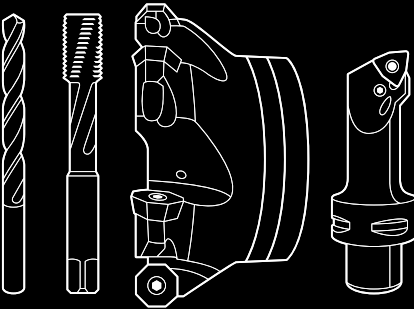


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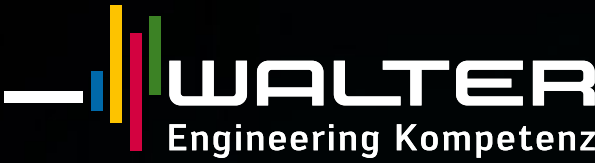
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Industry-specific
solutions

Energy

_EXPERTISE IN ENERGY APPLICATIONS

With energy into the future.



COMPREHENSIVE KNOWLEDGE OF COMPONENTS

for your machining tasks

Cleaner, more precise and more efficient: The requirements placed on the energy industry are constantly increasing, which in turn places greater demands on the manufacturers of systems and components for energy production. New technologies require new tools and machining processes. The same applies to new materials and complex component geometries. "Energy components" are also extremely expensive due to their often enormous size and long machining times. Errors during machining usually have extremely expensive consequences. Machining large components in the energy sector also requires complex custom-designed solutions.

Walter tool solutions are synonymous with maximum precision and process reliability. Turning, drilling, milling or threading: Walter is a partner you can rely on and has everything needed for all machining tasks in the energy industry.

Benefit from our "Engineering Kompetenz" and the complete solutions we offer for the energy industry from a single source: From the tool, process and machine to the knowledge we possess of applications.

Turbine housing
Page 4/5

Turbine blade
Page 9/10/13

Rotor hub
Page 16/17

Mainframe
Page 14/15

Electrical shaft
Page 6/7

Thermal shaft
Page 8/11/12

TURBINE HOUSING

Alloy and cast steels

Manufacturing housings for energy production systems is precision work involving many time-consuming process steps. The complete solutions we offer for all process stages involved in machining operations in the power generation industry are highly efficient. We provide you with the right tool for each individual step: For milling, drilling, threading and turning.

Walter solutions reduce tool change and chip-to-chip times to a minimum without compromising on quality. At the same time, the number of clamping operations and, consequently, non-productive times are reduced. This results in extra added value for you.

YOUR APPLICATION

Milling grooves

OUR SOLUTION

Walter WF351 slotting cutter



- Flexible cartridge system for rough and finish machining
- High level of accuracy as a result of the U guidance of the cartridges
- Milled surfaces to Ra 1.6 thanks to wiper technology

BENEFITS FOR YOU

High levels of flexibility and precision when roughing and finishing internal grooves in the housing.

