connector, the connector itself will be under a lot of stress, and the connector walls will be hard to touch and sucked inwards. If you have a connector 200mm long or greater, SS Rings should be considered.



## BFM® FLEXI CONNECTORS

There are BFM® flexi connectors available in 200 and 300mm diameter. The BFM® flexi has a stainless steel spiral wire wrapped in Urethane. These connectors are commonly used on two applications.

1. Light vacuum applications.
2. Where it is critical that the connector is held open while it moves up or down and as the product flows through the connector.



## BFM® LM4 CONNECTORS

BFM® connectors can be manufactured from LM4 which is a 100% pure woven polyester fabric. The woven fabric has been proven to allow air to bleed into the system, alleviating the pressure. We have numerous examples of this working, especially at the base of silo's where bridging can occur (material blockage at the outlet) causing a sporadic and extreme negative pressure situation.

Because the media alleviates vacuum allowing air into the system, failure can only occur in an extreme and sudden vacuum occurrence.



## Vacuum In Use (contd.)

### LARGE DIAMETER BFM CONNECTORS

For diameters over 650mm that will encounter vacuum it is strongly recommended that you talk with a BFM® representative.

The BFM® fitting will handle vacuum at gauge pressure of up to -1000mm w.g on short length connectors.

This will depend on the application and the environment.



### MAXIMUM RECOMMENDED OPERATIONAL PRESSURES

The following chart shows the maximum recommended operational working negative pressure for BFM® Seeflex 040E connector by length for standard and TR versions, both with and without stainless steel support rings:

MAXIMUM NEGATIVE PRESSURE					SEEFLEX 040E (Standard)				SEEFLEX 040E with SS Rings				SEEFLEX TR				SEEFLEX TR with SS Rings			
PSI	KPA	BAR	WG		CONNECTOR LENGTH				CONNECTOR LENGTH				CONNECTOR LENGTH				CONNECTOR LENGTH			
			(INCHES)	(MM)	100	200	300	400	100	200	300	400	100	200	300	400	100	200	300	400
-1.3	-8.963	-0.0896	-35.98	- 914																
-1.5	-10.342	-0.1034	-41.52	-1,055																
-1.7	-11.721	-0.1172	-47.06	-1,195																
-1.9	-13.100	-0.1310	-52.59	-1,336																
-2.0	-13.790	-0.1379	-55.36	-1,406																
-2.5	-17.237	-0.1724	-69.20	-1,758																
-3.0	-20.684	-0.2069	-83.04	-2,109																
-3.5	-24.132	-0.2413	-96.88	-2,461																
-4.0	-27.579	-0.2758	-110.72	-2,812																
-4.5	-31.027	-0.3103	-124.56	-3,164																

### LARGER VACUUMS

The BFM® fitting has been tested up to absolute vacuum on a number of connectors. All the connectors tested held vacuums far in excess of the limits we have provided, however as vacuum increases, the functionality of the flexible connector (ie. product flow) is compromised. Always test each application under controlled conditions. If in doubt, contact BFM for advice.

**NOTE:** The BFM® connectors were tested in a static test rig under ambient temperatures. The SS Rings on the connectors tested were set at 100mm centres. Although the suggested limits are well within our tested results, the conditions in which the BFM® fitting will be installed must be taken into account. Please contact BFM® if you have any doubts. Always test on site first.