

Coating Service Solutions Metco TURB

Extend hydro turbine life, maintain efficiency and safety

The situation

Apart from popular alternative energy resources like wind or solar, hydropower is one of the most efficient and environmentally friendly electric power sources available. The successful operation and economic viability of a hydropower facility depends on high-quality equipment and a long life cycle. In the long run, these two factors assure the operator's return on investment (ROI) and profitability.

Erosion and Abrasion

Many hydro turbines operate with high pressure water laden with abrasive minerals. If not properly controlled, these sharp, abrasive particles can cause Pelton and Francis turbines to suffer premature equipment failure from erosion and abrasion. More significant is the high risk of catastrophic mechanical failure if preventative steps are not taken.

Cavitation Effects

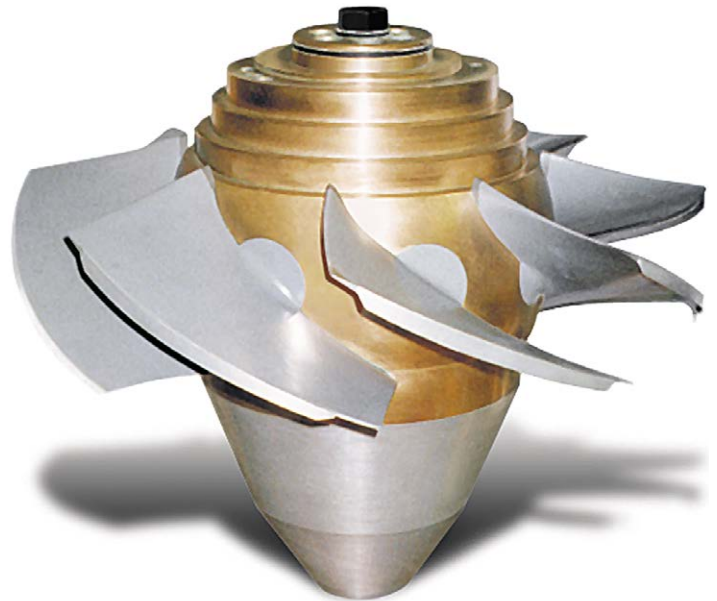
In addition, wear-induced changes in runner geometry can result in cavitation – the formation and rapid collapse of bubbles in the water. These collapsing bubbles produce very high, localized, hammer-like loads.

Over time, wear caused by cavitation can weaken the Pelton cup, leading to fatigue-induced failure with dangerous consequences. Wear can cause Francis turbines to lose efficiency as a result of labyrinth seal and wicket gate erosion. Kaplan or Kaplan Bulb turbines face wear and erosion of discharge runners and guide vanes.

Our solution

To help our customers increase the sustainability of their hydro turbines, Oerlikon Metco has developed Metco™ TURB. This high-quality, extremely wear resistant coating family protects hydro turbine vanes and other wetted parts against erosion, abrasion and cavitation.

Metco TURB has been designed specifically to enhance the performance and extend the service life of turbine components in contact with water.



Large Kaplan hydro turbines are coated with Metco TURB to protect against abrasion, which greatly extends operating life.

Metco TURB is recommended for application to both new equipment and used components to provide superior performance and extend life – especially where water is laden with silt and sand. When needed, on-site coating refurbishment is feasible.

Benefits

Metco TURB solutions are used on new equipment and for the repair of damaged hydro turbine components.

Metco TURB's crucial benefits are:

- **Component Safety:** Unlike other methods of producing a hard, tough coating on turbine parts, such as heat treating, the Metco TURB process ensures that components do not overheat during the coating application (max. 100 °C, 212 °F). No heat distortion means that the component substrate physical properties remain unchanged.
- **Economy:** Metco TURB, with its smooth surface, lasts longer, resulting in better efficiency and longer Mean Time Between Maintenance (MTBM).
- **Fast Application:** The coating process is quick. Metco TURB coatings can be applied in either Oerlikon Metco's production center or at the customer's site (certain conditions and premises apply).

Turbine parts coated with Metco TURB AA Service life increase *

Kaplan, Kaplan Bulb Turbine

Rotor blades	25
Guide vane trunnion	25
Guide vane rim	25

Francis Turbine

Case/wicket gate	25
Runner	30
Labyrinth seals	25

Pelton Turbine

Pelton bucket/ nozzle choke	20
Orifice land/ nozzle insert ring	20
Deflector, splash guard	30

* Versus uncoated component. Example: 25 = 25 times the service life of an uncoated component

Metco TURB AA

- Used for all turbine components to protect against hydro abrasion
- Coating material based on carbide alloys
- Hardness up to 1380 HV0.3
- As-sprayed surface of Ra 4 – 8 µm (160 – 320 µin)

Metco TURB AC

- Economic alternative to Metco TURB AA
- Coating material based on ceramic compounds
- Hardness of up to 1300 HV0.3
- Surface smoothness of Ra < 5 µm (< 200 µin)



A large Pelton turbine wheel, just coated with Metco TURB will last up to 20 times longer than uncoated turbine wheels.



A large Kaplan runner blade being coated for service at a major dam project. The Metco TURB-coated blade will last up to 25 times longer than an uncoated blade.



Information is subject to change without prior notice.