

Clean water for future needs

Sulzer provides efficient pumping solutions throughout the water cycle, from the water intake to the clean water tap. The special qualities that these pumps possess can be seen at the Zurich Municipal Water Utility. There, the operators have to cope with rising land and energy prices and a challenging topography.

A small water flea plays a major role in Zurich. It swims around in a container of drinking water with some of its cousins. Its swimming movements are recorded with the help of a computer, and they reveal the quality of the water. And the water quality in Zurich is excellent – as countless laboratory analyses have shown. “We are proud that we have been able to operate for many years without adding chlorine,” stresses Walter Aeschbach. He is the head of the maintenance department at the Zurich Municipal Water Utility. Most of his work involves servicing and maintaining the pumps because these pumps are essential for a functioning water supply. Most of the installed pumps are from Sulzer – a total of 50. Walter Aeschbach and his team swear by their Sulzer pumps. “We have never had a pump failure,” says workshop manager Ruedi Stöckli, lovingly stroking a Sulzer pump that his team is just overhauling in the workshop. The pump was built in 1958 and shows surprisingly few signs of wear. The pumps are brought to the workshop for inspection every 10 to 15 years, where the corrosion protection, seals, and bearings are replaced with great care and lots of expertise. “When we have finished overhauling a pump, it runs almost better than new,” says Ruedi Stöckli with pride, and that’s not only because of his “magic hands,” but also because of the unbeatable quality of the Sulzer pumps.



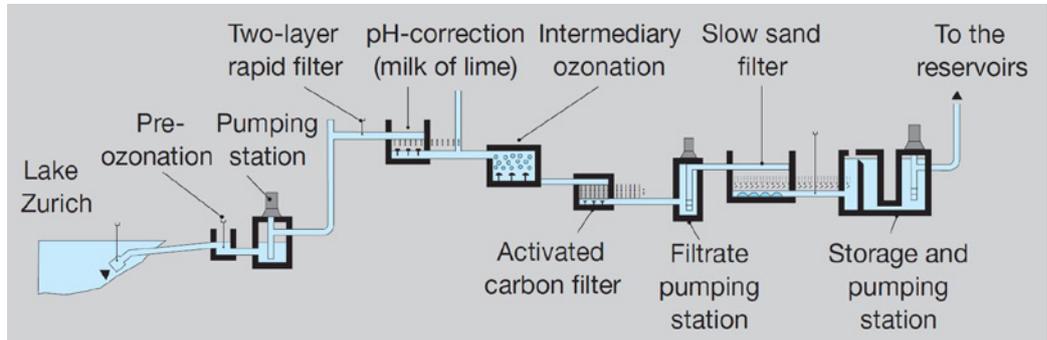
Walter Aeschbach is the head of the maintenance department at the Zurich Municipal Water Utility. At the Hardhof waterworks, he proudly presents the Sulzer pumps that transport the groundwater.



Ruedi Stöckli is responsible for the inspection and overhaul of the pumps. His team has just dismantled a Sulzer pump built in 1958. Despite its advanced age, the impellers are still in good shape.



Around 70% of the drinking water in Zurich is extracted from the Lake Zurich. The lake water runs through a multistage purification process.



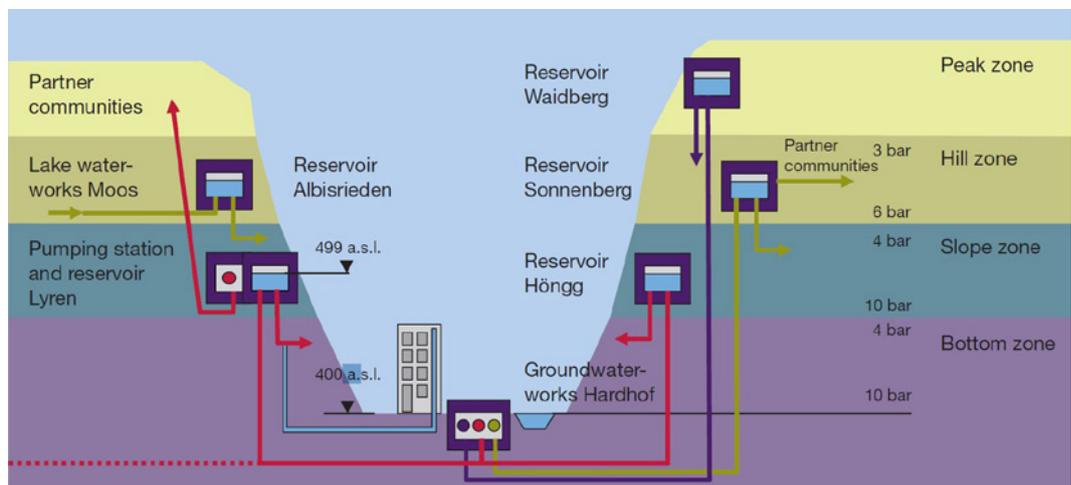
The trouble with the mountains

Zurich has the good fortune to have an almost inexhaustible water reservoir at its doorstep, in the form of Lake Zurich. There are also springs in the surrounding region as well as groundwater. However, supplying more than 800'000 people with fresh water every day is nevertheless a technical challenge. Over two-thirds of the more than 50 million cubic meters of drinking water that are produced every year originates from the lake. The quality of the lake water has improved significantly in the last few decades as a result of the more stringent water conservation laws. However, extensive treatment of the lake water is still necessary, which is not the case with springwater and groundwater. The water intake is situated 30 meters below the lake surface level. Pumping stations with a total of ten pumps transport the lake water up to the processing plants. Pumps can be switched on or off as required. A multistage, classical water purification treatment is then carried out, consisting of:

