Application Brief 370

Extending Legacy Compressor Life: Like-for-Like Cylinder Replacement for a Non-Howden Reciprocating Compressor

The Challenge

Situated in Southern Sweden, this refinery supplies roughly 2**5% of Sweden's total demand for refined oil products**. Compressors are critical assets in the refining industry—supporting process equipment, enabling key reaction and separation steps, ensuring reliable (feed) gas transport, and serving a range of utility and specialty duties. Their reliability and efficiency make them a cornerstone of modern refinery operations.

The client approached **CPI by Howden** to determine whether we could **design and manufacture a replacement cylinder** for a **Clark CMA2 reciprocating compressor**, originally built in **1959**. The need was driven by two key factors:

- The existing cylinder showed **visible cracking and leakage**, creating reliability and safety concerns.
- Repair options were limited because the **original OEM no longer exists**, making like-for-like replacement parts unavailable.

In response, Howden completed a detailed **engineering study** to identify the most favourable solution—one that would deliver long-term integrity while **minimising changes** to the compressor, its ancillaries, and overall **downtime**.

Following extensive in-house research and evaluation of alternative cylinder concepts, Howden and the client agreed that the optimum approach was to produce a **like-for-like "carbon copy" cylinder**. This required **reverse engineering** of the original component, followed by **pattern design, casting, and precision machining** to replicate the cylinder to the required specifications and interfaces.

Although the reverse engineering and manufacturing cycle introduced additional lead time, the solution delivered a major operational advantage: the client was able to **reuse all existing cylinder-associated components**, including **warehouse spare parts**, reducing total project cost, simplifying installation, and accelerating the return to service once the replacement cylinder was delivered.

The Solution

The outcome of the joint effort between the client and Howden was the successful delivery of **two (2) like-for-like replacement cylinders**, designed and manufactured to replicate the original Clark CMA2 geometry and interfaces. Both cylinders were supplied in full accordance with the client's performance **requirements**, meeting expectations for integrity, reliability, and operational suitability. All cylinders manufactured by Howden are produced in strict compliance with our rigorous quality plan.

A key benefit of the like-for-like approach was the **seamless mechanical and process integration** at site. The replacement cylinders were produced with matching connection points and mounting features, enabling the client to **reconnect existing ancillary equipment without modification**. This included critical items such as **pulsation dampeners**, as well as associated piping, fittings, and instrumentation tied to the cylinder interfaces.

As a result, the installation scope was simplified, commissioning risk was reduced, and overall downtime was minimised—delivering a practical, low-impact solution for extending the service life of a legacy compressor with limited OEM support.