



ISCAR'S MACHINING SOLUTIONS FOR **HYDROELECTRIC ENERGY**



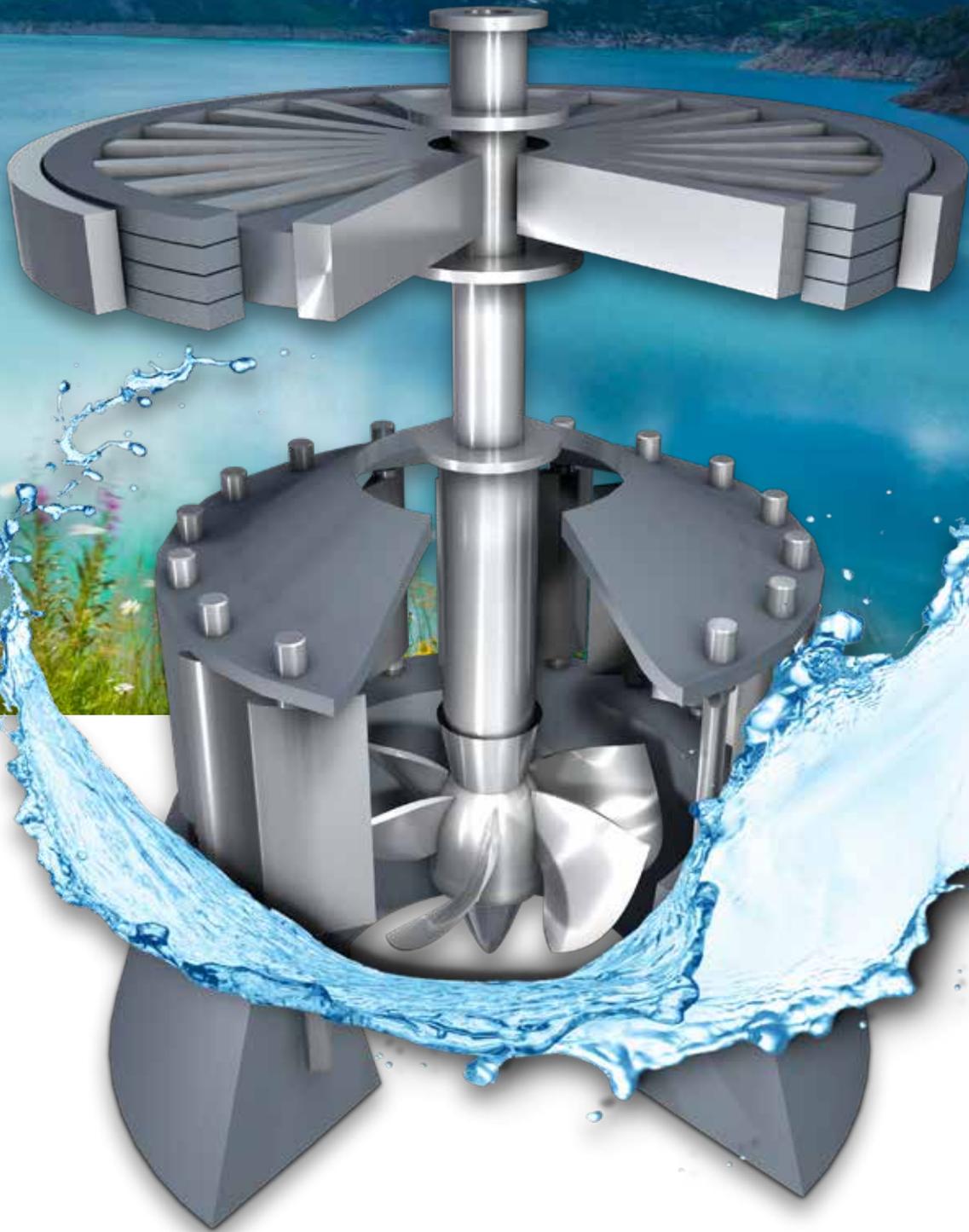


Hydroelectric Power

ISCAR, A World Leader in the Renewable Energies Industry

Renewable Energy is collected from clean resources that are naturally replenished on a human time scale such as sunlight, wind, rain, tides, waves, and geothermal heat. Hydro Power is power derived from the energy of falling water or fast running water, which can be harnessed for useful purposes.

ISCAR, a company with many years of experience in the production of metal cutting tools, offers unique solutions for the new generation of industries. As a leader in providing productive and cost effective machining solutions, **ISCAR** strives to be up to date with all the new trends and technologies which are a part of a brighter, greener future.





