

MORE HYDROELECTRIC GENERATION

ELECTROMECHANICAL EQUIPMENT FOR HYDRO POWER PLANTS
FROM WATER TO WIRE

GEPPERT
 **HYDROPOWER**
AUSTRIA



Managing director
Ing. Mag. Guntram Geppert

“Our team works hard and successfully every day to increase the economic efficiency of hydropower plants. This is done through research, development and continuous product improvement.”

History

1896 until today

In 1896 Karl Geppert (1867-1918) acquired the real estate of today's principal office at the Breitweg in Hall. The river Amtsbach has been used for energy generation since then. It was the time to start up the turbine production and the establishment of the Geppert factory for water turbines.

His son, Josef Geppert (1905-1994) ran the company first together with his brothers and then alone. He developed an oilhydraulic turbine governor, which is now proved for decades and still being employed.

Wilfried Geppert (born 1945) ran the enterprise since 1973 as managing director. Already since 1982 he has employed PLCs for the automation of existing and new plants. In 2001 Wilfried Geppert incorporated his individual enterprise into his new established Geppert GmbH.

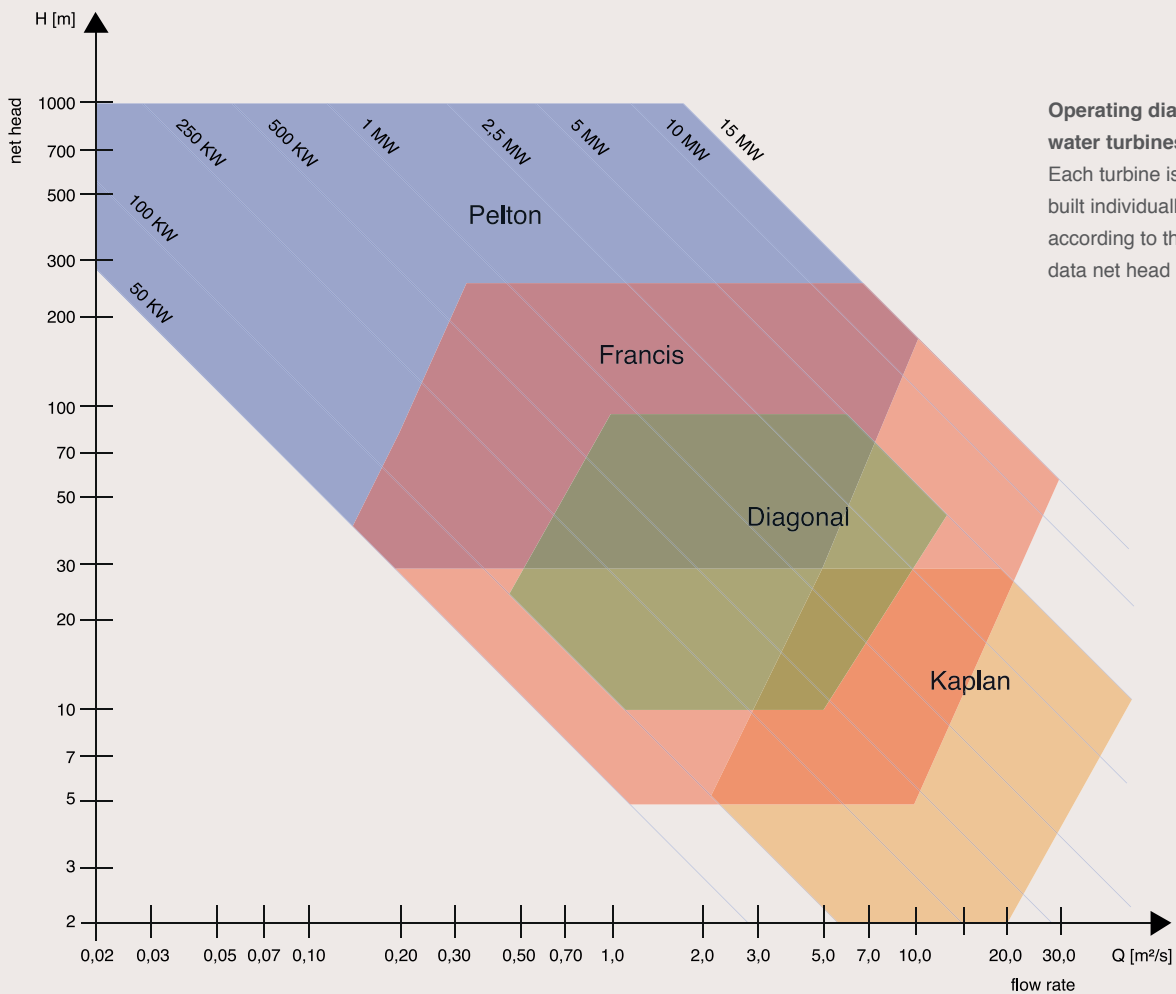
His son Guntram Geppert (born 1969) runs the family-owned enterprise from 2001 till 2007 together with his father. Since end 2007 Guntram Geppert is sole managing director of the enterprise by trade and commercial law. Geppert sees his company as family-run enterprise and admits to the production at the facilities at Hall in Tirol.

Tradition of turbine manufacturing in Hall since 1896

Mechanical workshop of Geppert anno 1900.

References

More than 4000 power stations on 4 continents are in operation. These are on an elevation between 0 and 4000 m sea level in different climate zones and are operated with river, drinking, waste and sea water. We are every day looking forward to take on new challenges.



Operating diagram water turbines

Each turbine is designed and built individually for our clients according to the main layout data net head and discharge.

Dimensioning and construction

Based on model test results, our turbines are laid out and designed 2 and 3 dimensional using CAD. These drawings proceed via a CAM interface to CNC manufacturing in our own workshop.



