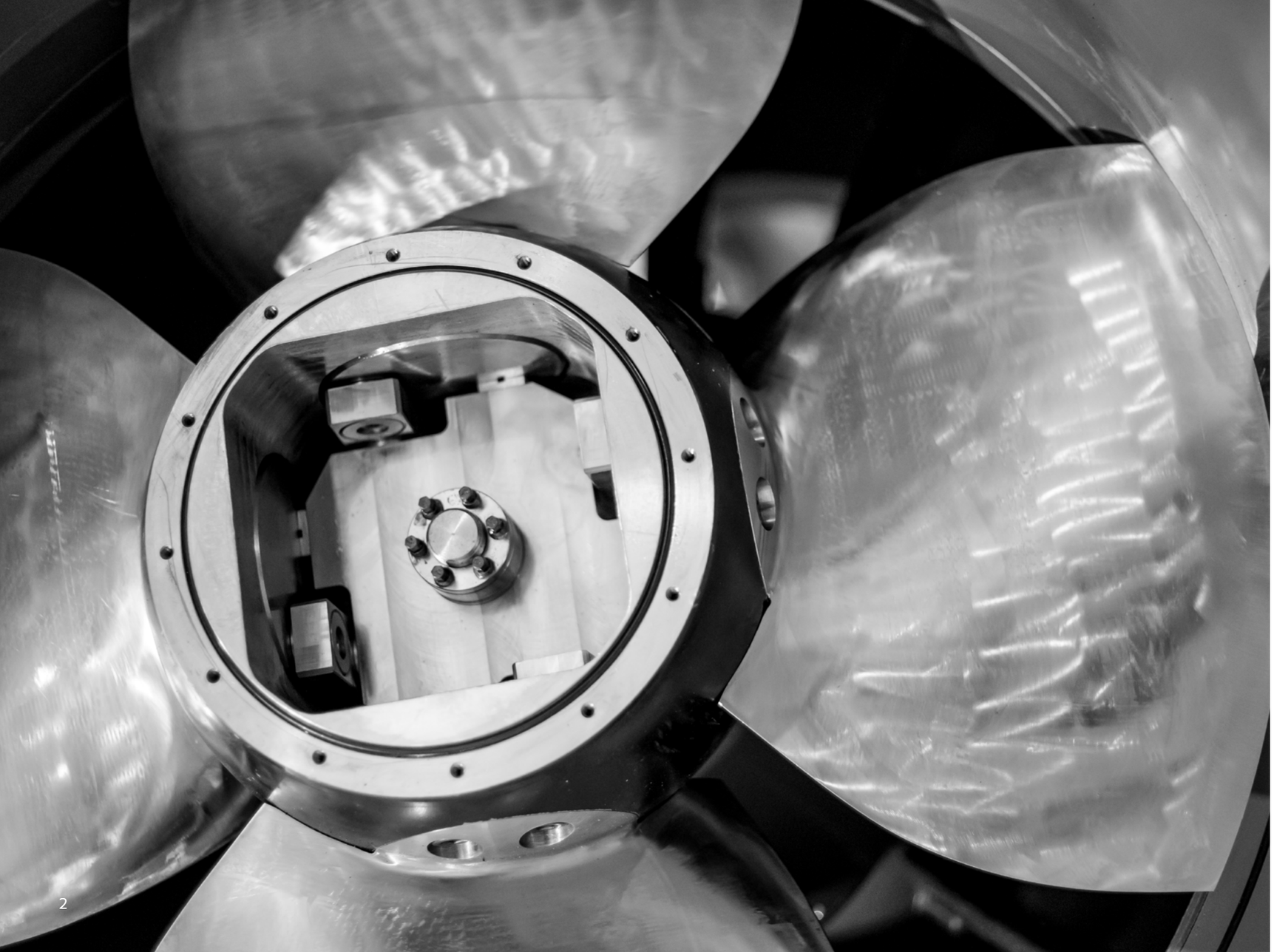
AC-TEC

HYDROPOWER



AC-TEC

THE COMPANY

Kaplan, Francis, Pelton, Cross Flow and Mini Turbines.

