Cryogenic Valves – Metallic to Non-Metallic Plate Conversion

The Challenge

Metallic valve plates can be harmful to the compressor. Breakage of metallic valve plates can cause damage to the valve seats and guards requiring valve replacements. Any broken plate elements can also cause subsequent damage to other parts of the compressor, leading to unplanned and costly interventions.

Some applications can require the compressor to stop and start regularly which can lead to corrosion of the metallic valve plates.

Metallic plate example

The Solution

CPI 518 valve plate material has proven to be a successful upgrade to metallic plate valves. This laminated glass fiber epoxy grade material provides numerous benefits over metallic valve plates. In some cases, the self-dampening material properties reduce impacts enough to eliminate the need for additional dampener plates, therefore reducing the number of components in the valve assembly. This minimizes potential issues encountered when reconditioning valves with multiple internal components, also reducing lead times.

The properties of CPI 518 allow it to absorb foreign particles that a metallic valve plate could not, meaning the CPI 518 valve will continue to seal in dirty gas conditions.

CPI 518 Operating Characteristics

The stability of CPI 518's mechanical properties in cryogenic boil-off gas conditions make it an ideal solution for these demanding applications.

- Operating temperatures ranging from -238°F to 302°F (-150°C to 150°C)
- Speeds up to 1,600 RPM
- Operating pressures up to 4,641psi (320 bar)
- Proven through laboratory tests to maintain its flatness and prevent shrinkage down to -310°F (-190°C)

CPI 518 plate example

Example Upgrades

Compressor: Linde 1 WK 160-2P
Application: Ethylene (100%)

	Stage 1	Stage 2
Suction Temperature	-94°F (-70°C)	113°F (45°C)
Suction Pressure	14 psi (1.01 bar)	65 psi (4.5 bar)
Discharge Pressure	65 psi (4.5 bar)	333 psi (23 bar)

Compressor: Linde
Application: Propylene (dry gas)

	Stage 1	Stage 2	Stage 3
Suction Temperature	-4°F (-20°C)	23°F (-5°C)	86°F (30°C)
Suction Pressure	15 psi (1.045 bar)	69 psi (4.8 bar)	131 psi (9.1 bar)
Discharge Pressure	69 psi (4.8 bar)	131psi (9.1 bar)	239 psi (16.5 bar)