EagleBurgmann
a member of EKK and FREUDENBERG

RELY ON EXCELLENCE

Fugitive methane emissions in natural gas compressor reduced to zero

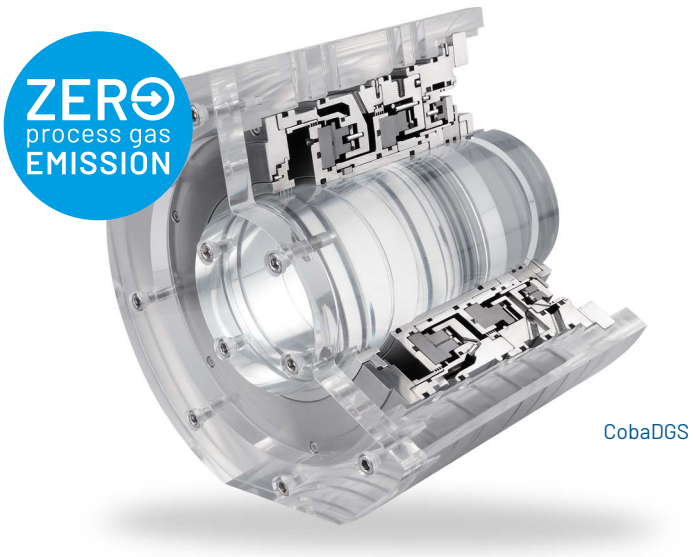
CobaDGS upgrade proves to be a successful decarbonization measure

A mechanical seal was replaced at GRTgaz, which for the past year has prevented the process gas compressors leakage commonplace when running natural gas compressors. Other benefits: less maintenance and higher safety.

It used to be impossible to avoid methane emissions from high-pressure compressors with conventional gas-lubricated tandem mechanical seals – until now. For the first time, the new CobaDGS dry gas seal eliminates all fugitive emissions during operation.

There is no way to prevent emissions entirely when operating natural gas compressors: The design of the turbo compressors used on compressor stations makes them susceptible to leakages. This is because the gas-lubricated mechanical seals used at high pressures, like other components, do not fully seal up.

In addition, the tandem dry gas seals may require the compressor to be vented when at a standstill, which is time-consuming and gives off emissions.
French transmission system operator GRTgaz was not content to put up with these issues. Its infrastructure is made up of 30,000 kilometers of pipeline network with around 10,000 valve stations as well as 26 compressor stations. The company has always focused on innovations and the use of the best available technology to improve environmental protection.



CobaDGS

CASE STUDY

- **Pilot project:** Conversion of a pipeline compressor, France
- **Customer:** GRTgaz Ltd, Bois-Colombes
- **Industry:** Oil & Gas
- **Challenge:** Design and delivery of the first emission-free dry gas seal for a pipeline compressor.
- **EagleBurgmann services:** Consulting, engineering as well as on-site installation and testing
- **Technical solution:** CobaDGS compressor seal as a complete solution with high-pressure nitrogen generator and supply system

CobaDGS high pressure nitrogen generator and supply system on the operator's site.

Ambitious plans for decarbonization

In 2016, the company set itself an ambitious goal to minimize methane emissions, aiming to reduce them to one third in just four years. After it had already halved emissions in the first two years, the company contacted the engineers at EagleBurgmann as part of its research into technical possibilities for further decarbonization measures.