YOUR APPLICATION

Roughing joint faces

OUR SOLUTION

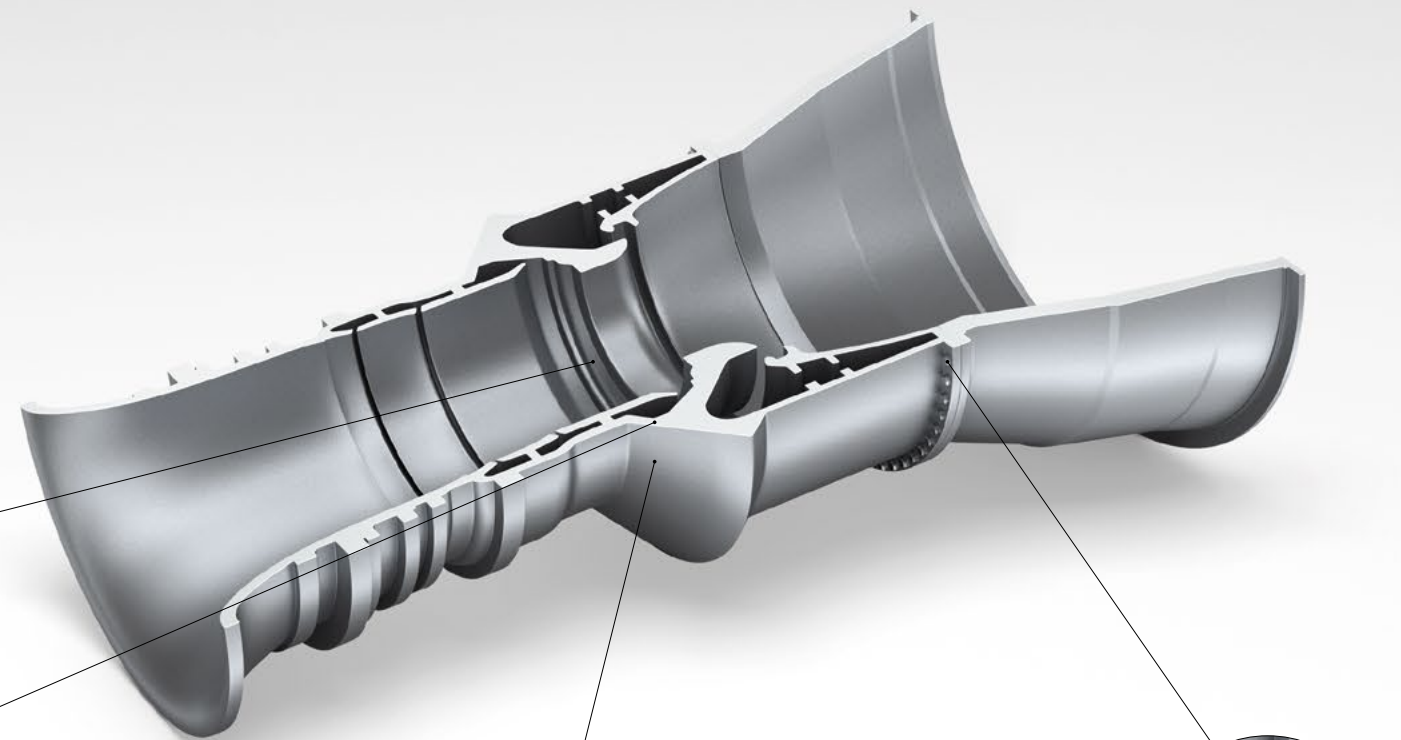
Walter M3016 heavy-duty cutter



- Differential tooth pitch, large chip gulleys for optimum chip removal
- Tiger-tec® Silver cutting tool materials for long tool life and a high level of process reliability, even for wet machining
- Protection provided for the indexable insert seat by an additional carbide shim which also functions as an "emergency cutting edge"
- One insert dimension for various lead angles

BENEFITS FOR YOU

Excellent cutting data, machining performance and process reliability. Lower tool and cutting tool material costs as a result of fewer ID numbers, administrative workload and inventory.



YOUR APPLICATION

Finishing burner holes

OUR SOLUTION

Walter B3234 precision-boring tool



- Internal coolant supply directly at the cutting edge
- Bridge version with cartridges (dia. 150–640 mm)
- With Walter Capto™ or NCT interface
- High-precision adjustment (0.01 mm scale with vernier)

BENEFITS FOR YOU

Powerful, modular precision-boring tool: Equipped with Tiger-tec® Silver indexable inserts with three cutting edges, available in all standard sizes.

YOUR APPLICATION

Producing connection hole counterbores

OUR SOLUTION

MODCO® back counterbore



- High-tech actuation tool
- Cutting edges which can be actuated automatically ($z = 2$)
- Precise activation using coolant or compressed air

BENEFITS FOR YOU

Back counterboring, even under unfavourable conditions. No need to change counterbore tools.

ELECTRICAL SHAFT

Alloy steel

Generators have to convert the rotational energy of turbines into electrical power with the greatest possible efficiency. To do so, the core piece of generators, the electrical shaft, must be manufactured with extreme precision. This is no easy task, as generators are up to 15 m long and weigh more than 200 t – with main winding grooves up to 250 mm deep and up to

9 m long. With Walter's tool and machining concept, winding grooves can be roughed and finished in a single pass. This is supplemented by comprehensive standard and customer-specific solutions for manufacturing winding, air, sealing and relief grooves in a highly precise manner.



YOUR APPLICATION

Milling sealing grooves in the main winding groove

OUR SOLUTION

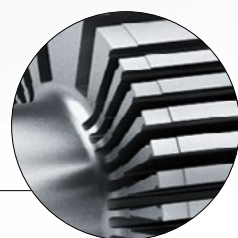
Sealing groove milling cutter



- Cost-efficient alternative to HSS or brazed solid carbide tools
- Custom solutions using indexable inserts for most common sealing groove forms
- There are five machining methods to choose from for producing sealing grooves

BENEFITS FOR YOU

High levels of cost efficiency and process reliability thanks to Tiger-tec® Silver coatings.