Pelton Wheel

LOGIQ4FEED
HIGH FEED MILLING

Pelton Wheel

Typical Materials:

Stainless steel

13Cr4Ni

16Cr5Ni

A Pelton wheel is an impulse-type water turbine invented by American inventor Lester Allan Pelton in the 1870s. The Pelton wheel extracts energy from the impulse of moving water, as opposed to water's dead weight like the traditional overshot water wheel.

Pelton wheels are the preferred turbine for hydro-power where the available water source has relatively high hydraulic head at low flow rates. Pelton wheels are made in all sizes. There exist multi-ton Pelton wheels mounted on vertical oil pad bearings in hydroelectric plants.



Profiling/Roughing

FFQ4 D...

FFQ4 SOMT 1205RM-HP/T IC830

Square single-sided inserts with four cutting edges designed for reducing cutting forces in long overhang applications.

ROUNDMILL



Profiling

Double-sided inserts with 5, 6 and 8mm radial cutting edges for profile milling applications.

MILLSHRED
ROUND LINE



Fully Effective Serrated Inserts

Produces small chips and assures easy evacuation even from deep cavities. Due to small cutting forces, the required machining power is low.

MULTI-MASTER
INDEXABLE SOLID CARBIDE LINE



Chamfering

A family of tools with shanks that have unique interchangeable heads for a variety of milling applications including ball nose, straight shoulder, slitting and slotting applications.





Pelton Wheel

MULTI-MASTER
INDEXABLE SOLID CARBIDE LINE



MM GRIT 16P-2.20-1.10

Interchangeable solid carbide small diameter, groove milling heads.

SUMOCHAM
CHAMDRILL LINE



Drilling

SUMOCHAM comprises a revolutionary clamping system that enables improved productivity output rates, while enabling more insert indexes.

SOLIDTHREAD



Threading

Solid carbide thread mills for the production of small internal threads. The thread mills feature a short 3-toothed cutting edge with 3 flutes and a released neck between the cutting zone and the shank.



ITSBORE



ITS Bore System

TCH AL Aluminum twin cutter heads for rough and fine boring operations.



Francis Turbine Blade

ROUNDMILL

Francis Turbine Blade

Typical Materials:

Structural steel

Stainless steel

13Cr4Ni

13Cr1Ni

16Cr5Ni

16Cr8Ni

The Francis turbine is a type of water turbine developed by James B. Francis in Lowell, Massachusetts. It is an inward-flow reaction turbine that combines radial and axial flow concepts.

Francis turbines are the most common water turbine in use today. "The Francis design has been used with head heights of from 3 to 600 meters, but it delivers its best performance between 100 and 300 meters" and are used primarily for electrical power production.



FRMT - Face Mill Tools

Face mills for productive machining of 3D surfaces, especially suitable for blade surfaces in turbo machinery and profile milling.

XQUAD
EXTENDED FLUTE



Finishing

Square inserts mounted on extended flute cutters, most suitable for high temperature alloys and stainless steel.

