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"When To Design A Single Coat or Double Coat Elastomeric Seal"

Elastomer is what is used to form a sealing barrier between the system pressure and the porous fabric enabling the diaphragm to convert the pressure into a mechanical force. Fabric is the reinforcing member of a diaphragm, but because it is porous and in order for it to support the high pressure of an application, it needs to form a seal. This explains why all diaphragms need elastomer on the high-pressure side of the diaphragm. But some diaphragms have elastomer on both sides.

Here are some of the most common reasons that elastomer is needed on both sides of the diaphragm:

First, in double acting systems the pressure differential flips back and forth in a system resulting in the need to seal the fabric from both sides in order to convert the pressure correctly in both directions. This means that both sides are at times the high-pressure side. There are also occasions when a pressure reversal can happen during a system failure. If the diaphragm is coated only on the high-pressure side then during the system failure the pressure reversal will blow the fabric off the diaphragm causing a rupture. In many cases this rupture could result in a dangerous situation such as leaking harmful materials or gas into the atmosphere or into other areas of the application.

Second, there are occasions where high-pressure is only on one side of the diaphragm but the low-pressure side may have high enough pressure to cause a leak path on the fabric side of the diaphragm. The fabric face is not an ideal sealing surface given that the fabric itself is made up of twisted threads, which can allow the gas or fluid on the low-pressure side of the diaphragm to seep out of the flange area of the hardware. Again, this leak could result in a hazardous scenario.

A third possibility exists when a caustic material is present on the low-pressure side of the diaphragm that the fabric cannot withstand. As the fabric degrades it loses its tensile strength. Once the fabric's tensile strength degrades to the point where it can no longer withstand normal operating pressures it will result in failure of the diaphragm and the system.

Finally, if the application's hardware has a rough finish then this will abrade the fabric to a point where its tensile strength is reduced and it can no longer support the pressure in the system. The additional layer of elastomer on the diaphragm will not eliminate the wear but will extend the life of the diaphragm. The loss of the elastomer does not weaken the diaphragm's ability to function.

Precision Industries' Engineering department will evaluate each design for the optimal construction to extend the life of the diaphragm and provide for the overall system reliability. Please feel free to contact Precision Industries at 262-946-0077 with your design questions.