LITOSTROJ ENGINEERING

Supplier of technological equipment

for hydropower plants and pumping stations

COMPANY profile

We are one of the leading suppliers of technology for hydropower plants and pumping stations.

The key part of our activities is design and engineering. In both areas we follow the long tradition that started in the Moravian town of Blansko – the first water turbine was manufactured in local ironworks at the turn of the 19th and 20th century. From our offices in the vibrant city of Brno, we keep developing these years of experience and history into modern sustainable business. Our sister company is the Slovenian manufacturer of water turbines – Litostroj Power. Both companies belong to the ENERGO-PRO group based in Prague. The core business of ENERGO-PRO is the hydropower sector. ENERGO-PRO operates hydropower plants and distribution networks in Central and Eastern Europe, the Black Sea Region and the Caucasus. Litostroj Engineering offers, in cooperation with its partners – especially the sister company Litostroj Power, complete supplies of hydropower plant equipment on a turnkey basis.

- **Supplies of technological equipment for hydropower plants and pumping stations**
- **Rehabilitation, modernization and overhauls of hydropower plants and pumping stations**
- **Hydraulic testing laboratory**

Litostroj Engineering a.s. is a direct successor of the company ČKD Blansko Engineering, a.s.

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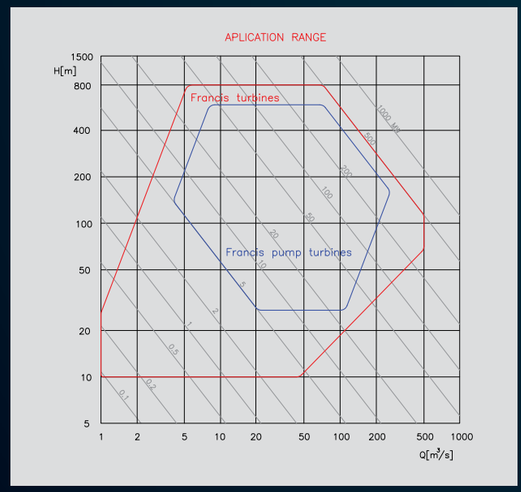
FRANCIS turbines

Heads from 10 m to 800 m

Outputs from 200 kW to 300 MW

Runner diameters up to 7,000 mm

On the basis of our own research and development, Litostroj Engineering ensures supplies and assemblies of Francis turbines, Francis pump turbines and storage pumps. Type series of these hydraulic machines, which were developed by means of numerical flow simulations (CFD) and verified by measurements of physical models, are available. The type series of turbines cover the range of heads and flow rates of hydraulic machine prototypes. In addition to supplies of new turbines, Litostroj Engineering also ensures rehabilitation and modernization of existing Francis turbines and storage pumps within the original components. We design new hydraulic profiles of turbine components to increase the efficiency, output and reliability, and to minimize costs. Up-to-date, cavitation resistant and environment friendly materials are applied when designing these turbines.



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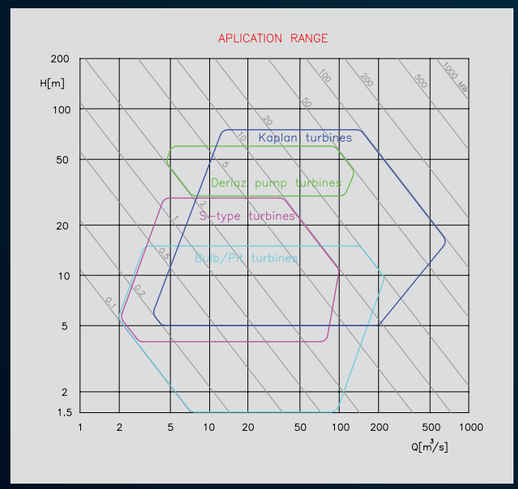
KAPLAN turbines

Heads from 5 m to 75 m

Outputs from 200 kW to 100 MW

Runner diameters up to 9,500 mm

On the basis of our own research and development, Litostroj Engineering ensures supplies and assemblies of vertical and horizontal Kaplan turbines. Type series of these hydraulic machines which were developed by means of numerical flow simulations (CFD) and verified by measurements of physical models are available. The type series of our turbines cover utilizable range of heads and flow rates of the hydraulic machine prototypes. In addition to supplies of new turbines, Litostroj Engineering also ensures rehabilitation and modernization of existing Kaplan turbines of all types. We provide design of new hydraulic profiles for turbine components to increase the efficiency, output and reliability, to enhance the environment and operational conditions, and to minimize costs. When designing these turbines, we use up-to-date, cavitation resistant and environment friendly materials.