DROPMILL
3 FLUTE BALL NOSE



BLP - Lollipop

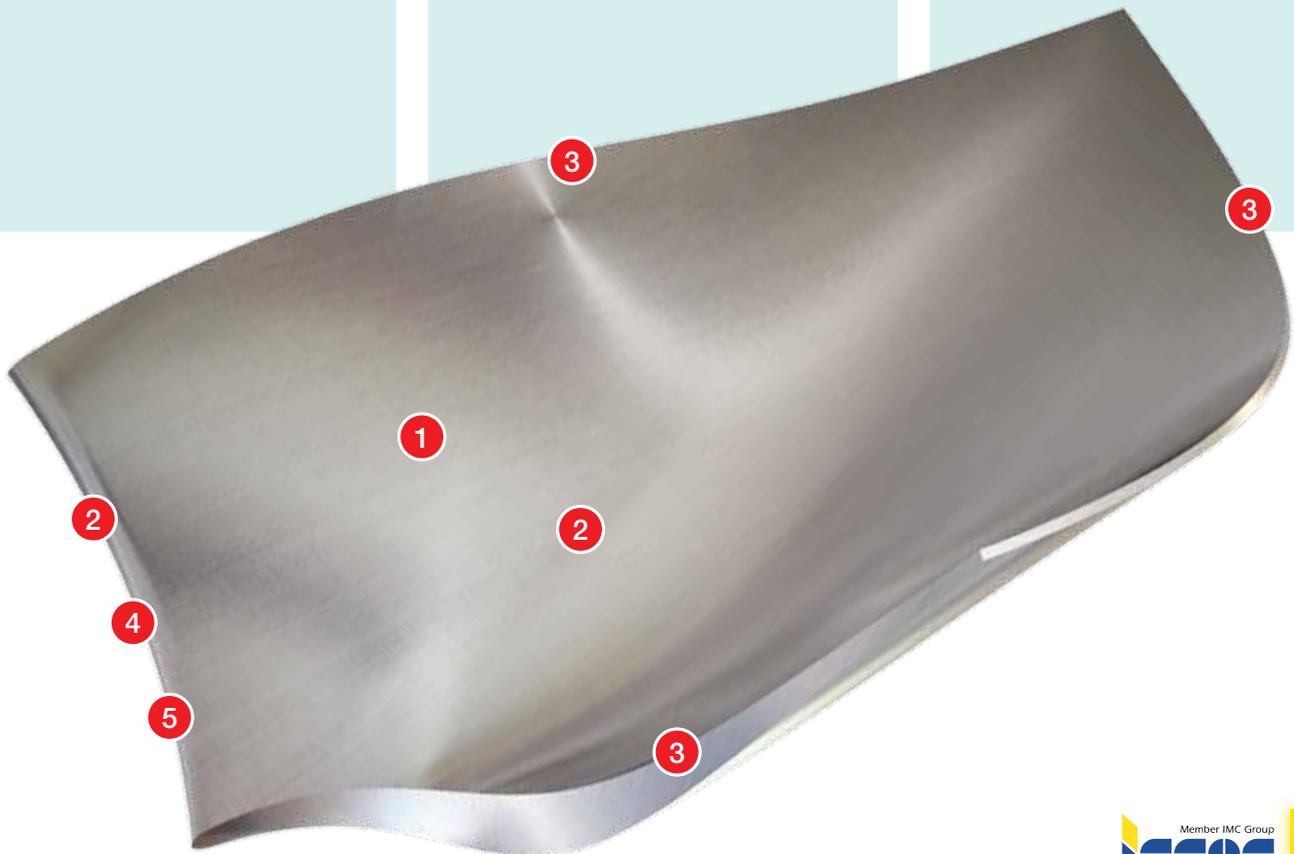
Three flute fully effective 240° ball nose endmills with FLEXFIT threaded adaptation, carrying double-sided inserts.

BALLPLUS



Profiling

2 cutting edged inserts (fully effective) used for profiling. Intended for up and down ramping and intercutting. Can be used for roughing or finishing applications.





Francis Turbine Runner

ROUNDMILL

Francis Turbine Runner

Typical Materials:

Structural steel

Stainless steel

13Cr4Ni

13Cr1Ni

16Cr5Ni

16Cr8Ni



FRMT

Face mills for productive machining of 3D surfaces, especially suitable for blade surfaces in turbo machinery and profile milling.

DROPMILL
3 FLUTE BALL NOSE



BLP - Lollipop

Three flute fully effective 240° ball nose endmills with **FLEXFIT** threaded adaptation, carrying double-sided inserts.

MULTI-MASTER
INDEXABLE SOLID CARBIDE LINE



Profiling/Finishing

A family of tools with shanks that have unique interchangeable heads for a variety of milling applications including ball nose, straight shoulder, slitting and slotting applications.

LOGIQ4FEED
HIGH FEED MILLING



Profiling/Roughing

FFQ4 D...
FFQ4 SOMT 1205RM-HP/T IC830
Square single-sided inserts with four cutting edges designed for reducing cutting forces in long overhang applications.





Kaplan Turbine Blade

Kaplan Turbine

Typical Materials:

Blades:

Structural steel

Stainless steel

13Cr4Ni

13Cr1Ni

16Cr5Ni

HUB:

Structural steel

HSMA (High strength micro alloy)

Heat treatment steel

Stainless steel

DR-TWIST
INDEXABLE DRILL LINE



Drilling

Drills designed with twisted coolant channels, allowing a strong drill body with excellent resistance to torsion and very efficient chip evacuation.



Back Face - Countersink

Function - countersinking bolt head bore.
Inserts - Plunger type: HTP LNHT 16... with four cutting edges.

