

New compressors fulfil a wide range of flow requirements

Shortland is a suburb of Newcastle, New South Wales, Australia, located 12 kilometres from Newcastle's central business district. It was named after Lt. John Shortland, master's mate of the Sirius, the escorting vessel to Australia's First Fleet. Shortland has a population of only 3'700, but the plant serves a much wider area processing 9.6 MI/day (9'600 m³/day). The blower purchase was part of the Shortland Alum Dosing & Aeration Upgrade project and it included four Sulzer HST™ turbocompressors to replace two old positive displacement blowers and one practically new competing high-speed turbocompressor. The machines were installed in mid-2014.



“Efficient, reliable twenty-first century machines.”

Sam Dugan, NSW & ACT Area Sales Manager, Sulzer Pumps Wastewater Pty Ltd.

The challenge

The plant had recently purchased a competitor's high-speed turbocompressor to trial. The new high-speed turbocompressor was not all the competitor promised. It could not achieve the required turn-down ratio (i.e. could not meet the minimum flow requirements) and had trouble operating reliably in conjunction with the existing positive displacement blowers. The pulsations caused by the positive displacement compressors created shockwaves in the manifold. These shockwaves interfered with the competitor's passive air bearing system, causing instability in the rotor.

Having limited local engineering presence the competitor was not able to solve the problems. The required range of flows was 2'700-5'467 Nm³/h. This represents an operational turndown ratio of 50%, and 42% compared with the maximum performance, which is a very wide range for a turbocompressor. With a competitor's machine failing in the field, it was vital that the Sulzer technology would be superior under the same real-life conditions.

The solution

Sulzer's HST turbocompressors can operate reliably in conjunction with existing positive displacement units. Sulzer has a reference site proving this near Melbourne, so an inspection was arranged for the customer. The original intention was to supply two HST turbocompressors to operate alongside the existing ones. The customer, however, decided that no further trials were required and chose to remove all existing machines and replace them with four new Sulzer HST 20-6000-150 turbocompressors.

The HST turbocompressors were factory tested and then field tested. The results were heavily scrutinized due to the competitive situation. The turbocompressors passed all tests showing that Sulzer delivers what is promised.

Customer benefit

- Dramatic increase in efficiency over old PD blowers
- Efficiency, reliability and availability improvement compared to competitor's high-speed turbocompressor
- Reduced footprint, noise and maintenance costs
- Sulzer's catalogue claimed performance was achieved in site testing.

The Shortland compressor room



The Sulzer difference

- The Sulzer HST turbocompressor offers reliable operation and top efficiency.
- Best life-cycle cost while minimizing the environmental impact.
- In the high-speed turbocompressor market, Sulzer is the leader in magnetic bearing technology. No other solution offers the same efficiency, stability or component life. Magnetic bearings offer unmatched rotor stability allowing tighter tolerances, which give both higher efficiency and predictability when performing in pulsating manifold environments.
- Integrated unit with compact footprint for straightforward installation.

Product data

The HST20 is an integrated package. The turbocompressor is designed for ease of installation and operation, with an inlet silencer, an outlet silencer and a silenced blow-off valve incorporated into the cabinet. Complexity is reduced, along with the cost of installation.

The project was a retrofit so it was essential that the solution fitted well into the existing compressor room, making it easy to replace the old, inefficient machines.

Rather than the added expense and complication of a field-installed Master Control Unit PLC, these units are controlled directly by the customer's existing plant-wide SCADA telemetry system. The system uses the latest MODBUS protocol to ensure fast and reliable communication between the customer's network and the HST 20 turbocompressors.

4 units HST 20-6000-150 turbocompressor

Power	150 kW
Flow rating	2'500 – 7'000 Nm ³ /h
Pressure rating	30 – 90 kPa
Peak total efficiency	76%
Peak isentropic efficiency	86%
Quantity	3 duty, 1 standby
Biological process	Intermittently Decanted Aeration Lagoon (IDAL)
Maximum required flow	5'467 Nm ³ /h (humid)
Maximum required pressure	65 kPa
Minimum required flow	2'700 Nm ³ /h (humid)
Minimum required pressure	40 kPa

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