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Clean Energy in the Mountains

Largest pumped storage hydro-electric power station of Voralberger Illwerke AG on Kopssee Lake, Austria

Project fact file

- 15 ERHARD Needle Valves
- Flow rate 76 m³ water per second with a velocity of 460 km/h
- Turbine output: 525 MW
- Generator output 600 MVA
- Pumped storage hydro-electric power station with Kopssee Lake (1,800 meters asl) as the headwater pond and Rifa reservoir (1,000 meters asl) as the tailwater pond

High-tech meets mountain world

Only those who are stood in front of the enormous dam wall which borders the romantic lake on one side can imagine that one of the largest pumped storage hydro-electric power stations in the world is located in the charming landscape in the Austrian region of Voralberg, bound on one side by the romantic Kopssee Lake: Voralberger Illwerke AG's Kopswerk II power station has been in operation since 2008 and supplies high-quality peak and standard electricity from renewable hydropower to the European electricity network. And this is not least thanks to special valves from ERHARD.

The dimensions of the new pumped storage hydro-electric power station are enormous and high environmental compatibility requirements had to be fulfilled during construction. A gigantic plant was therefore created inside the mountain. Chambers and shafts were blasted out of, and drilled and cut into the rock. Construction of the giant electric power house cavern alone created one of the largest artificial rock voids in the world.



Whether high-pressure distribution pipe, pressure shaft or turbine hall – all the equipment of the Kopswerk with its enormous dimensions is located deep in the rocks.

A mass of more than 110,000 tonnes, a velocity of 460 km/h and a flow rate of 76 cubic metres of water per second – this is how hard the operating conditions are for the valves. Therefore, during the initial phase of the construction planning, the power station operators decided to get ERHARD to design and build the special valves required. Following intensive discussions with the operator and with other suppliers, such as the manufacturers of mechanical elements, ERHARD's experts developed new solutions and some completely new valves.

Needle valves for the highest pressures

The particular requirements of this project, for example, led to ERHARD developing a needle valve with pressure rating PN 160. The externally controlled high-pressure needle valves as control and shut-off valves were especially interesting for the operator, because they were optimally suitable for use for draining the pressure shaft, the water jet pump, the rotary cut-off valve fill pipe, the control water supply and brake jet pipe. The body and internal parts are made of stainless steel, for optimum corrosion resistance and strength as well as good weldability in case of repairs.

Particularly high requirements were also set for the seals, because at a working pressure of approx. 80 bar, very high parting rates occur during the control process, which can cause very fast wear. To prevent this, and to avoid expensive and time-consuming replacement – the pressure main would have to be drained and the plant shut down with the consequence of a substantial loss of production – ERHARD developed a new sealing principle with an additional metallic seal as a secondary seal.

By a specially in collaboration with the operator developed ball valve, ERHARD provides an additional safety device at the needle valves. Using this it is possible to check the tightness between the slide crank gear and the shaft seal during operation without any additional maintenance work.

The comprehensive ERHARD product range made it possible to provide all the valves from a single source.

Product list:

- *Needle valves (DN 125 - DN 250 with pressure ratings up to PN 160)*

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46235DE (04/12)