The Kaplan turbine is a propeller-type water turbine with adjustable blades. It was developed in 1913 by Austrian professor Viktor Kaplan, who combined automatically adjusted propeller blades with automatically adjusted wicket gates to achieve efficiency over a wide range of flow and water level. Kaplan turbines are now widely used throughout the world in high-flow, low-head power production.

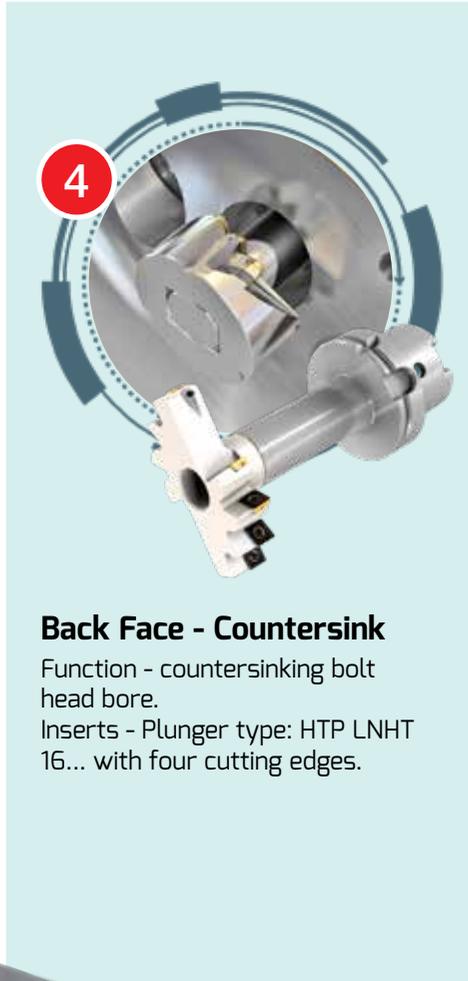
ITSBORE



Back Face - Countersink

Function - countersinking bolt head bore.

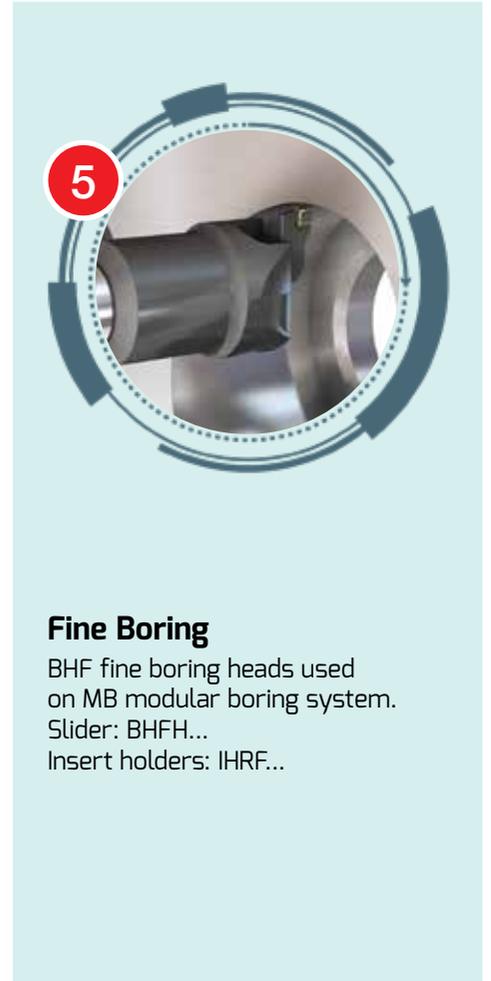
Inserts - Plunger type: HTP LNHT 16... with four cutting edges.



Back Face - Countersink

Function - countersinking bolt head bore.

Inserts - Plunger type: HTP LNHT 16... with four cutting edges.



Fine Boring

BHF fine boring heads used on MB modular boring system.

Slider: BHFH...

Insert holders: IHRF...





Kaplan Turbine Blade

HELIDO
600 UPFEED LINE

HELIDO
845 LINE

HELITANG
T490 LINE



Rough Pocketing

Trigon double-sided insert with 6 edges combines **HELIDO**'s strength and **FEEDMILL**'s special geometry to facilitate milling at very high feeds.



Face Milling

5845 SNMU 1305... - square, double-sided inserts with 8 cutting edges or ONMU 0505.. octagonal, double-sided inserts with 16 cutting edges.



Face Milling Cutter Tangential Clamp Inserts

4 cutting corners, tangential geometry for fast metal removal (FMR) and very high material removal rates on the sides of the blades.



