PRECISION ASSOCIATES, INC.
Sealing Solutions...YOUR WAY!

PRODUCT BULLETIN

Low Temperature Sealing for Energy Applications

Precision Associates line of B-Lo° rubber sealing compounds are developed especially for low temperature environments. We produce four compounds, two each in FKM & HNBR that have proven to be a good fit for Energy applications in frigid climes. These materials are designed not just for low temperatures, but for resistance to gases and fluids encountered in the industry.

Low temperature performance can be a very important characteristic of an elastomeric compound. Reducing the temperature of the environment surrounding the rubber article will have a negative impact on the rubber properties. With decreasing temperatures, the movements of the molecular chains are reduced. At a certain temperature the molecular chains will no longer be able to move and the rubber loses all its rubber characteristics. The rubber will embrittle and become plastic like, reducing or eliminating the ability of the material to act as a seal.

There are several different ways to measure the low temperature properties of a rubber compound. The three most common methods used in the rubber industry are:

Glass Transition (Tg) is the temperature at which a particular rubber compound becomes crystalline and is stiff and brittle. At this point many molecules will be aligned and the compound will cease to be liquid or elastic. Time at a given temperature may also be required as some polymers need time to develop this crystallization. Testing is performed per ASTM E 1640.

Brittle Point is the temperature at which the material breaks upon impact. Testing is performed per ASTM D 1329.

Temperature Retraction is the temperature at which frozen rubber returns to an elastic state.
Testing is performed per ASTM D2137.

Precision Associates typically tests our seal compounds for Brittle Point and for Temperature Retraction, specifically TR-10. We can also provide other retraction results if desired. We consider the TR-10 test to be the best indicator for the performance of seals at low temperatures.

Note: high pressures tend to raise the temperature at which rubber compounds become crystalline. This needs to be considered when choosing materials for high pressure-low temperature applications. A generally accepted rule is that the Tg will rise by 1°C (1.8° F) for each 5.1 MPa (740 psi) of pressure applied.

B-Lo™ Lo-Temp Rubber Compounds

	9701	9901	9705	9905	55703	55903
Polymer	**FKM**	**FKM**	**FKM**	**FKM**	**HNBR**	**HNBR**
Duro	**70**	**90**	**70**	**90**	**70**	**90**
TR-10	**-41° F** **-41° C**	**-41° F** **-41° C**	**-51° F** **-46° C**	**-51° F** **-46° C**	**-41° F** **-41° C**	**-44° F** **-42° C**
Brittle Point	**-49° F** **-45° C**	**-49° F** **-45° C**	**-67° F** **-55° C**	**-67° F** **-55° C**	**-55° F** **-48° C**	**-55° F** **-48° C**

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- ***Medical Seals***
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After 60+ years in the rubber business, we've learned to be flexible. We'll bend over backwards to design custom solutions that meet your needs *precisely.* PAI is the company you can trust for rubber seal solutions YOUR WAY!

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