YOUR APPLICATION

Milling main winding grooves

OUR SOLUTION

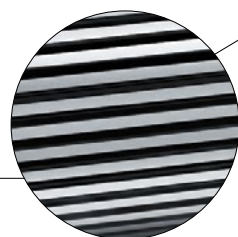
WF341 rotor-slot milling cutter



- Flexible cartridge system for roughing and finishing
- Can be used for diameters up to 1.3 m and cutting widths of more than 50 mm
- Surface qualities to Ra 1.6 thanks to new wiper technology
- Customer-specific solutions for all profile shapes

BENEFITS FOR YOU

Long tool life as a result of Tiger-tec® Silver coatings, versatility and process reliability based on many years of cooperation with power station manufacturers.



YOUR APPLICATION

Milling relief grooves and transverse slots

OUR SOLUTION

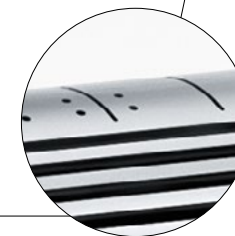
Relief groove milling cutter



- Machining with standard ROHX indexable inserts
- Latest Tiger-tec® Silver technology
- Both plunge milling and copy milling are possible

BENEFITS FOR YOU

The latest cutting tool materials and excellent chip removal ensure maximum process reliability.



YOUR APPLICATION

Circular interpolation milling of the coupling holes and groove

OUR SOLUTION

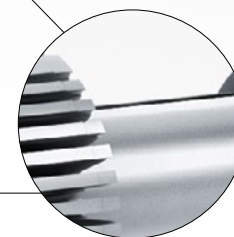
F2330 high-performance milling cutter



- Standard tool with Tiger-tec® Silver indexable inserts
- Lower cutting forces and shorter chips than other solutions
- Suitable for long projection lengths and diameters of $>3 \times D - 5.5 \times D$
- Optimised chip removal thanks to circular interpolation milling with process reliability

BENEFITS FOR YOU

Different diameters for coupling holes can be machined with the same tool. Intermediate machining, which is otherwise required, is no longer necessary.



MODULAR BELL-TYPE MILLING CUTTER

Alloy steel

YOUR APPLICATION

Roughing and semi-finish machining curved fir-tree grooves

OUR SOLUTION

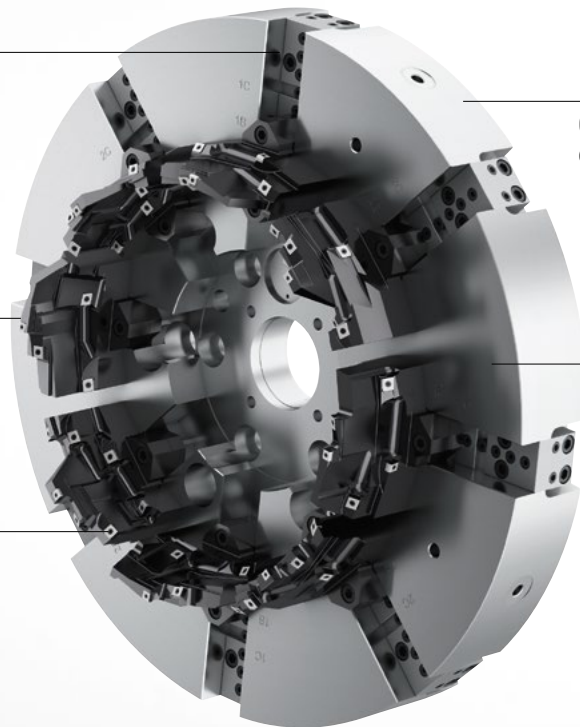
Modular bell-type milling cutter



Eight precision
cartridge seats

Patent-pending tool concept

Basic insert for cartridges –
diameter range: 350-700 mm



Construction: Modular
cartridge system

The user requires just one new
cartridge set to change over
to a new profile; the basic body
remains the same

BENEFITS FOR YOU

- Significantly more cost-effective than a monoblock bell-type milling cutter for two to three profiles
- Covers a diameter range of 350-700 mm
- Rapid replacement possible even for individual cartridges
- Can be flexibly equipped for various groove profiles

