

Dams and hydropower





Dams fulfil a variety of tasks. They are used to collect water and stave off the risk of flooding; they are used to generate energy and help to make rivers and canals navigable. In addition the reservoirs assure the water supply for industry and agriculture and last but not least are important recreational areas for sports and leisure activities.

Special demands are placed on the valves in the bottom outlets. Due to the great forces involved in large reservoirs the forces must be safely and reliably converted without damage to the valves or the installation. This is associated with a high drainage capacity and large flow rates in the shortest possible time to drain the stored water instantly in the event of danger. Weight-loaded actuators guarantee the emptying function if the conventional actuation options should fail.

The same requirements must be met in pumped storage hydro power plants and other installations for hydro power generation. The use of valves in these plants is a particularly sensitive issue as they are often not used for many years and then have to serve their purpose smoothly and reliably within a very short time.



Our products for dams and hydropower

- Resilient-seated gate valves
- Metal-seated gate valves
- Double-eccentric butterfly valves
- Needle valves
- Connection systems



The TALIS product range for dams and hydropower



Resilient-seated gate valves

As the latest generation of gate valves, the **TALIS BAKIO® gate valve** offers a lot of advantages, such as an insert-type stem bearing enabling seamless bonnet coating for complete corrosion protection and sealing of the spindle bearing with o-rings which can be replaced under full working pressure if required. An integrated spindle screw end stop guarantees increased safety and the innovative protective cap with integrated sealing lips serves as a secure sealing against dust and moisture. The shut-off wedge made from top-quality cast iron with complete elastomer coating guarantees a soft seal and one hundred per cent tightness. Profiles with integrated friction guides ensure easier actuation. Optimum corrosion protection is guaranteed by a fusion bonded epoxy coating.



Metal-seated gate valves

The **ERHARD wedge gate valve** as a metal-seated gate valve is suitable for numerous fields of shut-off applications like as an inspection valve in turbine downcomer pipes. It corresponds to the DIN EN 558 construction length, series 14 and 15, and is equipped with a metallic-seated wedge and internal spindle screw. The spindle sealing is maintenance-free but can be replaced under pressure if required.



Double-eccentric butterfly valves

The **ERHARD ROCO® Premium butterfly valve** stands for highest quality in the nominal sizes DN 80 to DN 600. The innovative polygon shaft-hub connection features a completely closed disc eye, does not need any additional connecting elements and hence no separation joints and offers 20 % more torque reserves. The connection is absolutely free of play and, together with the flow-optimised shape of the valve disc, prevents any fluttering whatsoever. The design also allows complete encapsulation of the connection between the shaft and valve disc and, therefore, there will be no contact between the shafts and the medium any longer. Sealing consistently and logically occurs at coated parts of the component, a decisive plus for protection against corrosion and durability. The sliding crank mechanism has an optimal movement kinematics that is almost exactly corresponding to the valve's characteristic curve.



Nominal sizes DN 700 up to DN 3600 and pressure ratings from PN 10 to PN 40 are covered by the **ERHARD EAK butterfly valve**. Proven details ensure reliable quality and a high degree of cost-effectiveness. Drive shaft and bearing pin are supported in maintenance-free, self-lubricating plain bearings and hence are highly resilient. The connection between drive shaft and valve disc with its proved and robust key connection allows a force transmission without play even under the highest stresses. The main seal is provided by a profile ring that is clamped onto the valve disc and fixed with a clamping ring.

Both ERHARD ROCO Premium and ERHARD EAK butterfly valves are available with an optional hydraulically controlled weight-loaded actuator with a compact design.

Needle valves

Needle valves are the ideal type of valves when the aim is to safely regulate pressure heads or flow rates, for example, as ground sluice of water reservoirs or in the inlet, the bypass or the secondary outlet of turbines. For this purpose, the cross-section of the internal valve body is constricted by an axially movable piston thus changing both the pressure and the quantity of flow and velocity. This induces high stress onto the valve which the **ERHARD RKV Premium needle valve** will be able to cope with in the long run having turned out as proven control valve for a variety of tasks since many years. Safe energy transformation without cavitation damage is enabled thanks to the ring-shaped cross-section existing in every position. Depending on the application field, further control inserts, such as vaned rings, slotted cylinders or perforated cylinders are also available apart from the standard seat ring. A range of drive options (electric, pneumatic, hydraulic or weight-loaded) complete the system, which offers four major additional advantages:

- Optimised flow guidance results in low zeta values thus enabling cost-effective operation since the pressure loss is lower. In addition, the formation of stagnant water is reliably prevented.
- The main seal up to 20 mm wide is located in the hydraulically uncritical pressure zone and completely embedded in a stainless steel chamber. The resulting system offers optimum sealing and minimum wear at the same time.
- Using at least four wide guide strips from a bronze-aluminium alloy, the piston weight force is being vertically and evenly distributed. This reduces wear and extends the service life.
- In contrast to conventional needle valves having a dead stroke of up to 18 %, the ERHARD RKV Premium needle valve can already be precisely controlled from 4 % opening which results in a control range of 96 %.

