EagleBurgmann
a member of EKK and FREUDENBERG

RELY ON EXCELLENCE

Record breaking savings in operating costs and CO_2 emissions

DGS compressor seal and the world's largest operating CobaSeal

The Kollsnes gas processing plant went into operation in 1996 and has been continuously expanded since then.

The Norwegian oil and gas group Equinor ASA operates the large Kollsnes gas processing plant west of the city of Bergen. Natural gas from the Troll, Kvitebjørn, Visund and Fram fields is separated here into dry methane and NGL (Natural Gas Liquids). The plant currently has a daily processing capacity of 143 million cubic meters of methane and 69,000 barrels of NGL. For such volumes, it is clear that the compressors must operate reliably at all times.

The operator faced a corresponding amount of work when, after commissioning the natural gas compressors, the separation seals were not performing properly. Bearing oil reached the seal chamber and contaminated the dry gas seals, which resulted in multiple seal failures.

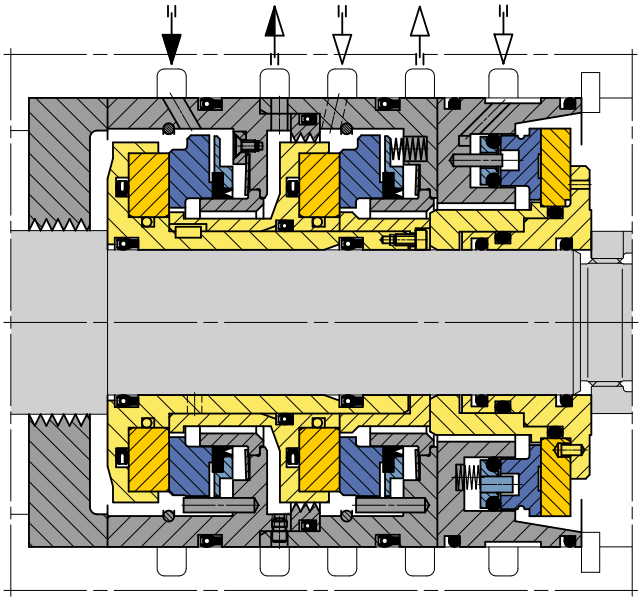
This situation forced the operator to carry out an extensive maintenance program for the seals and to replace them every two years as a preventive measure, as the compressors could not be shut down from October to April. This entailed high costs while there was still a certain potential for errors. Equinor decided to have the sealing solution completely overhauled and commissioned EagleBurgmann to develop a reliable sealing concept.

CobaSeal solves the problem

After detailed investigations, EagleBurgmann retrofitted one of the compressors with a dry gas seal cartridge "DGS" including the "CobaSeal" as the separation seal. One of the key features of this innovative separation seal is very low leakage. The leakage rates are up to 95% lower than those of conventional separation seals such as labyrinths or seals with carbon rings. Apart from low leakage, the very small coaxial sealing gap also ensures complete oil tightness, even if the nitrogen barrier fails briefly or shows irregularities.

The CobaSeal had already demonstrated its robustness and reliability in many applications. However, this seal with a diameter of 200 mm (7.87") in a real field application was something new at that time. Success was immediately noticeable: the compressor with the world's largest operating CobaSeal from EagleBurgmann so far, has been running reliably ever since.

CobaSeal-Retrofit: Not only is retrofitting worthwhile for reasons of reliability, but also to permanently reduce the need for nitrogen as a separation gas and thus operating costs.



A typical DGS tandem dry gas seal with a nitrogen supplied CobaSeal as a separation seal, installed towards the bearing chamber on the right, reliably protecting the dry gas seal from bearing oil.

Compressor operating conditions

- Suction pressure: p = 78 bar (1,131 PSI)
- Static pressure: p = 125 bar (1,812 PSI)
- Temperature: t = 70 °C (158 °F)
- Seal diameter: d = 200 mm (7.87")
- Speed: n = 7,333 min^{-1}
- Medium: Natural gas/Methane

The separation seal CobaSeal - the rotating seal ring on the left, the stationary seal ring on the right

Stable and low nitrogen consumption

This is shown time and again: The customer empties the chamber between the separation seal and the dry gas seal in all six export compressors on a weekly basis. The CobaSeal alone has so far perfectly sealed the bearing chamber of the shaft. Compared to the other separation seals, nitrogen consumption is the most stable and about 40% lower (0.8 to 1.0 Sm^3/h on the drive end and 1.2 to 1.4 Sm^3/h on the non-drive end). Consumption is no longer varying as it did with the former separation seal, which is another clear indicator that barrier oil is no longer reaching the DGS.