SOLIDMILL
TEC LINE



Shoulder Finishing

Helix extra long solid carbide endmills for finishing hard materials up to 65 HRC.
Tool: EC200B38-4C20R2.

ISCARMILL



Chamfering

Tool: E45 D30-W25
45° chamfering endmills
Insert: SCMT 120408-19
Square 7° positive flat rake inserts for semi-roughing applications at medium to high feeds.





Kaplan Turbin Blade

HELIDO
600 UPFEED LINE

MILLSHRED
ROUND LINE

BALLPLUS



Blade Profiling Roughing/Finishing Radius Profiling and Roughing

Trigon double-sided insert with 6 edges combines **HELIDO**'s strength and **FEEDMILL**'s special geometry to facilitate milling at very high feeds.



Blade Profiling Roughing/Finishing Radius Profiling and Roughing

Milling cutters that carry either round inserts with a serrated cutting edge or regular round inserts. The serrated insert has four indexing orientation options, the round insert has eight.



Profiling

2 cutting edges (fully effective) used for profiling up and down ramping and intercutting. Can also be used for roughing or finishing applications.

SUMOCHAM
CHAMDRILL LINE



Drilling

SUMOCHAM comprises a revolutionary clamping system that enables improved productivity output rates, while enabling more insert indexes. The drills have a flat or round shank and internal coolant.

SOLIDTHREAD



Mill Threading

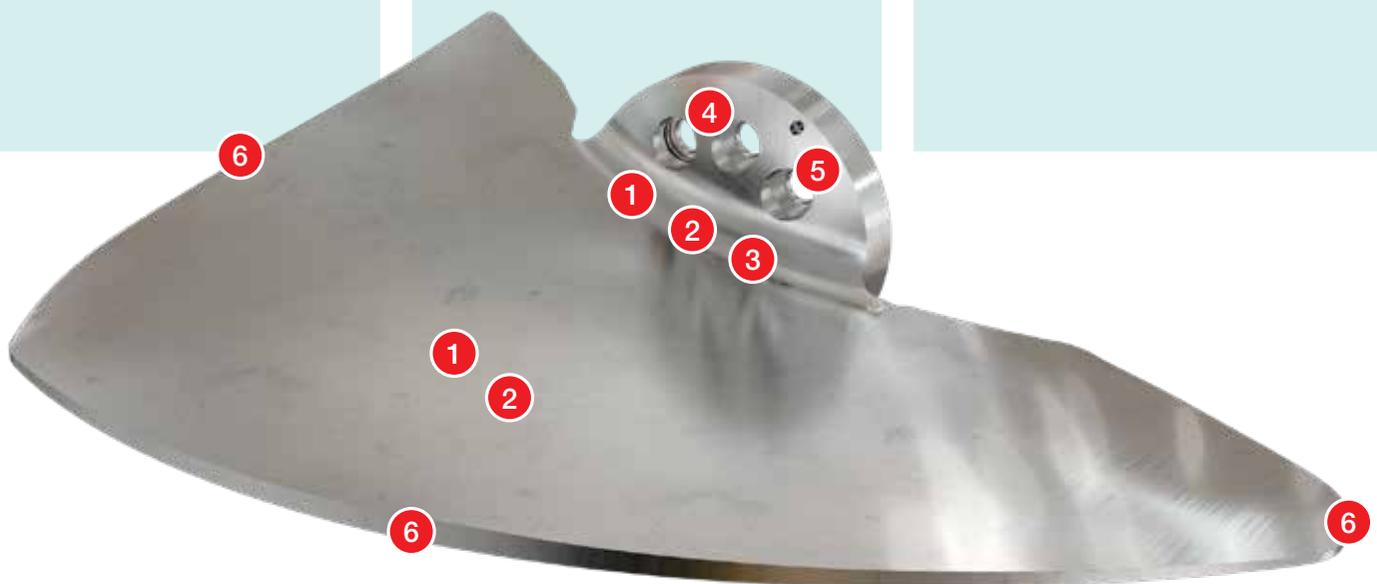
Solid carbide thread mills for the production of small internal threads. The thread mills feature a short 3-toothed cutting edge with 3 flutes and a released neck between the cutting zone and the shank.

HELITANG
T490 LINE



Shouldering Roughing

4 cutting corners, tangential geometry for fast metal removal (FMR) and very high material removal rates.





