

Pumping a highly corrosive cocktail of abrasive iron and sinter particles

A new range of pumps from Flygt keeps northern Europe's leading heavy-plate manufacturer in business

Averaging temperatures in excess of 100 degrees Celsius, the gases from a blast furnace contain sufficient energy to provide heat for other processes in and around a steel plant. But first they have to be cleaned of flue dust and other solids. And that takes large quantities of water. Water that, having picked up a high concentration of abrasive and corrosive solids, must itself be cleaned.

Steel city by the sea

With considerable iron ore resources, the metal industry has always played an important part in the Swedish economy. Oxelösund, 120 km south of Stockholm, boasts one of Sweden's largest iron and steel works. The city's population is 14,000, and some 2,750 people are employed at the plant. The first iron works were built in Oxelösund in 1917. Today production exceeds 1.2 million tons annually and the works are acknowledged as the leading manufacturer of heavy plate in northern Europe. With an extensive system for quality assurance, Oxelösund has been certified by both Lloyds and Det Norske Veritas.

Feeding 4,800 m3/h of water to a thirsty monster

The manufacture of steel requires huge quantities of water. At Oxelösund, over 4,800 m3 are circulated around the plant every hour. Kent Eriksson, supervisor, is responsible for approximately 150 pumps that feed the plant. Except for the summer break, production is continuous, around the clock, throughout the year. So it is vital that the pumps are reliable. For example, the main station pumps have been out of operation for only two minutes in more than 30 years.

Transporting 60 tons of solids per day, all day, every day

The gases from the blast furnace contain a large quantity of impurities that have to be removed before the heat from the gases can be used. This is achieved by passing them through electrofilters and scrubbers, a process that requires over 900 m3/h of water, which itself has to be used again. But before it can be reused, the acidic content must be reduced and the solids extracted.

The first step in recycling the water is to increase the pH level to just over 6 in an aeration tank. The addition of sodium hydrate then adjusts pH to a suitable level and a polymer is added, to cause flocculation.

The water is then lead into a sedimentation basin. Here the solids sink to the floor of the basin and a scraper pushes them down to the center. A mammoth pump lifts the resulting slurry into a tank to the side of the basin.

Pumping 40% sinter and 30% iron, 100% of the time

The water, containing a solids concentration of 3% to 4%, has to be pumped 400 meters to a sedimentation lagoon. Iron accounts for 40% of the solids and 30% is sinter. This is a particularly abrasive cocktail, with the iron working as a corrosive and the sinter as an abrasive, stripping away the corrosion-softened surface.

A new range of wear-resistant pumps

To handle such high-wear applications, Flygt launched a new range of abrasion-resistant submersibles. The new pumps, the 5500 series, feature a wet end that is entirely lined and what is possibly the most efficient slurry seal system available. The lining comes in 4 different hard-wearing materials, protecting all hydraulic parts that come into contact with the pumped medium.

Two 13.5 kW 5540 pumps deliver 101/s of the slurry to the sedimentation lagoon over 400 meters away. Replacing dry-installed units, one of the Flygt pumps is installed beneath the side tank, attached to the existing inlet and outlet connections, and the second 5540 is submerged in the media itself.

12,000 hours and still going strong

The pumps are in continuous operation, 24 hours a day, 7 days a week. After 12,000 hours of duty, the volute shows few signs of wear, and the seals are still performing efficiently. The impellers should be checked once per year, and a general service should be run every 6 months, to check wear on the other parts.

"They're close at hand and they'll work overtime"

There are over 100 Flygt submersibles in use around the works, with everything from small, portable emergency units, to larger pumps, circulating 250 liters per second.

With little manpower to spare for maintenance work, Eriksson finds himself relying on the local Flygt service team. "When I tell them it's urgent, they come fast, put in extra hours and really try to get the pump back into action as soon as possible." He appreciates their proximity and dedication: "They're close at hand, and they'll work overtime," he adds.

Quiet and flood-proof

A Flygt pump, whether submerged or dry-installed, is a very quiet worker. When submerged, the media acts as a sound (and heat) buffer, and when dry-installed, the encapsulated motor and shaft, together with the balanced action of the impeller, ensure a surprisingly low noise level. And a Flygt pump is, of course, completely flood proof in applications that demand dry installation.



Related Case Studies

Xylem helps solve water recycling in Australia

Located on the Adelaide Plains of southern Australia, the Piscioneri Brothers' vegetable-washing plant is modernizing how commercial washing companies use water

An intelligent Flow Control solution that outsmarted the competition

Xylem's Flow Control team in China successfully included a vehicle-mounted diesel refueling pump on SANY's new hydraulic excavator

Supplying filtration membranes to garden's wastewater treatment network

Novel membrane filters power ultra-compact wastewater plant for Venice's garden on the island of Sant'Erasmus

The heart of a wastewater treatment pumping in the heart of Virginia

Xylem and Flygt helped a Virginia county replace vertical centrifugal solids-handling pumps with compact vertical centrifugal submersible dry-pit mounted pumps

Pumping a highly corrosive cocktail of abrasive iron and sinter particles

A new range of pumps from Flygt keeps northern Europe's leading heavy-plate manufacturer in business

[View More Case Studies](#)

Follow Xylem Online



Twitter



YouTube

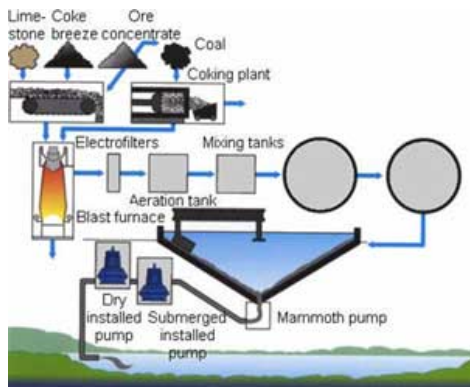


Facebook



LinkedIn

The new pumps, the 5500 and 5600 series, feature a wet end that is entirely lined and what is possibly the most efficient slurry seal system available.



[« Return to Case Studies](#)

[Site Map](#)

[Terms & Conditions](#)

[Privacy Policy](#)

[Contact Us](#)

[Request Information](#)

Copyright ©2011 Xylem. All Rights Reserved.