



**HYDROPOWER**

**SPARE AND REPLACEMENT  
PARTS AND SERVICES**

**NORTH AMERICA**

**ANDRITZ**

**ENGINEERED SUCCESS**

# Global market leader built on technology, local presence and history

With more than 185 years' experience in turbine technology and 135 years' experience in electrical engineering, we take care of your hydropower asset.

## ANDRITZ AND HYDROPOWER

International technology group ANDRITZ offers a broad portfolio of innovative plants, equipment, systems, services and digital solutions for a wide range of industries and end markets. Sustainability is an integral part of the company's business strategy and corporate culture. ANDRITZ aims to make the greatest possible contribution to a sustainable future and help its customers achieve their sustainability goals. Technological leadership and global presence are cornerstones of the group's strategy – the group has around 29,700 employees and over 280 locations in more than 40 countries.

ANDRITZ Hydropower is part of the ANDRITZ GROUP and a world leading supplier of electromechanical equipment and services for hydropower plants – "from water-to-wire". The modern state-of-the-art technology company with about 5,700 employees worldwide has rehabilitated and modernized more than 10,000 hydropower units worldwide – covering machines from 1 MW capacity up to 800 MW and across the full range of all possible heads and flows.

With highly qualified employees, the activities of ANDRITZ Hydropower North America comprise sales, project management, engineering, procurement, installation, and commissioning of electromechanical equipment of hydropower plants. ANDRITZ can supply all types of turbines up to 800 MW, generators up to 950 MVA, butterfly and spherical valves, gates, auxiliary electrical equipment (automation, protection, excitation, governor, SCADA) and mechanical (HPU, lube and lift systems, cooling systems). The company is also leading in operation and maintenance and service and rehabilitation activities.

## THE ORIGINAL EQUIPMENT MANUFACTURER (OEM)

ANDRITZ is proud to say that for almost half of all the hydropower equipment installed today, we own the Original Equipment Manufacturer rights. In North America this includes the heritage brands: Baldwin Lima Hamilton, Bell, Bouvier, Bouvier Hydro, Canadian General Electric, Dominion Bridge Sulzer (DBS), Dominion Engineering, Dominion Engineering Works (DEW), ELIN, Escher Wyss, General Electric (GE Hydro), I.P Morris, Kvaerner (KMW), Pelton Water Wheel, Sulzer Hydro, VA TECH, VA TECH Hydro, and VOEST.



## YOUR LOCAL PARTNER

With more than 50 service locations around the globe, we can take care of our customers and partners in their language and in their time zone. ANDRITZ' commitment to service is built on proximity and reactivity.

The exchange of experience between our multitude of locations and knowledge centers guarantees rapid and smooth transfer of skills and information. It means that wherever our customers are located they have access to the vast ANDRITZ experience base allowing to find the best solution quickly and easily.

In North America, ANDRITZ Hydropower has several locations:

### Canada:

- Pointe-Claire, QC (Canadian head office and turbine center)
- Chambly, QC (automation)
- Lachine, QC (hydraulic lab)
- Longueuil, QC (penstock and gates engineering)
- Richmond, BC (regional Office)
- Paris, ON, (gates manufacturing)
- Peterborough, ON (generator center and winding manufacturing plant)

### USA:

- Charlotte, NC (USA head office)
- Spokane, WA (hydro service workshop)



# Parts and services for turbines and generators

Periodic replacement of parts is fundamental to maintaining a hydro unit's performance and efficiency while reducing unnecessary unit downtime. The selection, quality, reliability, and maintenance of these parts are as critical to the performance of the plant as the turbine runner itself.



## STANDARD PARTS AND SERVICES THAT WE OFFER:

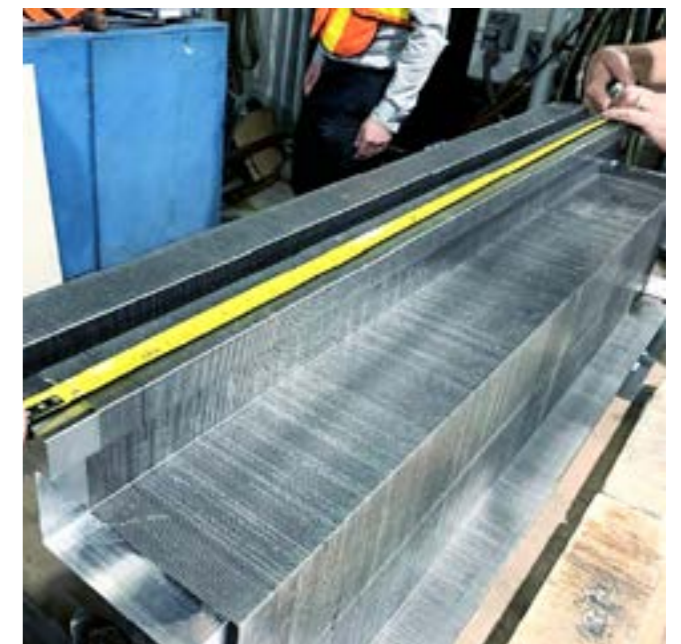
- Guide bearings
- Cooling coils
- Shaft liners
- Turbine seals (carbon seals, shaft seals, etc.)
- Sleeve pins
- Shear pins
- Links and levers
- Bushings
- Injector parts for Pelton turbine
- Super nuts
- Oil head parts
- Metal shims
- Residual life analysis
- Extended range operation
- Studies for potential modification to stationary components for rehab
- Studies for runner replacement (design, weight, size limitation)
- Dissolved oxygen uptake prediction
- Hydraulic field issues problem solving (performance, air admission, stability, axial thrust, cavitation)
- Perform transient analysis and report
- Custom CFD studies
- Perform index, hydraulic stability, vibration, axial thrust and stress test
- Homology verification and profile measurements at site
- Powerhouse optimization (dimensions and energy)
- Intake flow CFD analysis
- Start-up sequence optimization
- Upgrade study
- Condition assessment
- Runner balancing services
- Forensic / root cause analysis
- Soft and hard coatings
- Maintenance tool design
- Reverse engineering