The family business AC-TEC is specialized in the production of small hydro power plants for many decades and manufactures customized water turbines and the corresponding electrical part. We combine experience and innovation.

Our business is located in Caldaro, a village in South Tyrol. We offer complete electromechanical solutions and provide the system of surveillance as well as the communication interface. Every power plant is customized according to the client's water data and to the conditions on site in order to find the most suitable solution and to seek the highest level of efficiency.

YOUR PARTNER FOR SMALL HYDRO POWER

The Company, thanks to an excellent team, which is constantly experimenting with new technological solutions, has already produced over 600 turbines.

The company puts a lot of attention in selecting the best components, materials and suppliers in order to offer a high quality product.

We help you to find the most suitable solution.

Innovation & Customization

A continuous product improvement is important. It is our aim to offer innovative and customized solutions.

CUSTOMIZED NOZZLE

AC-TEC developed a special nozzle, which is applicable for large drop heights and small water amounts. The nozzles have been operating successfully for years now. Through a special design of the nozzle mouth, we are able to feed-in with drop heights of 610 m and a water amount of 0.8 l/s. The maximum opening degree of the nozzle enables a flow rate of 4.5 l/s. It is possible to reach very good efficiency degrees with small discharge capacities and high pressure.

KAPLAN TURBINE

The Axial turbine or Kaplan turbine offers a variety of applications and is working with heights form 2m to 30m and water volumes up to 20 m^3/s. The power of an Axial turbine ranges from 50 kW to 1 MW.

The water flows directly and parallel to the spindle and to the impeller. Through the guide vanes the water approaches the impeller blades and transfers the energy. The water leaves the turbine through the suction pipe. The impeller consists of 3 to 5 blades. The overpressure turbine is applicable for low drop heights and high flow rates.

Regulation:
Depending on the stream flow, the turbine is regulated by a fix distributor and variable impeller blades (simple regulation called semi Kaplan) or by a variable distributor and adjustable impeller blades (double regulation). The advantage of a double regulation consists in balancing the water amount variations. Through a perfectly adjusted regulation higher efficiency rates are reached.

The different Types:

- CAT
- PIT
- S-Type
- Kaplan spiral case
- Bulb
- Belt axial turbine
- Bevel gear turbine
- Kaplan semi spiral case

FRANCIS TURBINE

The Francis turbine is a diffused turbine type for average drop heights and water volumes. The ideal drop height for this type of turbine ranges from 20 m to 200 m. The performance level varies from 50 kW to 3 MW.

The water flows through a spiral casing to the distributor. Through adjustable guide vanes in the distributor the accelerated water hits the impeller blades, which transfer the energy.

The different Types:
- Francis spiral case vertical
- Francis spiral case horizontal
- Francis open chamber

PELTON TURBINE

Pelton turbines work with large drop heights and a relatively small amount of water.

The advantage of this turbine type is the relatively constant energy conversion efficiency with highly variable water volumes. High pressure leads to high efficiency. The efficiency level ranges from 84% to 92%.

Hydropower plants from 100 kW up to 3 MW and altitude differences from 20 m to 800 m are feasible. The water volume is regulated by up to 6 jets.

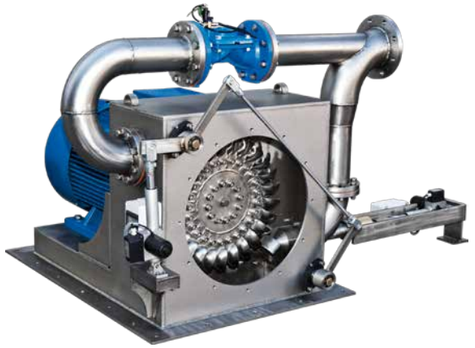
CROSS FLOW TURBINE

The Cross Flow turbine or radial turbine is an impulse- turbine. The radial turbine is applicable for drop heights from 4 m to 30 m and average water volumes. The technology of the cross flow turbines allows the usage of strongly varied water quantities. The water supply is divided into a one-third chamber working with small water amounts and into a two-thirds chamber working with average water volumes. The division of the water supply into two chambers allows the maximum efficiency.

