CSA (COIL SPRING ACTIVATED)

Seal Stack Solutions for Riser/Coupling Applications

SEALING DESIGN SOLUTIONS

- Increased seal life, no measurable leakage
- Handled high ovality and pressure effectively
- Proved easy to install
- Should be considered for application with large clearances or where ovality may cause problems

Equipment

- Coupling application, such as riser joints

Existing Seals

- U-Cup elastomer seal

Problem

A coupling application, e.g., riser joints, utilizing a U-cup elastomer seal was experiencing problems with the pressure capability of existing seals and problems caused by high ovality in riser applications.

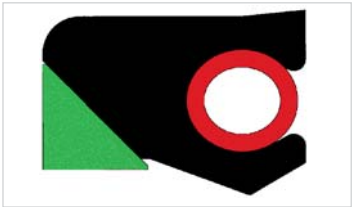
Solution

The CSA gives the benefits of a true elastomer accommodating large changes in squeeze caused by ovalization, high-diametral clearances or large eccentricities caused by wide tolerances.

The CSA seal, giving a virtually constant force, provides optimum seal performance at both low and high temperatures. Dependent upon material used, temperature performance can range from 65ºF to 500ºF (18ºC to 260ºC). The CSA seal has tested to pressures of 15,000 psi. The CSA seal is ideal for use on coupling applications, such as riser joints, or where hardware sees excessive side forces.

The solution consisted of a three-part assembly arranged as follows:

- Elastomer jacket (black)
- Metal spring (red)
- Arlon heel bearing (green)



Testing

The CSA was tested in singular and combined applications of tension, internal pressure (water unless otherwise stated) and bending and then stabilized for 15 minutes.

1. Internal pressure to 15,000 psi.
2. Breakout, inspect, make-up, then apply bending to 220,000 ft-lb. with 100 psi internal monitor pressure.
3. Tension of 1.2 million lb. with 100 psi internal monitor pressure.
4. Breakout, inspect, make-up, then repeat. The monitor pressure was maintained during load changes and left overnight.

No observable leakage occurred during the test.

The next test sequence was for combined loading with 8,000 psi continuously maintained internal pressure as follows:

5. 110,000 ft-lb. bending only.
6. 72,000 ft-lb. bending, 200,000 lb. tension.
7. 36,000 ft-lb. bending, 400,000 lb. tension repeated.

During the combined load testing, no loss of pressure was observed, even during load changes.

Gas testing with nitrogen was then carried out as follows:

8. Pressure to 500 psi, stabilize and hold for 15 minutes.
9. Pressure to 10,000 psi, stabilize and hold for 15 minutes.

No measurable leakage occurred.

Rating

Tension 800,000 lb.; pressure 10,000 psi; bending 150,000 ft-lb.

csa \ case study

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