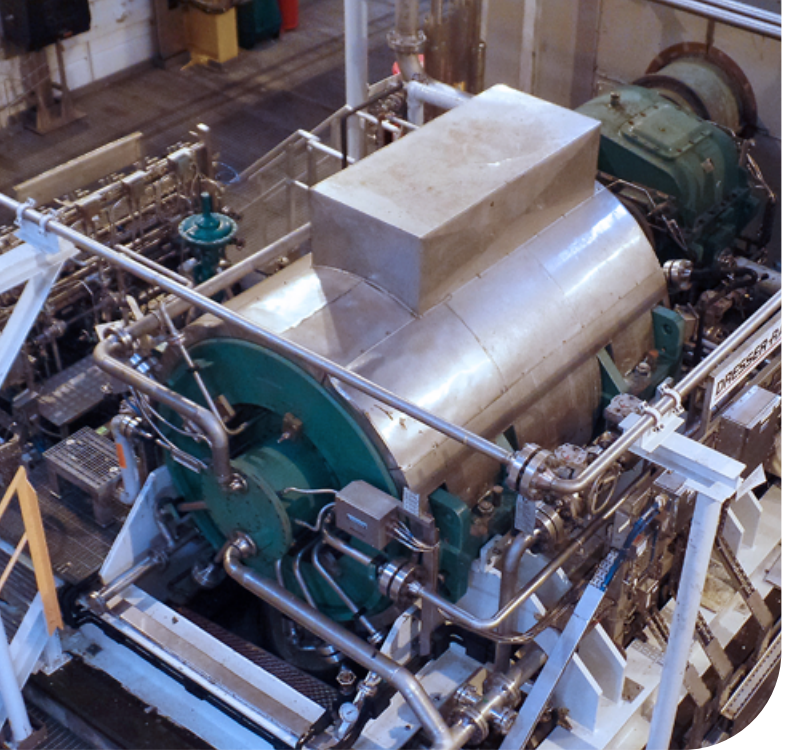
Equinor can also rely on the fact that the CobaSeal will have a much longer service life than its predecessor seal: Its unique coaxial design ensures that the sealing rings are non-contacting and therefore non-wearing in all operating conditions.

70 % less methane leakage due to DGS

The low process gas leakage rates of the DGS dry gas seal are ensured by bi-directional 3D gas grooves in conjunction with silicon carbide sealing faces and an extremely small sealing gap. The bi-directional design also increases the robustness and safety of the seal as it can rotate in both directions without damage.

Large seal, high reliability, low leakage

The separation seal "CobaSeal" is now also available for shaft diameters up to 355 mm and has been successfully tested. It is suitable for compressors in any plant in the oil and gas industry, such as refineries, LNG and petrochemical plants. Since much smaller quantities of nitrogen are sufficient for its supply than for standard sealing solutions on the market, the plant operator can save up to 50,000 euros or more per year and compressor.
In addition, the special material combination for the stationary seat and seal face also allows operation with ultra-dry nitrogen. The sealing rings are non-contacting in every operating condition and thus non-wearing, so that maintenance intervals of the system can be extended accordingly. Special settings are not necessary for operating conditions at extremely low speeds (slow-roll or turning) or when the compressor slows down (coast-down) - a convenience for the plant personnel.



The compressor with the EagleBurgmann solution compresses the dry methane and transports it in one of the four pipelines to Central Europe.

The DGS21 type gas seal enables very low process gas leakage.

This feature prevents seal damage when compressors unexpectedly reverse rotation.

The customer confirmed to EagleBurgmann that the new DGS has about 70% less leakage than the seals in the other compressors. This is reflected economically with considerable savings: The operating costs for this one compressor with the DGS are thus reduced by about 25,000 euros per year. 70% less methane leakage also means less CO_2 emissions due to flaring off the leakage and consequently less CO_2 tax burden for the operator.

"Compressor Seals" guide

Seal contamination, operating conditions, leakage, product loss - there are many causes that affect the optimum operation of a compressor. We have compiled ten scenarios and suggested solutions in our guide.

Download flyer
Download the flyer "Dry Gas Seal solutions – A guide to a safer and more reliable operation of compressors" at

EagleBurgmann – at the leading edge of industrial sealing technology

Our products are used wherever safety and reliability count: in the industries of oil & gas, refineries, petrochemicals, chemicals, pharmaceuticals, food, energy, water, mining, paper, aviation and aerospace and many more. About 6,000 employees contribute their ideas, solutions and dedication every day to ensure that customers around the globe can rely on our seals. With our modular TotalSealCare Service, we emphasize our strong customer orientation and offer custom-tailored services for every need.
Rely on excellence

eagleburgmann.com
info@eagleburgmann.com