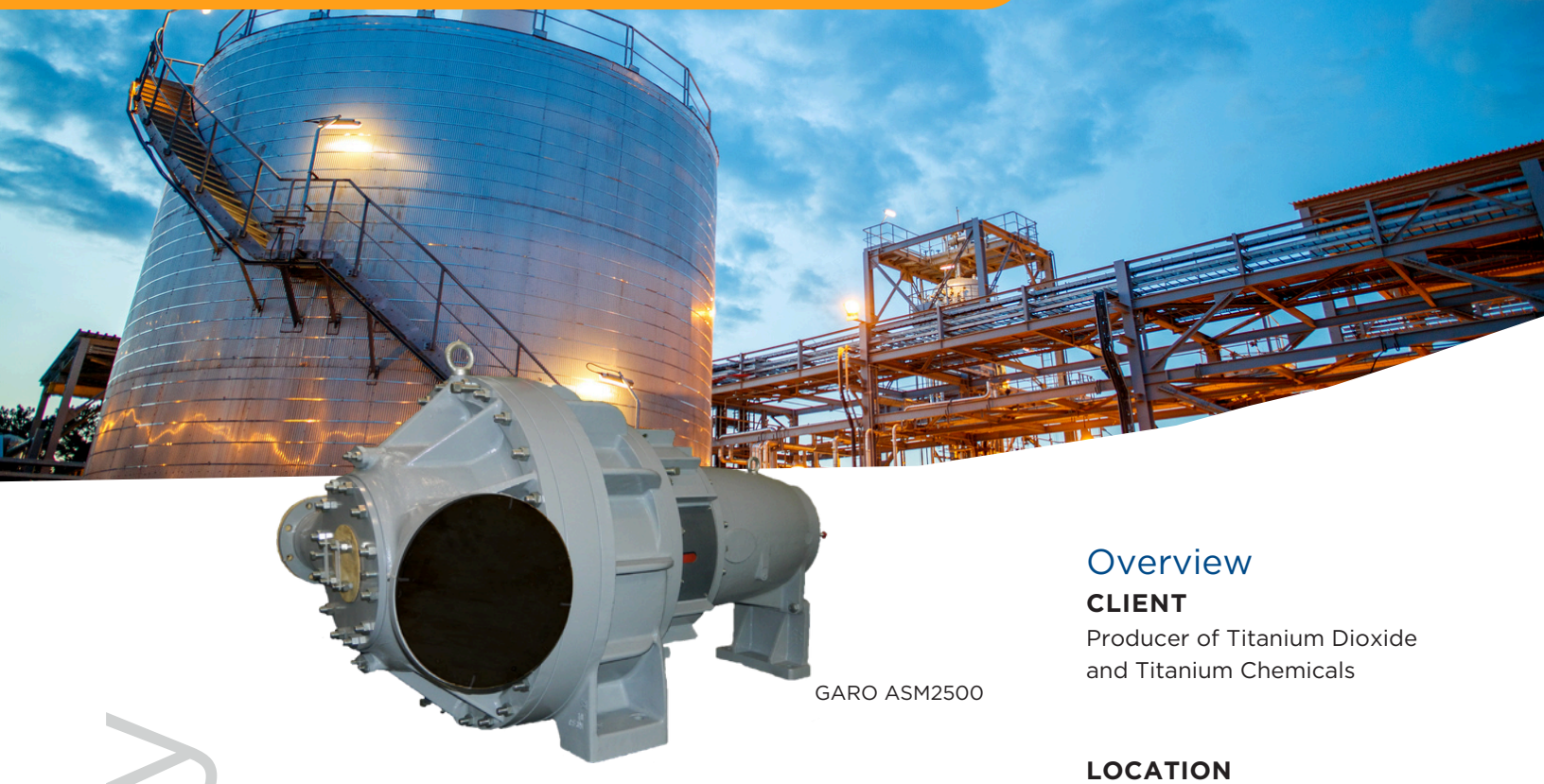

GARO ASM2500

Case Study

GARO Custom Liquid Ring Systems Prove Ideal for Low Pressure, Dry Chlorine Applications

As one of the largest global producers of titanium dioxide and titanium chemicals, the customer boasts an impressive, ever expanding portfolio of businesses that encompasses pigments, mining, metals, and chemicals. Employing over 4,000 staff, and controlling 8 manufacturing plants in a number of countries, the customer is dedicated to using cutting edge technologies to unleash the potential of titanium.

Established in the 1980's and commissioned in the early 1990's, the customer has been at the heart of the titanium industry in the middle east for decades. Using advanced technology to produce titanium dioxide using a chlorine process, the plant has been determined to produce the highest quality products since its inception.

