

# Special Polymer Alloy for High Duty Gas Compressor Piston and Rod Seals

## CPI 192 Material Upgrades

Upgrade to CPI 192 from traditional filled PTFE materials (like CPI 315 or CPI 303) for durability and longer wear life under the dirty/liquid running conditions\*.

CPI 192 is a special polymer alloy that was developed for extreme services in both lubricated and non-lubricated applications. With a combination of higher strength and higher hardness, CPI 192 material provides extended run life in refinery applications where traditional filled PTFE based materials can experience shorter and inconsistent run life due to a combination of higher pressures and temperatures and when dirt and liquids are present in the gas stream.

### The Challenge

Premature wearing of piston and rider rings with typical run life varied from less than 1 year up to 2 years. Rings worn and excessive debris present in the cylinders. Premature wearing of the packing rings and breakage of the ring segments. Ring wear leads to high vent leakage.

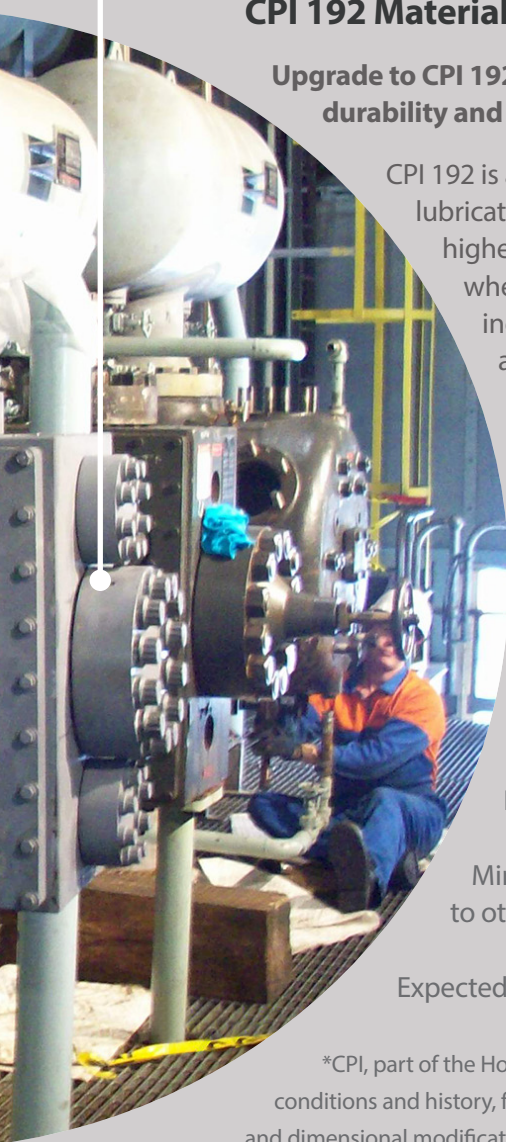
### Solution Highlights

Run lives typically extend beyond 3 years

Minimal wear debris collected in the cylinders and packing cases prevents damage to other components

Expected acceptable packing leakage rates were achieved

\*CPI, part of the Howden group, performs a full evaluation of every application to understand the operating conditions and history, from this evaluation the design and material selection is made. This might involve some ring style and dimensional modifications as part of the upgrade due to the different properties of the materials involved.



**Example references of successful upgrades from traditional filled PTFE rings to CPI 192 for a combination of piston, rider and packing rings.**

**Application #1**

Refinery Compressor, Worthington BDC – 6 throw  
300 RPM, Lubricated, Gas: mixed hydrogen and heavy hydrocarbon gasses, MW < 10

Multiple processes and stages; discharge pressures ranging from 610 psi (42 Bar) to 1,530 psi (105 Bar); discharge temperatures up to 232 °F (111 °C); cylinder diameters up to 15 in (381mm)

**Application #2**

Refinery Compressor, Cooper FM – 2 throw  
450 RPM, Lubricated, Gas: mixed hydrogen and heavy hydrocarbon gasses, MW > 35

Two-stage application; final discharge pressure = 250 psi (17 Bar); discharge temperatures up to 177 °F (80 °C); 24.5 in (622.3 mm) and 13.5 in (342.9 mm) cylinder diameters

**Application #3**

Refinery Compressor, Worthington BDC – 3 throw  
298 RPM, Lubricated, Gas: mixed hydrogen, methane, and water vapor, MW < 5

Three-stage application; final discharge pressure = 2,300 psi (159 Bar); discharge temperatures up to 275 °F (135 °C); 18.5 in, 12.2 in, 9.25 in (470 mm, 310 mm, 235 mm) cylinder diameters

**Application #4**

Refinery Compressor, Esslingen – 2 throw  
295 RPM, Lubricated, Gas: mixed hydrogen and methane, MW < 5  
Two-stage application; final discharge pressure = 3,770 psi (260 Bar); discharge temperatures up to 293 °F (145 °C); 8.267 in (210mm) cylinder diameters

**Application #5**

Refinery Compressor, Nuovo Pignone – 4 throw  
230 RPM, Lubricated, Gas: mixed hydrocarbons, MW > 10  
Two-stage application; final discharge pressure = 1,740 psi (120 Bar); discharge temperatures up to 302 °F (150 °C); 12.598 in (320 mm) and 11.024 in (280 mm) cylinder diameters

