

Solving a decade of problems

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Burckhardt Compression reverses fortune of dry-running hydrogen compressors

It is always best to operate a business with minimal maintenance costs, while achieving efficiency and reliability targets. However, industries such as gas compression present many challenges, and keeping key equipment like reciprocating compressors in prime condition requires considerable expertise. For an Air Products plant in South Africa, losing up to 20% of output due to frequent downtime for more than 10 years was solved by a range of solutions from Burckhardt Compression that got the process back on track.

Tackling hydrogen

Sealing dry-running hydrogen compressors is particularly challenging; maintaining effective seals to prevent the escape of the smallest molecules in existence is a complex task. For Air Products, two non-Burckhardt Compression dry-running hydrogen compressors were a cause for very high maintenance costs and wearing parts were being replaced every month. This not only caused increased costs and additional downtime, but the leakages equated to lost revenue as well.

Air Products called in Burckhardt Compression to establish the sources of the problems and to propose long-term engineering solutions. The initial investigation showed that the sealing elements and the piston rods were at the heart of the problem. Internal leakages were causing reduced gas flow as well as temperature issues and a significant loss of efficiency.

The root cause analysis identified several areas for improvement, including a redesign of second-stage packing case assemblies and a piston rod refurbishment.

The project would also involve the creation of a new piston ring set and upgrading the materials to the latest design along with the renewal of the cylinder liners.

Delivering the repair strategy

The execution of the refurbishment project was carefully planned to optimize delivery and minimize downtime. New parts were manufactured and delivered to site to enable one compressor to be overhauled while the second remained in service. Once complete, the renewed compressor was recommissioned and work began on the second unit, while performance data on the first machine was monitored closely.

The results were stunning on several levels. The compressors ran for 22 months without incident – the monthly replacement of parts is thankfully a distant memory. Internal leakage was stopped – a considerable achievement on a hydrogen compressor, and emissions were significantly reduced along with the maintenance costs.

Equally important, production losses, which had been established at 20%, dropped to just 2%. At the same time, the wearing parts designed and installed by Burckhardt Compression delivered a substantial increase in service lifetime and the energy consumption by volume of produced gas was reduced by 25%. The operator was surprised by the scale of the improvements.

“We didn’t think that this level of performance was possible!” explains Johan Maartens, Air Products, Vanderbijlpark, South Africa. “Burckhardt Compression diagnosed the issue swiftly and executed the repairs with precision. Our second compressor was booked in for the same refurbishment and we will be involving Burckhardt Compression in many more overhaul projects in other facilities, based on the remarkable results of this project.”

Where some operators may have considered the compressors beyond redemption, Air Products saw an opportunity to retain the existing equipment with improvements

that would extend their service life and sustainability. The end result was a significant short- and long-term cost saving for the business, as well as greater peace of mind regarding some of its most crucial machinery.

Image captions:



Image 1: Keeping key equipment like reciprocating compressors in prime condition requires considerable expertise.



Image 2: Upgrade of rings & sealing elements with newest design.



Image 3: Compressor cylinder after overhaul.

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About Burckhardt Compression

Burckhardt Compression is the worldwide market leader for reciprocating compressor systems and the only manufacturer and service provider that covers a full range of reciprocating compressor technologies and services. Its customized compressor systems are used in the gas gathering and processing, gas transport and storage, refinery, chemical, petrochemical as well as in the industrial gas and hydrogen mobility and energy sectors. Burckhardt Compression's leading technology, broad portfolio of compressor components and the full range of services help customers around the world to find the optimized solution for their reciprocating compressor systems. Since 1844, its highly skilled workforce has crafted superior solutions and set the benchmark in the gas compression industry.

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