M2471 ROUND INSERT MILLING CUTTER

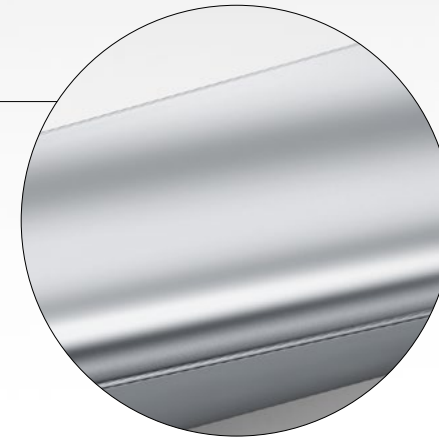
Difficult-to-machine materials

YOUR APPLICATION

Roughing the blade root, turbine blade and blade head

OUR SOLUTION

Walter M2471 round insert milling cutter



Eight usable cutting edges
(four per side)

Perfect for roughing and
Z-level machining turbine blades

Powered by Tiger-tec® Silver



Positive cutting characteristics

BENEFITS FOR YOU

- Excellent cost efficiency thanks to high metal removal rate, even on low-performance machines
- Lower cutting tool material costs compared to positive round inserts due to eight cutting edges per insert
- High level of process reliability thanks to stable indexable inserts and soft cutting action thanks to positive cutting geometries.
- PVD-coated grade WSP45S can be used without coolant, with MMS and for wet machining operations (emulsion)



Watch the product animation:
Scan this QR code or go directly to
<http://goo.gl/mMPeMo>

TURBINE BLADE

Difficult-to-machine materials

Turbine blades are exposed to extremely high thermal and physical stresses: A turbine blade at full load covers up to 500 m/s. This corresponds to a centripetal acceleration of 160,000 m/s² with centrifugal forces of around 550 t. Only difficult-to-machine materials, such as Inconel or similar super

alloys, can withstand this. Complex blade profiles are an additional challenge. With comprehensive tool solutions, we ensure that your tool changes and chip-to-chip times are reduced to a minimum, while still maintaining extremely high quality.

YOUR APPLICATION

Roughing the blade root, turbine blade and blade head

OUR SOLUTION

F2334R round insert cutter



- Optimised insert seat design
- Reinforced tool body adaptor
- Direct coolant supply to the cutting edge
- Four cutting edges per indexable insert
- Insert sizes: R0.X.10T3.. or R0.X.1204..

BENEFITS FOR YOU

Long tool life thanks to new indexable insert grades.

YOUR APPLICATION

Finishing the turbine blade

OUR SOLUTION

Prototyp Protostar N50 multi-flute



- Modular milling system thanks to the ConeFit adaptor
- 50° helix angle for a soft cutting action
- TAX coating for high feed rates and cutting speeds

BENEFITS FOR YOU

Significantly shorter machining times and excellent cutting properties in difficult-to-machine materials.

YOUR APPLICATION

Semi-finishing and finishing of thin-walled, forged blades

OUR SOLUTION

Walter BLAXX F5041/5141



- Tangential indexable inserts with four cutting edges at a 90° angle
- Special surface treatment of the body for a high level of wear resistance
- Real high-performance cutting (HPC) for blade machining
- Intermediate machining with large depths of cut (down to 9 mm) with a simultaneous high feed rate
- Powered by Tiger-tec® Silver

BENEFITS FOR YOU

Large depths of cut and high feed rates reduce the machining time by up to 40%. Axial forces and vibration are practically eliminated by the small corner radii.

YOUR APPLICATION

Finishing the transition radius and platform

OUR SOLUTION

Walter Prototyp conical ball-nose end mills



- Variable inclination angle: From 1° to a maximum of 30°
- Two to four teeth – with or without chip breaker/knurling profile
- Radius of 0.5-8 mm
- Substrate, geometry, pre-treatment and coating are ideally matched to the application and material
- Reduced delivery time with Walter Xpress

BENEFITS FOR YOU

Long tool life and excellent surface quality on the component.

Watch application video:
Scan this QR code or go directly to
<https://goo.gl/U5ZrLW>



THERMAL SHAFT

Alloy steel

Thermal shafts are fitted in steam turbines. They are often around 10 m long and weigh over 100 t. It often takes months to machine them, with up to 20 t of chips being produced. Machining this type of stainless-steel shaft is generally considered one of the most demanding machining tasks. This particularly applies to milling the precision mount-

ing grooves. As a result of a component-specific machining process developed individually for the user, Walter ensures that machining is both accurate to size and cost-efficient. This is implemented in production with our highly precise special tools for milling and drilling.