Connection systems

Of course the TALIS range also provides all components for an easy and secure connection of valves like:

- **FRISCHHUT fittings** according to DIN EN 545, Series A, made of EN-JS1050 ductile cast iron with epoxy coating, flanged connections or TYTON® socket
- **UNIJOINT flange adapter** with flange connection on one side and insertion socket for the pipe on the other side, offers an adjustability of ± 25 mm as well as an angular deflection of 3° ; absorbs vibrations in the pipeline, overcomes axial offset and guarantees a permanently leaktight connection
- **UNIJOINT PAS20 dismantling joint** with a length compensation up to ± 25 mm for an easy installation and removal of valves, with connection flanges to both ends, 100 % tension with sturdy, continuous threaded rods





References



The alpine hydro-electric power plant Kopswerk II in Austria was equipped with needle valves of the extreme pressure rating PN 160.

High-tech meets mountain idyll – the Kopswerk in Vorarlberg

Green fields, a steep mountain top and a lake which glistens in the sun. It's a picture that could be taken straight from a holiday catalogue. But this idyllic place in the Austrian region of Vorarlberg is also home to one of the largest pumped storage hydroelectric power stations in the world: "Kopswerk II". The flowing water has a mass of over 110,000 tonnes, the speed is around 460 km/h and approximately 76 cubic metres of water per second flow through the turbines while they are in operation – and the operating conditions for the valves are just as tough. Following numerous briefing meetings, the power station operators decided during the initial phase of the construction planning to allow ERHARD to design and build the special valves required, like a needle valve in the pressure rating of PN 160.

The externally controlled high-pressure needle valves as control and shut-off valves were especially interesting for the operator, because they could be used for draining the pressure shaft, the water jet pump, the rotary cut-off valve fill pipe, the control water supply and the brake jet pipe. Particularly high requirements were also set for the seals, because at an operating pressure of approximately 80 bar, very high parting rates occur during the control process, which could lead to accelerated wear and tear.

Blue gold – the water supply for Sydney

Sydney, capital of the Australian federal state New South Wales and host of the Olympic Games 2000, is a city throbbing with life. The water demand of its nearly four million inhabitants is 80 % covered by the water reservoir of the Warragamba dam. Warragamba is the biggest concrete dam in Australia and one of the world's biggest used as an urban water reservoir. This reservoir consists of a lake which is 80 km long with an area of 7,500 hectares and a volume of

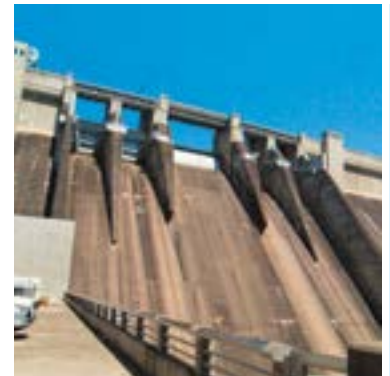
2,000 million m³ of water. In the dam's gate house, there are four bottom outlet pipes DN 2100, equipped with two ERHARD EAK butterfly valves DN 2100 each, of which one has an electric actuator and the other a hydraulic weight-loaded actuator. The hydraulically driven butterfly valve is designed for emergency shuts with a maximum flow velocity of 30 m/s. Total weight of the hydraulically driven butterfly valve is 18 tons.

Top-quality drinking water – the Granetal reservoir

The Harz waterworks with its more than 500 km long transport network supplies top-quality drinking water to more than 1.5 million people. The naturally soft water is extracted, among other places, from the Granetal reservoir in the western Harz region in Germany. Up to 180,000 m³ per day of high-quality drinking water is extracted from this reservoir with 46 million m³ of drinking water. Since the Harz waterworks started operation in 1928, engineering planning has been focused on the durability of the plant and systems. The waterworks at the Granetal reservoir was built in 1972 and is currently equipped with ERHARD ROCO Premium butterfly valves.

Water fortress with a history - the Möhnetal dam

The Möhnetal dam started operation in 1913 and was at that time one of the largest reservoirs in Europe. Behind the masonry dam with a length of 650 m, a height of 40 m and a thickness of 34 m is a storage capacity of 135 million m³ of water which serves the water supply of the Ruhr district. In case of a malfunction of the main power station or in case of its discharge capacity being exceeded, two groups of bottom outlet systems with two independent bottom outlets are responsible for releasing water. The outlets of each group consist of an ERHARD RKV needle valve with direct regulation of the discharge and a flat slide valve with conical jet. The four bottom outlets lead into a compensating reservoir.



The dam is 142 m high and 351 m long. At the wall end, it is 104 m wide, tapering towards the wall deck to a width of 94.5 m.



Up to 180,000 m³ of fresh drinking water are extracted daily from the Granetal reservoir [1] which holds 46 million cubic meters.

The Möhnetal dam [2] was erected in 1913 and serves the water supply of the Ruhr district in Germany. It is equipped with ERHARD needle valves in its bottom outlet system [3].



TALIS is always the number one choice whenever water transport or control is required. TALIS has the best solution for water and energy management, as well as for industry and municipal applications. With a varied range of products we offer comprehensive solutions for the entire water cycle. From hydrants to butterfly valves. From the knife-gate valves to the needle valves. Our experience, innovative technology, global expertise and individual consultation process form the basis for developing sustainable solutions for the efficient handling of the vital resource "water".



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