

CENTRIFUGAL COMPRESSOR RERATE

By Matt Konek



A Midwest manufacturer and distributor of industrial gases is relocating an idle air separation plant and acquired a vintage 1965 surplus 3-stage centrifugal compressor for nitrogen recycle service. However, the original compressor design did not provide the required discharge pressure.

RMS performed a rerate study and determined the compressor was a suitable candidate to meet the uprated conditions. Detailed analytical work included aerodynamic, lateral rotor dynamic, vibration, and shaft stress analyses.

The rerated operating conditions were achieved with minimal modification to the compressor. Flowpath components in the first and second stages were not modified.

The uprate in discharge pressure was accomplished by only redesigning the third stage, which included a new impeller, diffuser and a reworked pinion. The surplus machine was completely overhauled by RMS with new bearings and seals.

A final documentation package that includes the final performance analysis with compressor curves, assembly drawings and installation instructions is included in the work scope. The new components were installed in the spring of 2009.

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