

# PumpAction..... Issue 29

## CASE STUDY

### Kelair's Goulds GIS verticals take the heat

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Recently, one of Kelair's customers in the Power Generation industry purchased a quantity of eight Goulds GIS-Series vertical sump pumps for use on remote areas of its site, accessible only to electricity.

Vertical sump pumps are still widely used throughout many industries. Self-priming pumps, centrifugal pumps with foot valves, and submersible pumps also share the same ability to pump wastewater from a pit. However, when the fluid reaches temperatures exceeding around 45°C, that fluid is no longer capable of providing sufficient cooling for the submersible pump which sits within the fluid. Higher levels of insulation are required, and not all pump manufacturers provide options on insulation.

In this case, the water temperature could climb as high as 90°C. The huge vapour pressure head losses would rule out the options of using a centrifugal with a foot valve, or a standard self-priming. There are more specialised self-primers capable of pumping vapour, but the trade-off is a loss of efficiency. So a vertical sump pump was the best option in this case. For this type of pump, the wet-end sits directly in the fluid, while the motor is situated on a mounting plate above the pit. The motor and wet-end are joined by a long stainless steel shaft.

There are two variations on vertical sump pumps. The first is a cantilever type, built with robust bearings that sit directly under the motor and above the mounting plate. The shaft is large in diameter, as there are no support bearings along its length. This version is used primarily when there are solids or salts in the sump fluid.

The second variation on vertical sump pumps has column bearings that support the pump shaft along



its length. These bearings need lubrication and they sit less than a metre apart. This is a cost-saving on the cantilever configuration as the stainless steel shaft doesn't have to be quite as thick.

On the Goulds pump (pictured above), the stainless tube supported along the length of the shaft carries sump water to cool the shaft bearings. In addition, attached to that tube are cyclone separators to 'fling' out any small solids, returning them to the sump which keeps them away from the shaft support bearings thus increasing the bearing life.

Another consideration was selecting the correct paint. Paint that is suited to 90°C in air is only rated to half that in water, so a paint suited to 180°C in air was selected to provide adequate protection.

Kelair also worked in conjunction with the customer to develop a sliding support bracket for the discharge-riser piper at the mounting plate. This bracket was to protect the paint on the pipe from being scratched by the plate, as the pipe moved during expansion and contraction of the pipework with temperature changes.

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