



Case Study

GARO AB2500

Patented GARO WAIS Provides Substantial Benefits for Flare Gas

Recovery & Amine Treating

With ageing infrastructure and tightening environmental requirements, our customer was looking to maximize the efficiency of their refinery, while reducing its impact to the environment, by installing Garo's patented Washing Amine Integrate System (WAIS) for Flare Gas Recovery (FGR).

Read the article to learn more about how Garo's team of experts was able to deliver and commission a customized WAIS Flare Gas Recovery unit, to help our customer get the most out of their facility.

Overview

CLIENT

Oil & Gas Refine

LOCATION

Western Russia

APPLICATION

Amine Treating, Flare Gas Recovery

PRODUCTS

- GARO AB2500 two-stage Liquid Ring Compressor

CUSTOMER BENEFITS

- Safe
- Reliable
- Efficient
- Flexible
- Self-Sustainable

Having been in operation since the 1940's, our customer is one the largest oil and gas enterprises in Western Russia, processing approximately 7 million tons of oil per year. Primarily focused on the production of high-grade automotive fuels, the plant plays host to a variety of secondary processing facilities, including catalytic cracking, reforming and hydro-treating, visbreaking, light hydro-cracking and isomerization, and hydrogen production.

Faced with ageing infrastructure and tightening environmental regulations, our customer was looking to boost their plant efficiency and minimize the amount of pollution generated by implementing a Flare Gas Recovery system. Flare Gas Recovery (FGR) is key to the safe, efficient, and environmentally conscious operation of many refineries and petrochemical facilities around the world.

Essentially, FGR is the process of recovering and repurposing gasses and emissions, such as methane/LPGs, and sulfur dioxide, that

would normally be burned and released into the atmosphere during the flaring process. FGR systems although effective, can add an additional layer of complexity and operational cost that can sometimes offset a small portion of the savings that can be gained.

With quality and reliability being front of mind for the operator, refinery engineers sought the feedback from a range of international consultants and third party FEED companies to determine the best solution. Time and again, the answer was the same - Garo's patented Washing Amine Integrated System (WAIS).

Traditional FGR systems utilize a 'closed-loop' design, relying on water as the service liquid during the compression phase. Although effective, the use of water can add complexity to the FGR process by requiring treatment of the gas prior to recycling. This additional step uses an amine solution to scrub/sweeten H₂S from the compressed gas to make it usable.



GARO's WAIS is an evolution of traditional FGR systems which exploit the ability of Liquid Ring Compressors to support a wide range of seal liquids. In this way, WAIS can provide a host of benefits over traditional water based seals, particularly in applications where water quality and/or supply are an issue. By using amine as service liquid, Garo's WAIS eliminated the need for a separate gas treating unit, as well as the need for cooling and treatment water. WAIS replaces the gas treating unit with an innovative three phase separator that does not rely on pressure release, providing several benefits:

- Safe - The recovered gas can be used directly as fuel, even in case of unscheduled shutdown of the fuel gas absorber.
- Flexible - The final clean-up, ensured by a small absorption column on top of the separator, allows Garo's WAIS to withstand sudden and wide variations of H₂S content in the gas fed to the compressor.
- Self-Sustainable - WAIS operates independently from amine washing units, which may not be present, or may not be able to handle additional gas to be treated.

In addition, Garo's WAIS provides traditional FGR benefits to reduce gas flaring, remove gas impurities, and can provide significant cost savings by reducing steam consumption and utilizing flare gas as fuel gas.

The supplied system consisted of a GARO AB2500 two stage liquid ring compressor with double eccentric casing and overhung impeller, and an



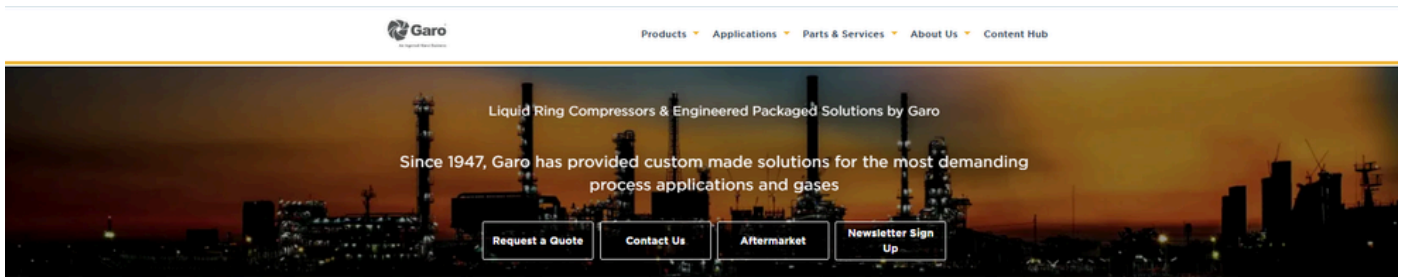
automated turndown system to meet the plant's 0-100% operational requirements. GARO compressors offer a custom cone design that eliminates any metal-to-metal contact, providing minimal clearance between static and rotating parts, further boosting the overall system's efficiency.

Garo's engineers designed, built, tested and supplied the customized system to the customer in 2007, with commissioning in 2008. The supplied system provided the customer with the most reliable and efficient method for compressing sour flare gas at high pressure, improving H₂S performance (2.8% gas in, 24 ppm gas out) without impacting the plant's existing amine absorption tower.

Contact one of our trained technical sales representatives, or visit www.gdgaro.com, to learn more about our patented Washing Amine Integrated System (WAIS) and how it can help you get the most out of your operation.

To find out more about Garo Liquid Ring Solutions for Flare Gas Recovery visit

www.garocompressors.com



Explore GARO's solutions for oil, gas, chemical, and petrochemical sectors

Welcome to the World of Industrial Excellence: Garo!

With over 70 years of unrivaled experience, Garo stands as a beacon of innovation, reliability, and customized solutions in the realm of industrial plant systems. Our unwavering passion for engineering and efficiency drives us to create tailor-made compression solutions that consistently surpass our customers' expectations.

Our Expertise: Liquid Ring Compressors: at Garo, we specialize in the design, manufacture, and maintenance of high-quality liquid ring compressors. Our unparalleled experience in this field has enabled us to develop liquid ring compressors that deliver exceptional performance and reliability.

Customized Packages for Your Needs: we understand that one size does not fit all. That's why we offer customized packages that cater to your specific requirements. Our engineered solutions are meticulously crafted to ensure they meet and exceed your industrial needs.

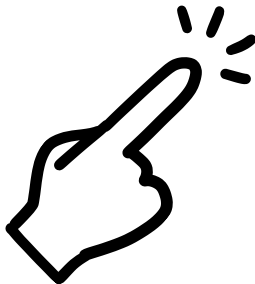
Pioneering Flare Gas Recovery Solutions: in addition to our expertise in liquid ring compressors, Garo is at the forefront of innovation in flare gas recovery.

We are dedicated to creating pioneering solutions for capturing and repurposing flare gas emissions, helping your facility minimize waste and maximize resource efficiency.

Discover **Garo's Liquid Ring Expertise** and **Flare Gas Recovery Solutions**. When it comes to liquid ring compressors, Garo is the name you can trust.

And now...

Explore our comprehensive range of liquid ring compressors and our cutting-edge flare gas recovery solutions, and



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