

# Ethylene liquefaction & storage

## Qenos, Sydney, Australia

Our client requested an ethylene liquefaction system, with especially high reliability, as the system was intended to be a 1 x 100% installation without standby, but at a lower cost than the conventional oil-free centrifugal compressor system. We met this requirement by developing world-first technology for use of an oil-flooded screw compressor in an application previously regarded as impossible, while still meeting exceptional reliability standards.

- Refrigeration unit for ethylene liquefaction & storage
- 685 kW cooling, normally at  $-88^{\circ}\text{C}$ , occasionally to  $-100^{\circ}\text{C}$
- Ethylene-propane cascade system
- World's lowest-temperature operation for an oil-flooded screw compressor
- Exceptional reliability – over three times the normal period for overhaul, without compressor maintenance

In an oil-flooded screw compressor, cold suction gas mixes with the lubricating oil. For  $-100^{\circ}\text{C}$  suction gas, it was previously regarded as not feasible to use an oil-flooded compressor, as the oil would freeze. For this project, we developed proprietary oil-management technology to maintain oil movement even at  $-100^{\circ}\text{C}$  inlet gas temperature, allowing a very large cost saving compared to using oil-free compressors.

Screw compressors are usually due for overhaul every 25000 hours, or three years in continuous operation. We specified additional non-standard compressor design features, and incorporated further special designs into the ancillary systems plus extensive condition monitoring, to permit all three compressors in the system to have run without opening for maintenance almost 10 years so far – and still counting! The savings in reduced maintenance have far exceeded the additional costs to build in this level of reliability.



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