

## RELY ON EXCELLENCE

# Espey WKA cartridge seal for superlative turbo compressors

Designed as a "plug-and-run" solution, the carbon floating ring seal proved impressive in a new CCS plant.

Everllence, a German original equipment manufacturer specializing in turbomachinery, sought a groundbreaking new sealing solution for its compressors. In collaboration with EagleBurgmann Espey, the first plug-and-run solution for carbon floating ring seals was developed.



The goal was to develop a carbon floating ring seal that offers the advantages of a cartridge unit and that can function safely and reliably under the most demanding conditions. The seal should be suitable for use with a wide range of process gases and withstand an operating pressure of up to 250 bar.

As a pioneer in cutting-edge technology, Everllence is constantly questioning the status quo of its portfolio. This includes the shaft seals used in compressors. The idea arose to align the installation space of the standard carbon floating ring seal from EagleBurgmann Espey with that of a dry gas seal. This allows customer requirements regarding seal selection to be met as efficiently as possible.

Everllence (formerly MAN Energy Solutions SE) manufactures steam turbines, power plant technology, and reactors for a variety of industries. The company's strategy includes developing future-oriented technologies that drive the decarbonization of the economy. The Berlin site manufactures radial gear compressors for carbon dioxide compression, among other things. With the innovative carbon floating ring seal, the engineers therefore had applications such as CO<sub>2</sub> capture and storage (CCS) in mind.

### Successful collaboration between two areas of expertise

To ensure they had the necessary sealing expertise in carbon floating ring technology, the project team turned to the engineers at EagleBurgmann Espey. The two companies had previously collaborated to further develop the Espey WKA802S to meet ever-increasing technical requirements. Close cooperation in designing the cartridge version was therefore an obvious choice.



Based on the proven Espey WKA802S carbon floating ring seal, the new plug-and-run solution developed with Everllence combines the components shaft sleeve, seal, and housing for the first time.



» The development of a cartridge carbon floating ring seal, specially designed to reduce downtime in high-pressure compressors, is a new milestone in sealing technology. «

Carsten Bennewa, Engineering Director, EagleBurgmann Espey

### CASE STUDY

- **Reference:** Multistage compressor in CCS plant
- **Client:** Ammonia producer, USA
- **Industry:** Chemical industry
- **Challenge:** Development of a carbon floating ring seal as a plug-and-run solution for a high-pressure CO<sub>2</sub> application
- **EagleBurgmann Services:** Consulting and design of the new seal in close cooperation with Everllence Berlin
- **Technical Solution:** Espey WKA802S-CC cartridge with modular service concept

## “Plug-and-run” – a new standard for chamber design

The pre-assembled unit minimizes the risk of component damage during maintenance and servicing because it can be replaced quickly and safely. Additionally, the balanced shaft sleeve ensures smooth, low-vibration operation even under the most demanding conditions. This new concept enables efficient integration and handling, which is a decisive advantage in complex systems and high-load operations.

### New service concept

The service concept was also rethought during the further development of the Espey WKA802S. Operators can choose the scope of support that best suits their needs from the range of services provided by the EagleBurgmann carbon floating ring competence center. This includes options such as quality control and reconditioning, as well as the partial replacement of technical parts, which is a sustainable and efficient solution.

### First deployment in CCS plant

After numerous successful performance tests on the in-house test bench, the Everllence project team decided to use the new seal under real-world conditions.

A new CO<sub>2</sub> dewatering and compression plant with permanent CO<sub>2</sub> sequestration was built in one of the world's largest ammonia production plants on the Gulf of Mexico in the southern United States. In this plant, the moist, CO<sub>2</sub>-rich gas produced during the production process is compressed and cooled. It is then passed through a dryer to remove excess water. The separated CO<sub>2</sub>

is to be permanently stored underground. The CO<sub>2</sub> capture and storage plant enables the transport and permanent geological storage of up to two million tons of CO<sub>2</sub> per year, which would otherwise be emitted into the atmosphere. Through this project, the American manufacturer aims to increase the availability of low-carbon ammonia for industrial and energy purposes, as well as further decarbonize its own production.

Everllence supplied two radially driven turbo compressors of a new dimension for this plant. The eight-stage system, which is equipped with 16 of the new cartridge seals, has been in operation since July 2025. These seals are specially designed for extreme operating conditions, impressing the operator with their high reliability and ease of maintenance.

### Benefits of the Espey WKA802S Cartridge

- Ready-to-install unit consisting of shaft sleeve, seal, and housing
- Modular chamber design
- Compact
- Very small operating gap for minimal leakage
- Service offering with service levels as desired
- Can be used as a retrofit in Everllence turbo compressors

## Result

In October, the plant surpassed 5,000 hours of trouble-free operation. This impressive achievement is proof of the robustness and reliability of the sealing solution used under real process conditions.



**PLUG & RUN**

» The goal of modularization is to respond to customer requirements as efficiently and flexibly as possible. A cartridge seal solution is the answer. «

Jens Böker  
Engineer RG Compressors and Seal Expert,  
Everllence



Further information on the Espey WKA802

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