

CASE STUDY

Renovation of Pumping Station to Manage Unscreened Wastewater after Rainfall

Deurne is a rural municipality about 25 km from Eindhoven, in the province of Nord Brabant, with a population of 32,000 people. The Waterboard AA en Maas is responsible for numerous municipal pumping stations. From the pumping station Deurne Bakel, unscreened wastewater is pumped directly to the treatment plant Aarle-Rixtel.

In this terminal pumping station the three horizontal dry-installed wastewater pumps (DN300 size with P2=75 kW/6 pole) were facing continuous and frequent clogging after rain. During long dry periods, rags and trash settle in the incoming piping system (DN 1,000-1,500 mm, length 2,000 m). This problem is the result of low flow speed and is becoming more common since there is a clear tendency towards reduced water consumption and higher fiber and rags contents, which results in increased pump blockage.

The Sulzer difference

- Exceptionally blockage resistant pumping of wastewater containing solids and fibrous material
- High-efficiency impeller design with single-vane and multi-vane models to ensure exceptional blockage resistance. Solids passage min. 100 mm and larger.
- Optimum balance of impeller vane numbers and solids handling based on extensive computational fluid dynamics (CFD) research and testing
- Market leading efficiency, without compromising solids and rags handling
- Reduced life-cycle costs (energy consumption, operation time and downtime costs)

“ We very much appreciate the prompt and constructive support by Sulzer in installing the new ABS XFP 306M CB-2 Plus pumps that help solve the blockage issues and allow proper frequency setting. ”

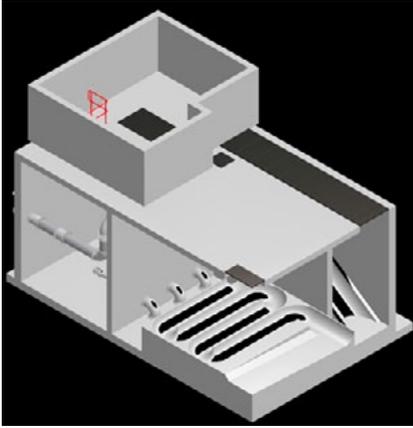
Johannes Boersma, Project Leader, and Frans van der Laak, Technical Engineer at the Waterboard AA en Maas

The challenge

After heavy rainfall, rags that have settled inside the sewer pipes are transported into the pumping station and this causes a great trash volume within a short period. As a result, the installed pumps often failed due to clogging.

The solution

The existing pumps were replaced step by step with new Sulzer submersible sewage pumps type ABS XFP 306M CB-2 Plus. Sulzer recalculated the duty points using two years' flow data from the existing installation and selected the new ABS XFP CB-2 Plus pumps with premium efficiency motors. To ensure the best operation in terms of energy management and high reliability, Sulzer installed one new ABS XFP 306M CB-2 Plus with 75 kW (6 pole) for a trial period in September 2013. In July 2014 the other two pumps were replaced by the new ABS XFP CB-2 Plus pump. The minimum frequency was set to 42 Hz with a minimum flow of 194 l/s. Since the replacement with the new CB-2 Plus hydraulics no blockage has been recorded.



Tapered and meander shaped inflow



Sulzer submersible sewage pumps type ABS XFP

The complex control panel was designed for an optimum pump protection, controlling and monitoring three pumps with variable frequency drives (VFDs). The panel is programmed to operate the pumps close to the best efficiency point with the lowest possible energy consumption. The new minimum set point is 700-850 m³/h at 42 Hz.

Customer benefit

With the new ABS XFP 306M CB-2 Plus PE750-6, the customer has the advantage of a blockage resistant pump. The hydraulic radial impeller design includes an adjustable bottom plate with intercepted slotting and ensures efficient rags handling throughout its lifetime.

Due to abrasion by sand, the gap between the impeller and the wear plate will increase in the course of time. Thanks to the adjustable CB wear plate, the clearance between the impeller and the bottom plate can be set back at the site. This also sets back the hydraulic efficiency to "as new".

Product data

Three submersible sewage pumps type ABS XFP306 CB-2 PE750/ PE750-6 with a closed loop water cooling system and integrated heat exchanger

- 400 Volt 50 Hz
- Electro Magnetic Compatibility (EMC) cable
- Operation with variable frequency drives (VFD)

Medium unscreened sewage:

Rainwater conditions

2 pumps total (50 Hz)	540 l/s at 16 meters (P3 & P1 or P2)
1 pump (50 Hz)	320 l/s at 18 meters (P3)

Dry weather conditions

1 pump min (42 Hz)	195 l/s at 18 meters (P1 or P2)
max (50 Hz)	235 l/s at 24 meters (P1 or P2)



Terminal pumping station Deurne Bakel

Contact

vincent.schoenmaeckers@sulzer.com
oliver.guglielminetti@sulzer.com

Applicable markets

Wastewater collection

Applicable products

Submersible sewage pump type ABS XFP