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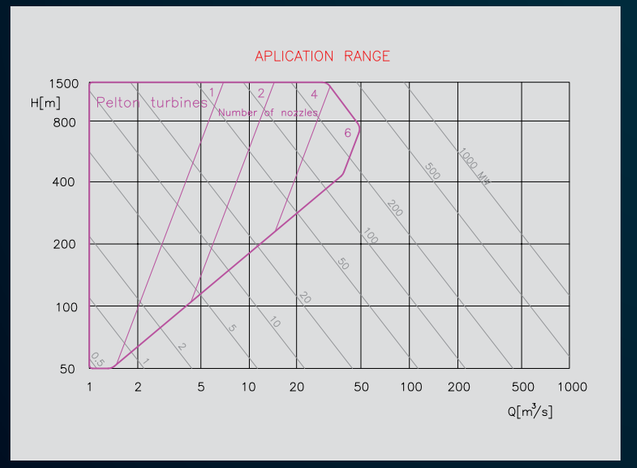
PELTON turbines

Heads from 50 m to 1,500 m

Outputs from 100 kW to 300 MW

Runner diameters up to 4,000 mm

On the basis of our own research and development, Litostroj Engineering ensures supplies and assemblies of Pelton turbines with vertical and also horizontal shaft alignment. Up-to-date technologies for numerical flow summations as well as for model testing of Pelton turbines are used. Type series covering the range of heads and flow rates are available. Turbines in horizontal shaft alignment are supplied with one-, two- or three-nozzle arrangement. Vertical Pelton turbines for outputs up to 300 MW are supplied in three- to six-nozzle arrangement. In addition to supplies of new turbines, Litostroj Engineering also ensures rehabilitation and modernization of existing Pelton turbines. We design new runners and nozzles to increase the efficiency, output and reliability, and to minimize costs. When designing these turbines, we use up-to-date, cavitation resistant and environment friendly materials.



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PUMP turbines

Heads from 30 m to 600 m

Outputs from 5 MW to 500 MW

Runner diameters up to 6,000 mm

Litostroj Engineering belongs to world leading companies in the area of technologies for pumping hydropower plants. The offered machines allow to achieve a high efficiency of the pumping cycle.

DESIGN

Francis Pump Turbine

Suitable solution for higher heads with a Francis radial runner. Our Francis pump turbines achieves high efficiency in both directions of machine operation.

Dériaz Pump Turbine

For lower heads (up to 50 m), a Dériaz diagonal runner with adjustable blades can be used. This solution allows to achieve a very flat characteristic for a wide range of heads and flows.

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other **PRODUCTS**

LOW HEAD TURBINES

- Heads from 1.5 m to 30 m
- Outputs from 100 kW to 20 MW
- Runner diameters up to 6,000 mm
- BULB turbines, PIT turbines, S-type tubular turbines, Vertical axial flow turbines

LARGE PUMPS

- Delivery heads from 20 m to 800 m
- Inputs from 5 MW to 150 MW
- Runner diameters up to 2,500 mm
- Storage pumps, Cooling pumps, Irrigation pumps

SMALL HYDRAULIC TURBINES

For small hydropower plants (turbine output up to 10 MW)

VALVES AND GATES

Butterfly valves, Knife valves, Hollow cone valves, Cone valves, Spherical valves, Draft tube gates, Fish belly flaps, Tainter gates, Stop – log gates, Vertical lift gates and Emergency gates with wheels

HYDRAULIC STEEL STRUCTURES

Penstocks, Lock chambers, Steel structures, Valves and Piping

TRASH RACKS AND CLEANING MACHINES

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HYDRAULIC
laboratory

The hydraulic laboratory is a jewel of our company Litostroj Engineering. It was put into operation at the end of 2008 as a part of our strategic orientation which consists not only of constructing and designing, but also of a high-quality experimental research and development. We are able to test new hydraulic solutions through physical models of water turbines, pumping turbines and pumps before launching their production. Thanks to the hydraulic laboratory and cooperation with our partners, we are able to supply hydraulic machines of a world-class quality.

Tests in our laboratory serve to verify technologies for power engineering and agriculture abroad as well. Several tests have taken place here, among others: tests of an irrigation pump model for the pumping station in Gangaram in India, tests of a Francis turbine model for the Toro 3 hydropower plant in Costa Rica, and tests of a Francis turbine model for the hydropower plant in Austrian Häusling.

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ABOUT us

Litostroj Engineering a.s. is a member of international organizations IAHR and IEC.

- Litostroj Engineering has maintained the accredited certificates and respects the requirements of standards:
- ISO 9001 (quality)
- ISO 14001 (environment)
- OHSAS 18001 (safety)
- Welding quality requirements as per ISO 3834-2
- Large Certificate of Qualification for design and fabrication of welded steel structures as per ČSN 732601, ČSN P ENV 1090, DIN 18800, and DIN 19704
- Litostroj Engineering a.s. is a direct successor of the company ČKD Blansko Engineering, a.s.