The advantage of this turbine type is a relatively constant efficiency level with strongly unstable water amounts. The efficiency isn't directly depending on the water volume and is the same for a volume from 25% to 100%. With constant water volumes the water is supplied directly, without any division. Water power plants from 30 kW to 250 kW are realizable.

MINI TURBINES

We produce specialized mini turbines of every size and type. We customize Pelton, Cross flow and Fixtube (small fixed Axial Turbines). Depending on the turbine type, performances from 0.2 kW to 100 kW are achievable.
Tailored to the specific project, we use synchronous, asynchronous or permanently excited generators working in isolated operation or parallel generation.



SMALL HYDRO POWER PLANTS IN CONTAINERS

All the small hydro power plant components are installed into a container; the particularity of this turbine type is its compact product structure. The container-installed small hydro plant is a suitable solution for rural areas. The plant operates in isolated and in parallel operation.

Through the simple assembly and disassembly process, the eventual rotational speed variability and the selection of multiple nozzles, the turbine can be used at multiple sites and the existing water sources can be used more efficiently. The container has four openings and is accessible through all sides. The small hydro container plants can be used as single modules or as multiple parallel units.

The container is perfectly integrated into the natural surrounding landscape. An optional cooling water jacket for the generator and a sound insulation of the container enable a better acoustic insulation. When the container is closed, at a distance of 1 m of the sound source, a sound pressure level [SPL] of 55 decibel dBA is measured.

The container turbine is very customer friendly. Through a very user-friendly programming interface and an internet connection, a mobile network, a HiperLAN connection or a fixed network line, the turbine is telecommanded and controlled with any mobile device in a simple, quick and location-independent way.

TURBINE FOR DRINKING WATER

The drinking water turbine is using an already existing potable water source to generate energy without any impairment on the quality of the drinking water. The drinking water turbine is placed instead of the pressure- reducing valve or directly on the drinking water reservoirs, just before the pipeline network. The power output is feed into the grid. All the components in contact with drinking water are made out of high quality stainless steel so that the quality of the drinking water isn't negatively impaired by the additional usage. The primary scope of the drinking water source isn't the energy production, but the efficient utilization of the drinking water supply.