Overview

CLIENT

Producer of Titanium Dioxide and Titanium Chemicals

LOCATION

Middle East

APPLICATION

Low Pressure, Dry Chlorine for Titanium Production

PRODUCTS

- 13 GARO ASM 2500 Liquid Ring Compressors

CUSTOMER BENEFITS

- 30% Increase in Productivity
- 50% Decrease of Annual Maintenance Costs
- 30% Reduction in Downtime

Looking to further cement its position as a leading global provider of titanium dioxide products and chemicals, while building on their Middle Eastern plant's success through innovation and cutting-edge technology, the customer began working to increase production capabilities through a series of expansion projects.

Ageing Equipment has Reached its Maximum Operational Capacity

With a battery of ageing liquid ring compressors operating at maximum capacity, it was clear that new equipment would be required to meet the expansion projects goal of boosting production capabilities. In addition to stretched capabilities, plant engineers also noted that the legacy compressors were showing an ever-decreasing resistance to erosion caused by titanium dioxide particulates, and signs of corrosion caused by a low concentration of sulfuric acid, increasing the plant's maintenance costs and the risk of unplanned downtime or equipment failure.

Governed by the production process and to maintain their ISO quality certifications, the customer developed a range of requirements that the new battery of compressors would need to meet. In addition to a focus on cost of maintenance and overall reliability, the new equipment would need to be highly

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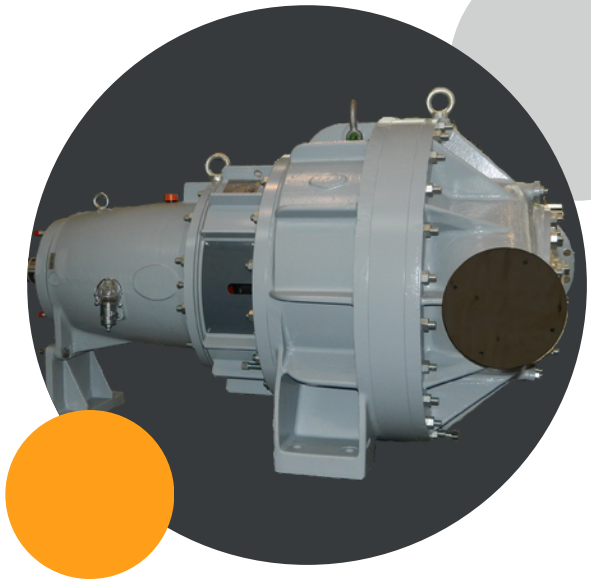
resistant to titanium dioxide erosion and have a high mean time between failure.

As a solution provider with a reputation for high-quality, resource efficient, and reliable liquid ring technology, the customer reached out to GARO to design a system that would meet not only the rigors of production, as well as their cost and reliability requirements.



A Complex System Tailored to the Customer's Unique Requirements

After evaluating the customer's requirements, GARO engineers promptly began work on designing a system built around a battery of GARO ASM 2500 liquid ring compressors. Working with stainless steel rotors, the ASM 2500 units utilize a cone design that minimizes metal-to-metal contact, with minimal clearance between static and rotating parts. This unique design not only boosts efficiency, but also prevents build-up, or 'choking', of titanium dioxide particulates within the unit.

The complete system consisted of a total of 13 ASM 2500 units, connected to a single gas liquid separator, resulting in the largest GARO liquid ring compressor system for dry chlorine applications. The complete system also incorporated an automatic turndown controller, to allow for 0 – 100% operation, in addition to custom piping to allow regular cleaning and removal of titanium dioxide particulate, in line with the customer's maintenance schedule and requirements.

To minimize disruption and downtime, the system was delivered in four stages, beginning with commissioning of the first compressor package, consisting of a single ASM 2500 unit in 2004, and culminating with the commissioning of the final package of three compressors in 2011.

The Result – A Solid Foundation with Tangible Savings

Since commissioning of the final package, the customer has noted a significant improvement, estimating a 30% increase in productivity at their Middle Eastern plant. Though slightly lower due to the rigorous production process, the new system was also able to boast a mean time between failure of 7 years, a marked increase over the legacy system. Additionally, the plant has been able to report a 50% decrease in their annual maintenance cost, and 30% reduction in unplanned downtime.

For the customer, the benefits of selecting a custom package from an expert provider of innovative, reliable, and efficient products for industrial applications were clear. To learn more about how GARO's custom liquid ring compressor systems can help your operations, contact us today.

To find out more about Garo Compressors for Chlorine visit

www.garocompressors.com

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