Case Study

Seals

Summary

Industry: Oil & Gas

Application: Alternative door seal arrangement for Oil and Gas pipeline pigging system

Actual Saving: £n/a

Payback Period: n/a

Enhanced Pipeline Solution

ERIKS provides specialist O-ring for OEM customer

ISSUE

One of ERIKS customers requested an alternative arrangement for their large aperture, low pressure (ANSI 150) door seal. Their existing arrangement offered adequate sealing across the pressure range of systems but offered limited flexibility for the size of closure due to the requirement of new tooling with each different permutation. This was driven by their customer demands requesting closures for a varied range of pipe diameters. The solution needed to take into account the complex varieties of media associated with oil, gas and water pipelines such as hydrocarbons and sour gas. Also, the material needed to provide effective sealing at -50 deg C due to locations varying from desert to arctic. The seal would also be tested at 427psi (hydro test) for a max working temperature of 285psi. The seal needed to be located in a captive groove due to the doors being mounted on a vertical plane. The door sizes ranged from 300mm to 1.5 meters in diameter. Worst of all, they were experiencing up to a 3mm maximum extrusion gap once pressure was exerted on the door.

SOLUTION

The use of an o-ring was suggested as the most economic arrangement due to flexibility of size, varied range of materials and cost. The material decided on was Silicone encapsulated with PFA (Perfluoralkoxy) providing excellent resistance to media, wide temperature range, better resistance to extrusion and available in many sizes with no setup tooling. The ERIKS Material Testing Centre carried out FEA simulation where ERIKS changed the wall thickness of the PFA and the dovetail groove geometry to calculate the most effective design. The PFA created an additional feature due to the ability of resisting moisture penetrating the material surface. The benefit prevented moisture freezing under the surface of the material and binding with the metal work causing rupture to the seal when the door is opened, which could be up to 10 times a day. The solution and final FEA proposed moved to Hydotest, with great success.

These o-rings have now been fitted to the customers biggest ever door closure of 1.8 meters and are a part of a large pipeline which was delivered to site by ice road trucks.

OTHER BENEFITS

- The customer is now able to better serve their customers with an advanced and better quality product

FURTHER COMMENTS...

This solution has made it possible for the customer to provide closures without size restrictions, complying with their customers' ever increasing demands.

MORE INFORMATION

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