

Natural Gas - The Preferred Fossil Fuel of the Future

Chemraz® 526 Optimizes Production Process of Compressors



Customer

The customer, a joint venture between two leading international oil & gas companies, is the largest gas producer in the Netherlands, covering 75 percent of the Dutch demand. The production capacity is 13,210 billion gallons (50 billion m³) of natural gas per year. They operate several gas refinery plants and explore a number of different gas fields, including one of the largest fields in the world, covering an area of 222,394 acres (900 km²) with gas reserves estimated at 713,000 billion gallons (2,700 billion m³). The customer has been working with Greene Tweed since 2001, and the plant is located near Rotterdam, The Netherlands.

Customer Goals

- Improve reliability of the compressors
- No unscheduled downtime due to o-ring failure
- Reduced risk of gas emissions
- Reduced risk of seal damage caused by explosive decompression, high temperatures, and aggressive chemicals
- Extend MTBR (mean time between repair) from nine months to four years

Application

- Casing seals, cartridge seals, and o-rings in the mechanical seal in booster compressors of a gas refinery plant experienced o-ring leakage due to aggressive chemicals such as naphthalene, aromatic hydrocarbons (high boilers), amine-based corrosion inhibitors, carbon dioxide, and steam.
- Operating temperature of 95°F to 293°F (35°C to 145°C) and pressure ranging from 566 psi to 1,595 psi (39 bars to 110 bars).
- Booster compressors are “the heart” of a plant with the estimated cost of one compressor at \$13 million. Failures of single components cause time- and cost-intensive maintenance and repair work, and in this case, led to complete shutdown of the field.



Challenge

- The customer was experiencing some sealing challenges with five turbo-boosters compressors.
- A temperature-induced chemical attack caused loss of mechanical properties and a decrease in the strength of the seal material. This subsequently caused explosive decompressive seal failure of the o-rings within nine months of service, which in a worst-case scenario can lead to emission of hazardous gas.

Solution

Based on the performance of Greene Tweed elastomers, the customer decided to replace their former sealing material with Chemraz® 526. Chemraz® 526 withstands the harshest chemicals even at high temperatures, has good resistance to explosive decompression, and provides good mechanical properties. This makes it the perfect solution for oil and gas applications.

Chemraz® 526 has a temperature range of -4°F to 482°F (-20°C to 250°C). This allows the material to maintain its properties under extreme conditions over a longer period of time. As the need for fossil fuel continues to grow, less “economical” fields will be brought into production, thus raising the compressor requirements. Future conditions may include high sour gas concentrations (> 15 mol% H₂S), increased use of amine- or methanol-based corrosion inhibitors, higher operating temperatures > 356°F (180°C) and MTBR periods of eight to twelve years. Chemraz® 526 is one of the few if not the only material at present that will be able to comply with these demands.

Benefits

- Chemraz® 526 o-rings have increased lifetime of the compressor from nine months to two years. MTBR periods are expected to be greater than four years. This leads to lower maintenance and operational cost and reduces lifetime cycle cost.
- Chemraz® 526 reduces the risk of gas emissions and seal damages in case of explosive decompression and extreme process conditions.



Mechanical seal removal

Chemraz® 526 o-rings have increased lifetime of the compressor from nine months to two years.