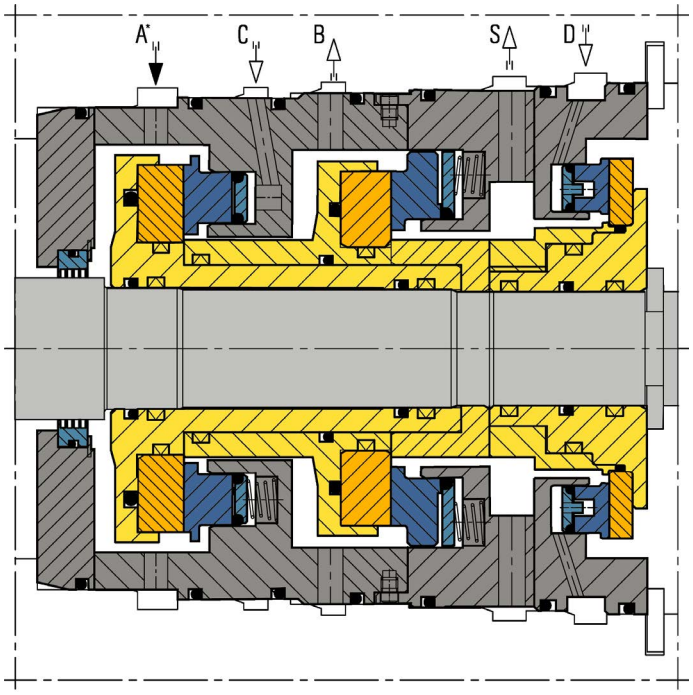
The goal: to build an emission-free dry gas seal for turbo compressors and test it for a year – first internally and then in practical use. For the pilot project, the sealing experts converted a compressor at a compressor station to the innovative new product known as the CobaDGS.

Innovative new seal design for zero emissions

For the newly developed CobaDGS dry gas seal, EagleBurgmann has adapted the coaxial design of its nitrogen supplied separation seal CobaSeal. Further secondary seal faces were arranged behind the coaxial seal. At the same time, the components were designed for higher operating pressures, giving the CobaDGS a level of safety on par with that of a tandem seal.

The innovation eliminates process gas leakage at the compressor station during operation and downtime alike. Since it is continuously supplied with nitrogen during operation, the process gas is not discharged into the atmosphere (venting), which is standard procedure with tandem seals.

According to EagleBurgmann's calculations, a CobaDGS seal upgrade can prevent up to 228,000 m^3 of gas emissions per compressor in one year, depending on the nature of a plant. This corresponds to more than 12,500 t of CO_2.



CobaDGS tandem arrangement.

A: Buffer gas supply (optional)
B: Primary vent
C: Seal gas supply
D: Separation gas supply
S: Secondary vent.

Product side is shown on the left, atmospheric side on the right.

The system not only ran safely and robustly at pipeline operating pressure but also during a simulated nitrogen failure. The CobaDGS thus achieves a higher level of safety than ever before, with a longer mean time between maintenance (MTBM) as an added bonus. The compressor housing did not need to be modified, so the seal could be easily retrofitted.

Nitrogen generated on site
In addition to developing the seal, EagleBurgmann's services included the design of an entire nitrogen generation and supply system on site: An autonomous container with accumulator generates the gas from the air through pressure swing adsorption and secures supply at the remote location in France. The high-pressure generator was installed outside the ATEX zone so as to ensure protection from explosions.

Pascal Alas, Senior Rotating Equipment Engineer, at GRTgaz, describes the pilot project's success:

» It was the right decision to go with EagleBurgmann for that innovative solution. The results are in line with the ambitious targets of this pilot project – a great success for the whole team. «

Pascal Alas –
Senior Rotating Equipment Engineer

ZERO process gas EMISSION

The benefits of the CobaDGS
CobaDGS is the first dry gas seal that prevents the emission of process gases that harm the climate. It ensures reliable sealing at pressures of up to 160 bar, making it a practical and sustainable option for upgrading existing compressors or for installation in new compressors. The installation-ready cartridge seal is available as a single and as a tandem seal.

- No methane/process gas emissions
- No problems with dew point and contamination, since it is supplied with nitrogen
- No emergency stop required thanks to excellent emergency running characteristics of the seal
- Requires no modification of the compressor
- For compressors with gas or steam turbine or electric drive
- Optionally available as complete solution with high-pressure nitrogen generator for on-site generation of nitrogen

Result

The CobaDGS not only proved itself in EagleBurgmann's test rig, but it also showed that natural gas compressors can be operated without fugitive emissions in practice. It thus provides an important building block for secure and environmentally friendly gas supply over the long term. The CobaDGS – as a complete solution with nitrogen generator and supply system – also simplifies procurement, coordination, and implementation.

Further information on CobaDGS

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 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