- Pretreatment
- Fast filter
- Ozone station
- Active carbon filter
- Slow sand filter

Pumps raise the water each time so that it can then trickle through the filter basin. The purified water is then transported to various reservoirs via additional pumping stations and from there to the households. Because of the hilly topography of Zurich, this is no trivial undertaking; the supply area covers altitudes between 400 and 870 meters above sea level. To ensure that there is sufficient pressure in all the waterlines, the Zurich Municipal Water Utility has divided the area of the city into four pressure zones. Each zone is then supplied from a reservoir located above it. That means the pumps have to fulfill very different requirements, depending on the reservoir they supply. Sulzer has designed the pumps precisely for each situation so that they run at ideal efficiency and do not need a frequency converter. The delivery heads range from 50 to more than 400 meters and the capacities from 12 to 2'500 m³/h. It would be easier to supply a city without hills; it takes a great deal of energy to raise water. In some places, the water even has to be transported over a hill. Backward-running pumps are in use there to recover at least some of the energy from the downward-flowing water. The Swiss love their mountains, "but a flat city would be more sensible from the viewpoint of water supply," says Walter Aeschbach with a smile. Mountains do have an advantage though: thanks to the reservoirs, there are fewer pressure fluctuations in the distribution network, and the risk of burst pipes is reduced.

Sulzer was able to offer a full set of new components, available in just five weeks.



Fascinating pumps

Visitors can view pumps firsthand at the Hardhof water-works. There are four large wells there, each with three underwater pumps that lift the groundwater. The advantage of the groundwater is that it has already been filtered by sand and gravel layers in the soil, and no additional cleaning is needed. But this is only true for the groundwater flow from the direction of the river, the Limmat. Another underground stream flows from the center toward the groundwater water-works. To keep this impure water away from the collection locations, the groundwater field is enriched in a clever way. Water from the Limmat is led to twelve absorption wells at the edge of the groundwater field, where it then seeps into the ground. In this way, the maximum capacity of 150'000 cubic meters a day can be maintained without lowering the groundwater level. After looking into the 25 meter deep well shaft, visitors can also admire the pumping station that transports the water further into the reservoir. Nine imposing Sulzer pumps stand in rank and file in a large hall. "When I saw this hall for the first time during my job interview, my amazement was written all over my face," says Walter Aeschbach. This convinced his boss that Aeschbach had the necessary passion for pump technology.

Too good to be replaced

Although most of the Sulzer pumps installed in Zurich are more than 40 years old, their efficiency is still impressive. Walter Aeschbach's team has just examined some pumps whose drive motors need to be replaced. They found that it wouldn't be worth replacing the pumps along with the motors. They are simply still too good. Walter Aeschbach is convinced that, "these pumps have not yet reached the end of their long service life."

There is, however, a plant in the lowest pressure zone where the transport requirements have changed over time. The pumps there are no longer running within their optimal efficiency range. These pumps supply urban lines directly, and, unlike the conditions at the reservoirs, conditions at this plant are not constant – for example, when a supply network is being extended. In such cases, the retrofits offered by Sulzer are a good solution. They make it possible to adapt existing pumps to new requirements and to improve their efficiency. "In addition to reliability, we regard energy efficiency as being the most important criterion of a pump," confirms Walter Aeschbach. In view of rising energy prices, every kWh that can be saved is decisive. In addition to rising electricity prices, there are also new developments in



the treatment processes that devour more energy. Modern membrane filters are increasingly replacing the conventional sand filters. They remove even the very smallest particles, such as viruses and bacteria, and they take up much less room. Because of the exorbitant land prices in Zurich, this is a compelling argument, and this is why membrane filtration is being tested here. However, the membrane filters make high demands of pump technology because the water has to be forced through the membranes at high pressure. Sulzer has specialized in producing efficient, high-pressure pumps over many years. The pump models from Sulzer can create high pressure in a particularly energy-efficient manner and thereby increase the efficiency of the membrane filter procedure.

The future will bring new requirements and challenges for the water supply industry. With indestructible pumps and new technologies, Sulzer helps its customers to fulfill their tasks and produce good drinking water. In Zurich and around the world, Sulzer pumps will continue to work tirelessly to ensure that clean water bubbles out of the taps. This is good news not only for the tiny water flea but also for the other inhabitants of Zurich.

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