Pelton Turbines

Up to 15 MW

Francis Turbines

Up to 15 MW



These impulse turbines for the high head range (relatively small discharge with heads of more than 30 m) are manufactured by Geppert with 1 to 6 nozzles. The jet units are offered external and internal controlled.

Units with 1 and 2 nozzles are built in horizontal design and units with 1 to 6 nozzles are built in vertical design. All jets are individually controlled in order to achieve the optimized efficiency. Drinking water turbines are built drinking water safe.

With external regulated nozzles the nozzles are offered with scavenging stroke. Thus, blockages resulting from laid on leaves during operation are dissolved and these foreign objects are flushed out. For this purpose, the machine must neither be stopped nor opened.

These medium head range turbines (range of application 5 to 300 m) are supplied as open flume turbines with lower heads and as horizontal and vertical spiral turbines with medium heads.

Geppert guarantees with utmost safety hydraulic characteristics of the turbines by ongoing model tests.

Spiral turbines are mostly built as compact turbines. The runner is directly fitted to the generator shaft. The size of the machine hall is so reduced to a minimum. With this 2-bearings arrangement we avoid wearing parts like coupling and minimize the running cost.

Diagonal Turbines

Up to 5 MW



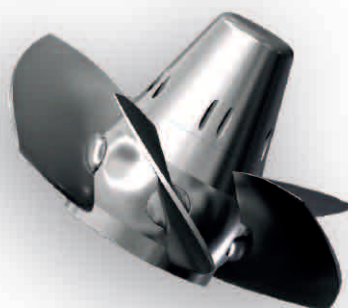
The diagonal turbine (also Dériaz turbine) is a double regulated reaction turbine for medium head range (Range of operation up to about 80 m head). Geppert builds this innovative product since 1999 for small hydro power plants and has successfully installed it dozens of times.

Adjustable runner- and guide vanes maintain a high efficiency over a wide flow range for this medium pressure turbine with resulting high partial-load efficiencies, comparable with Kaplan turbines. With seasonal strongly variable discharge a higher annual production can be reached with this turbine type than with comparable Francis turbines.

This turbine type is often installed with seasonal strongly variable discharge in order to avoid regarding electrical equipment and civil works costly solutions with more Francis units. Also high positioned Kaplan turbines have been replaced by Diagonal turbines as these have turned out to be less cavitation sensitive.

Kaplan Turbines

Up to 5 MW



These low-head range turbines are appropriate to huge discharge. The plants are built as chamber, as S-type or as bulb units in horizontal or vertical design with 3 to 6 blades.

Due to optimized coordination of guide vane and runner blade position the water flow is passed over the entire range of discharge that the outflow is optimal and the water has a minimum of rotational energy in the draft tube. The Kaplan-aggregate situates the generator and the turbine in a casing inside the water carrying tube.

At the Kaplan aggregate the submersible generator and the runner are mounted on a common shaft. As generators permanent magnet or asynchronous generators are used. The advantages are the compact design and the elimination of gears and belt drive by the directly coupled generator. Kaplan units are an ideal solution in terms of price and efficiency.

**Water to Wire supply of
Geppert in operation**

3 units 6-nozzle Pelton turbines
with 6 MW power output each.

Turbine governors and automations

Geppert utilizes regularly improved PLCs to automate new and existing plants. These automations can manage a fully automated unmanned operation with remote enquiry Visualization, and SMS-message alarming according to the clients' requirement. Power house data and data of other plant components like valves, gates, screen cleaners, residual flow etc. can be linked.

The main functions are:

- Automatic start up and stopping
- Speed governor
- Level control
- Power factor control
- Optimizing efficiency when more units in operation
- Optimizing interrelationship of guide vanes and runner blades
- Visualization and registration

Inlet valves

During the last years inlet valves, suitable for emergency shutdown, especially designed for power plants were developed and constructed.

The butterfly valves feature short face-to-face length (being appropriate to replace slide valves). They are fluidic and steadiness optimized and have very favorable fluidic coefficient.

Ball valves for special use in the hydropower sector are characterized by compactness and high reliability. Versions are as ball valve, spherical valve - also offered with revision seal.

After-sales service

The reliable operation of your existing power plant is a concern to you? Do you always want a well-maintained turbine and the costs calculable?

Please contact us! We are also happy to offer you a service contract, whether it is a GEPPERT turbine or another make!

The transfer of a turbine to the customer is for us not only the successful completion of a project but at the same time the beginning of a long-term customer relationship because we care for our customers on request throughout the lifetime of their water power plant. We like to offer maintenance and delivery of spare parts in order to ensure as much as possible uninterrupted electricity generation for our clients.

From our experience, we collect through continuous product improvement and optimization for new plants will also benefit customers of older, pre-existing stations. Irrespective of the manufacturer of the turbine we can offer new hydraulic shapes and modern automation solutions to increase efficiencies, reduce the vulnerability to disturbance and to make the operation more economical and more comfortable.

By upgrading and refurbishment we bring your turbine on the current state of the art, to increase the effectiveness and efficiency of your power plant and contribute in this way to maintain the value of your substance, and to „more hydroelectric generation“.

In case of an eventual disturbance our trained team of electrical engineers and mechanical technicians will be rapidly on the spot with a fully with tools equipped service van. With visualization and remote control we can start quick and cost efficient diagnostics and possible corrections via modem or internet connection.

Turn-key plants

Geppert has the capability to supply the entire electromechanical equipment from water to wire from one source.

Our engineers care for ideal fit of all components containing steel construction, hydraulic engineering, turbine, remote control until feed in. Technical expertise and experience in operation of own power plants are incorporated in this field.



consulting
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