SPEED-VARIABLE TURBINE

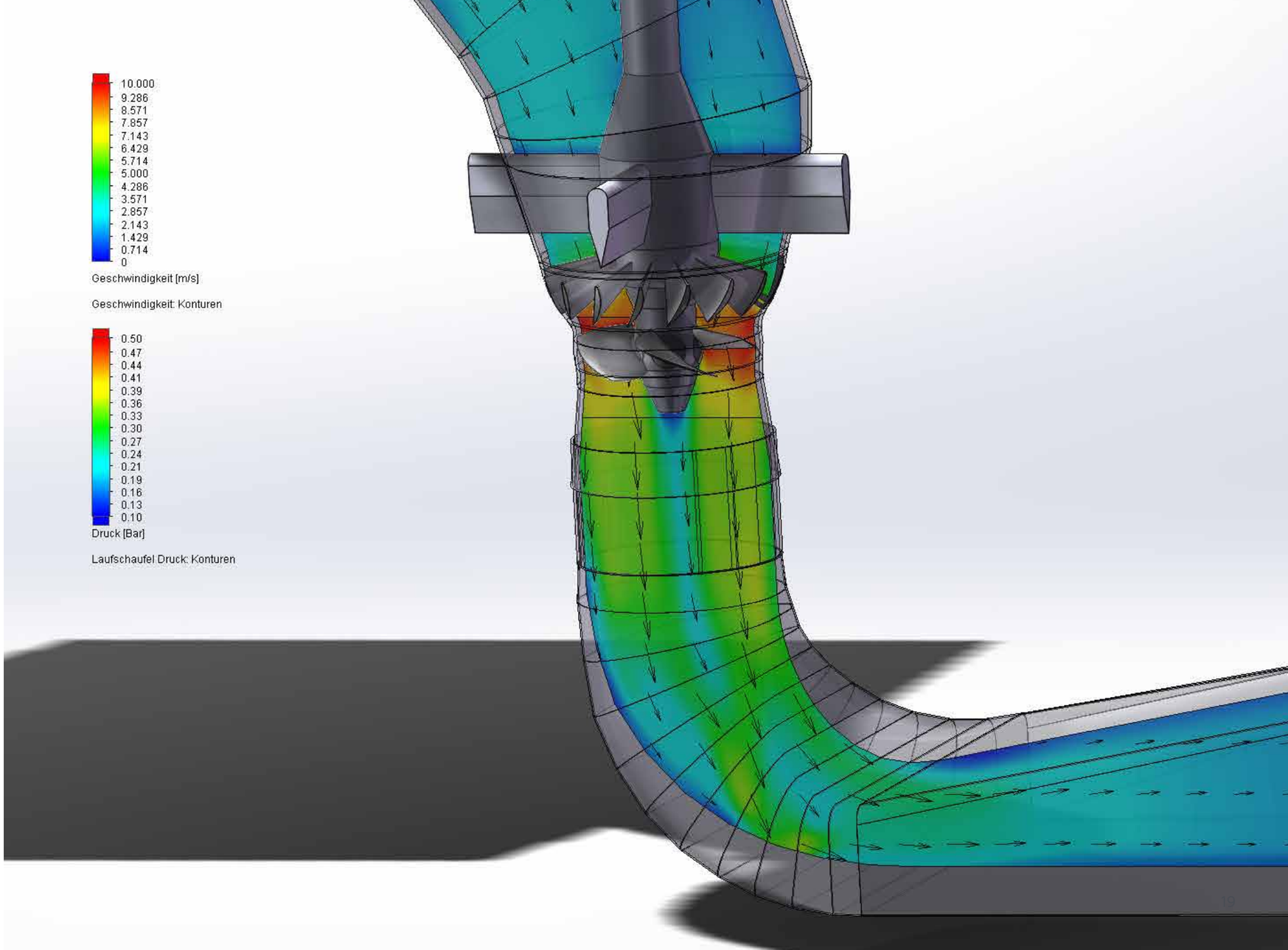
This type of turbine has been constructed for drinking water systems with old water conduits and high frictional losses. The drinking water supply, which constitutes the primary goal, is guaranteed and through the speed-variable turbine, the optimal power output can be adapted according to the required flow rate. Through the gathering of various optimum points there result different mathematical curves with which the programmable logic, the opening degree of the nozzle and the rotational speed are adapted automatically and accordingly; they work within the optimal characteristic field. In order to avoid resonances, the optimal rotational speed point is shifted along the mathematical curves.

FINITE ELEMENT METHOD AND FLOW SIMULATION

For a continuous improvement of our in-house flow simulation aiming to construct the turbines more efficiently, we collaborate with the faculty of Science and Technology of the local university. Through the Finite Element Method (FEM) the stability and the critical loading of the housing shapes are analysed and adapted.

Through various stiffening techniques, the resonances of the housing shapes and the weight savings are identified and evaluated. The power shaft of the turbine is designed and dimensioned through the finite element method and through various frequency calculations.Innovative measuring systems enable the distinction between harmonious frequencies of the bearing units and vibrations of the turbine itself in operating condition, if required error alerts are displayed and erosion is determined.

Continuous Improvement



AC-TEC
HYDROPOWER

AC-TEC
Zona artigianale 26
39052 Caldaro (BZ) - Italia

info@ac-tec.it
www.ac.tec.it

Tel 0039 0471 962653
Fax 0039 0471 965829