Replacement of parts for hydro generators are particularly important because of the higher operating temperature and wear to which these components are exposed. ANDRITZ has the design and engineering experience to help identify performance abnormalities and potential areas of concern. Customers receive the insight, knowledge, and advice to ensure a comprehensive understanding of the condition of their equipment and its causes.

## MOST REQUESTED GENERATOR PARTS AND SERVICES:

- Generator bars and coils
- Generator poles
- Surface air coolers / oil cooler
- Guide bearing / thrust bearing
- Thrust bearing springs
- Wedging materials
- Air, water, and oil valves
- Collector assembly
- Brush rigging
- Creep indicators
- Moisture detectors
- Epoxies, grading paint, semiconducting paint and tapes
- Carbon brushes / brush holders
- Uprate study
- Overspeed study
- Condition assessment
- Rotor balancing
- Rim shrink (reshrink)
- Stator wedging inspection / rewedging
- Thrust bearing analysis / optimization
- Ventilation analysis / optimization
- Forensic / root cause analysis
- Analysis (FEA, critical speed, residual life calculation, deflection, etc...)
- Maintenance tools design
- Electrical tests (hipot, meggar, DC ramp test, PI)
- Heat Run/ efficiency testing
- Reverse engineering
- Corona discharge (camera or TVA probe)
- EL CID and core loop test

ANDRITZ is aware that most turbine parts require fully engineered solutions. Our engineering and design staff is available to work with customers and provide information regarding any additional parts that are not listed below.



# Other hydro parts and service

In addition to the most demanded generator and hydro turbine parts, ANDRITZ also offers a wide range of additional parts for hydropower plants. Unmatched experience and engineering expertise, combined with a comprehensive range of aftermarket spare parts, provide customers with complete solutions for standard and customized spare parts - from design to installation. ANDRITZ is committed to always providing its customers with a complete solution that meets their needs.

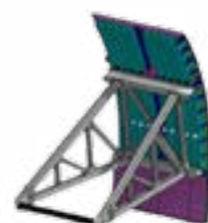
## ADDITIONAL PRODUCTS WE CAN OFFER:

- Turbine inlet valve parts
- Governor spare parts
- Hydraulic power unit spare parts
- Cooling systems and bearing lubrication units spare parts
- Gate spare parts
- Isolated phase bus duct parts
- Range of associated hydro materials
- IESO testing and certification assistance
- Protective relay coordination study
- Protective relay testing an calibration
- Arc flash study
- Network design and optimization
- Scada, historical, and information flow analysis
- Control system simulations
- Control logic programming optimization
- Governor modelling and simulations
- Database server design and implementation
- Commissioning and testing services
- Excitation system testing, support, and design
- Excitation system and power system stabilizer modelling
- Hydraulic piping system design
- Hydraulic system capacity calculations
- Hydraulic governor rehabilitation
- eBop support ( including but not limited to dewatering systems, heating and lighting, grounding requirements, gate controls, security systems)
- Visual inspection report incl. recommendations for necessary repairs or refurbishment

- Dimensional surveys on embeds
- Physical inspections on gates seals, wheels, bearings, etc.
- General hoist condition assessments
- Inspection and repairs at the ANDRITZ Hydropower facility in Paris, ON.

## OPERATION AND MAINTENANCE FOR BETTER PERFORMANCE

Metris DiOMera is an advanced, intelligent, real-time O&M monitoring and predictive platform allowing dynamic assessment of key equipment through operation in all types of environmental events. It has a superior detection and analysis capability that identifies emerging operating problems ahead of any unit trips. Appropriate actions are possible to immediately mitigate risk, maximize availability of the plant and plan targeted intervention when convenient. DiOMera is also key in optimizing predictive maintenance planning to minimize outage costs.



## QUICK CUSTOMER SUPPORT:

Requirements for support are created and triggered by our customers and their equipment. Our quick support concept offers rapid solution-oriented services to solve any problems which occur as soon as possible in order to bring the units back online. Additionally, we provide diagnosis for repairs both on-site and remotely.



## LIFETIME SERVICES:

In addition to the hydro- and electromechanical scope, our team provides general services such as expert support, training, spare parts inventory management, and service agreements as required to meet all technical, economic, and legal requirements. Special services can be offered for life cycle and risk analysis, as well as for operations and maintenance.



## ANDRITZ QUALITY:

Spare and replacement parts affect the performance, durability and reliability of an entire power generating plant. ANDRITZ Hydro applies the same rigor, testing and validation on all our equipment and component manufacturing. To ensure all parts meet the highest standards for quality, construction, design and engineering, reviews are done periodically.



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