Wicket Gate

Wicket Gate

Typical Materials:

Structural steel
Stainless steel
13Cr4Ni
16Cr5Ni

HELIDO
ROUND H400 LINE

1



Profiling Roughing/Finishing H400 FR -12

Face mills that mount double-sided inserts with four 6mm radius cutting edges.

HELI6FEED
UPFEED LINE

2



Rough Pocketing

Trigon double-sided insert with 6 edges combines **HELIDO**'s strength and **FEEDMILL**'s special geometry to facilitate milling at very high feeds.

A wicket gate, or guide vane, is a component of water turbines to control the flow of water that enters the turbine. A series of small openings of the wicket gates surround the turbine. When the wicket gates are opened wider, more water will flow into the turbine runner which results in higher power output. The control of wicket gate opening and closing will allow the output energy generated by the turbines to be controlled to match the desired output energy levels.

HELIDO
ROUND H400 LINE



**Profiling Roughing/Finishing
H400 FR -12**

Face mills that mount double-sided inserts with four 6mm radius cutting edges.

BALLPLUS



Profiling

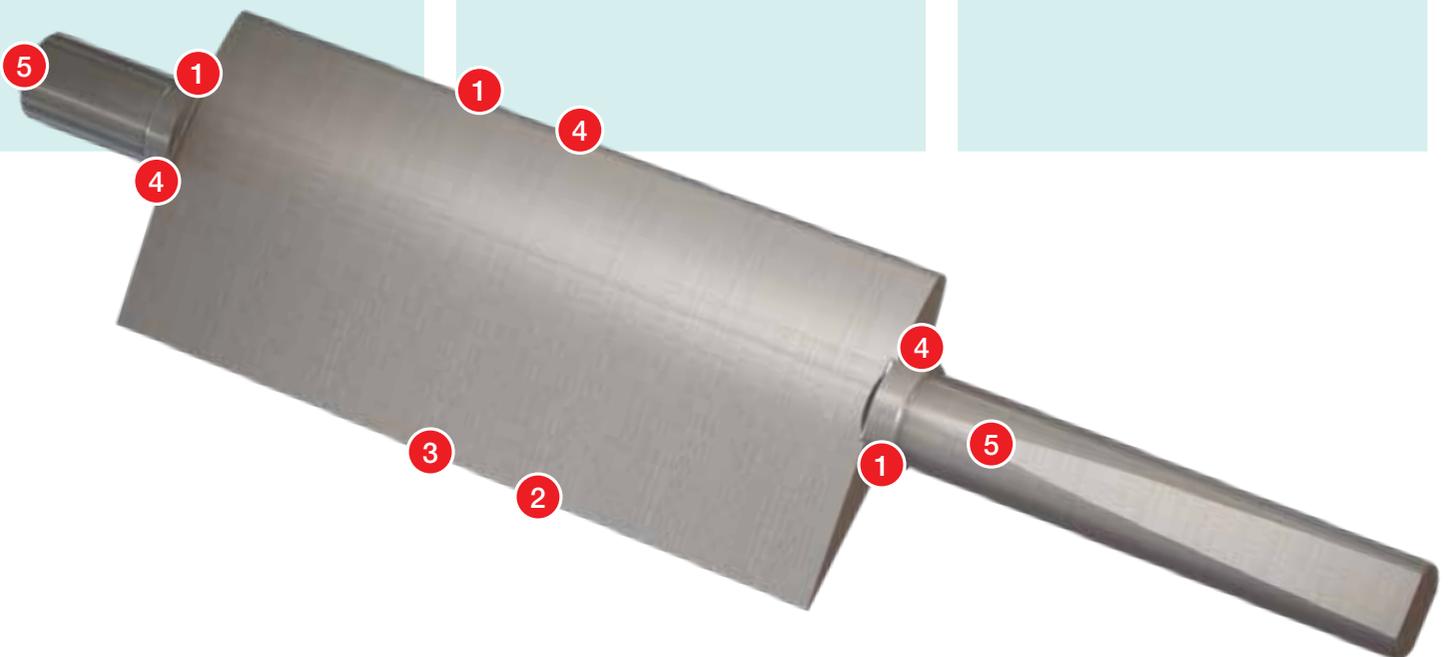
2 cutting edges (fully effective) used for profiling up and down ramping and intercutting. Can also be used for roughing or finishing applications.

ISOTURN



**Ceramic - Hard Turning
Finishing Operation**

IN23 - 40-50 HRc
IN22 - over 50 HRc
IN420 - over 50 HRc





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HYDROELECTRIC ENERGY