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REFERENCES

We have **more than 20 years of experience** in supplying technology for hydropower plants and pumping stations.

We provide **rehabilitation, modernization and overhauls** of hydropower plants all over the world.

We have **almost 200 installations in 33 countries** worldwide.

We continue **the tradition of research and water turbine production** in Blansko.

We **design** water turbines, pumps and other hydraulic devices; produce models of them, **and test** them in our hydraulic laboratory.

We apply robust **mechanical and hydraulic design** for our products. The support of wide range of **new technologies** is our standard.

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REFERENCES

HPP Dlouhé Stráně / Czech Republic

Description of activities: Modernization and overhaul of unit No.1 and 2, hydraulic design, model tests, delivery of a new runner, assembly, tests, commissioning.

Type of turbine: Francis pump turbine

HPP Lipno / Czech Republic

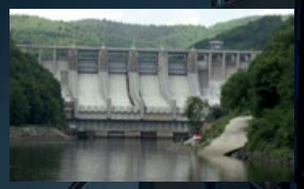
Description of activities: Modernization and overhaul of unit No.1 and 2, hydraulic design, model tests, delivery of new components, assembly, tests, commissioning.

Type of turbine: Francis turbine

HPP Dalešice / Czech Republic

Description of activities: Overhaul of unit No. 1, hydraulic design of guide vanes, assembly, commissioning. Overhaul of butterfly flap valve, delivery of new disc for butterfly flap valve – unit No. 1 – DN5400PN16 – design documentation, assembly, commissioning. Overhaul of unit No. 3, assembly, commissioning. Overhaul of butterfly flap valve, delivery of new disc for butterfly flap valve – unit No. 3 – DN5400PN16 – design documentation, assembly, commissioning. Modernization and overhaul of unit No.4 – hydraulic design of runner, model tests, assembly, overhaul of rapid – closing flap valve, commissioning.

Type of turbine: Francis pump turbine, **Author of the Photo:** Z.e.o, CC BY-SA 3.0



HPP Slapy / Czech Republic

Description of activities: Supply, testing and handing over of temporary stop-logs of bottom outlets. Modernization and overhaul of unit No.3, hydraulic design, model tests, deliveries of new components, assembly, tests, commissioning.

Type of turbine: Kaplan turbine

Author of the Photo: Hynek Moravec – Own work, CC BY 2.5

HPP Kamýk / Czech Republic

Description of activities: Modernization and overhaul of unit No.1, hydraulic design, model tests, delivery of new components, assembly, tests, commissioning. Modernization and overhaul of unit No.3, hydraulic design, supply, assembly, commissioning.

Type of turbine: Kaplan turbine

HPP Orlík / Czech Republic

Description of activities:
Repairs of unit No.1, 2, and 4 after they were damaged by floods.

Type of turbine: Kaplan turbine

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HPP Koprinka / Bulgary

Description of activities: Modernization, hydraulic design, assembly, commissioning.
Type of turbine: Kaplan turbine

HPP Kwoiek Creek / Canada

Description of activities: Hydraulic design, model tests, design and manufacturing documentation.
Type of turbine: Pelton turbine

HPP Moforsen / Sweden

Description of activities: Hydraulic design, model tests.
Type of turbine: Kaplan turbine
Author of the Photo: By Rune Ångman - Own work, CC BY 3.0

HPP Klosterfoss / Norway

Description of activities: Hydraulic design, model tests.
Type of turbine: Bulb turbine

HPP Brežice / Slovenia

Description of activities: Hydraulic design, model and acceptance tests.
Type of turbine: Kaplan turbine

HPP Karakurt / Turkey

Description of activities: Hydraulic design, model and acceptance test.
Type of turbine: Francis turbine

HPP Tainionkoski / Finland

Description of activities: Hydraulic design, model tests.
Type of turbine: Kaplan turbine

HPP Hapcheon / Korea

Description of activities: Hydraulic design, model and witness tests.
Type of turbine: Francis turbine
Author of the Photo: Mavel s.r.o.

HPP Rongni Chu / India

Description of activities: Hydraulic design, model and witness tests, manufacturing documentation.
Type of turbine: Pelton turbine

HPP Stejaru II / Romania

Description of activities: Modernization of HPP - hydraulic design, model tests, design and manufacturing documentation, supervision of assembly, commissioning.
Type of turbine: Francis turbine
Author of the Photo: By Cristian Bortes - Flickr, CC BY 2.0

HPP Mörsil / Sweden

Description of activities: Hydraulic design, model and acceptance test.
Type of turbine: Kaplan turbine

HPP Häusling / Austria

Description of activities: Hydraulic design, model and acceptance test.
Type of turbine: Francis turbine
Author of the Photo: By Böhringer Friedrich, CC BY-SA 3.0

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