YOUR APPLICATION

Back counterboring the coupling holes

OUR SOLUTION

Walter back counterbore



- Customer-specific, custom-designed tool solution for back counterboring shaft couplings
- Available as back counterbore or circular interpolation technology
- Also available as a manual solution for unfavourable ratios, either with ScrewFit, shell or bayonet interface

BENEFITS FOR YOU

Custom-designed solution. Flexible tool system with process reliability.

YOUR APPLICATION

Machining fir-tree grooves

OUR SOLUTION

Indexable inserts for semi-finishing and finishing face mills



- Cost-efficient semi-finishing and finishing of fir-tree grooves
- Finishing profiles up to a profile tolerance of ±10 µm
- No regrinding for solid carbide and shorter machining times
- Available for various profile shapes

BENEFITS FOR YOU

Cost-efficient machining of fir-tree grooves with process reliability. Faster machining times and no additional regrinding costs compared to solid carbide tools.

YOUR APPLICATION

Rough milling of straight fir-tree grooves

OUR SOLUTION

Form slotting cutter



- Construction: Modular cartridge system
- Equipped with Tiger-tec® Silver standard indexable inserts
- Roughing the grooves in the most effective and cost-efficient manner
- Maximum number of teeth and optimum chip spaces ensure maximum cutting performance and chip removal

BENEFITS FOR YOU

Tiger-tec® Silver standard indexable inserts for maximum cutting performance and process reliability.

YOUR APPLICATION

Finishing fir-tree grooves

OUR SOLUTION

Solid carbide and HSS finishing face milling cutters



- Particularly well-suited for smaller fir-tree profiles and tighter tolerances
- Rounds off Walter's product range to allow all customer and tool requirements to be processed in full

BENEFITS FOR YOU

Increased accuracy on the component and complete machining from a single source.

MAINFRAME

Ductile cast iron

The mainframe is the central component of the generator nacelle on a wind turbine. The transmission, rotor bearing and bearing for the tower connection are flanged onto it. The power generator is installed on the generator frame. Mainframes weigh up to

70 t and are subjected to permanent and high dynamic loads. Their manufacture must meet the most rigorous quality and safety requirements. We meet these high requirements with our highly precise tools for drilling and milling.

YOUR APPLICATION

Roughing the main bore

OUR SOLUTION

Walter F4238 porcupine milling cutter



- Special version with outstanding cutting values
- Excellent shoulder and profile machining performance
- Tiger-tec® Silver grade WSP45S and extremely soft-cutting tool geometries

BENEFITS FOR YOU

High levels of productivity and process reliability – especially in conjunction with the Tiger-tec® Silver grade WSP45S.

YOUR APPLICATION

Roughing the end face

OUR SOLUTION

Walter M3016 heavy-duty cutter



- Differential pitch counters vibration, large chip gulleys for optimised chip removal
- Tiger-tec® Silver cutting tool materials for long tool life and a high level of process reliability, even for wet machining
- Protection provided for the indexable insert seat by an additional carbide shim which also functions as an "emergency cutting edge"
- One insert dimension for various lead angles

BENEFITS FOR YOU

Excellent cutting data, machining performance and process reliability. Lower tool and cutting tool material costs as a result of fewer ID numbers and administrative workload.

YOUR APPLICATION

Machining vent holes

OUR SOLUTION

DC170 Supreme solid carbide drill



- Greater carbide mass behind the cutting edge provides a high level of stability
- Special coolant grooves allow the uninterrupted passage of coolant, and chip jams are prevented
- Coolant is washed around the lands
- Heat dissipation allows higher cutting data

BENEFITS FOR YOU

Improved component quality, lower vibration and higher levels of productivity and process reliability as a result of 360° coolant coverage and a new type of land design.

YOUR APPLICATION

Roughing the bearing surfaces and rear faces

OUR SOLUTION

Walter WF351 slotting cutter



- Available as a monoblock or cartridge tool
- Maximum number of teeth and optimum chip spaces for the best possible cutting performance
- Walter's many years of experience with tools up to 1600 mm in diameter

BENEFITS FOR YOU

Roughing and circular interpolation milling without compromise, even under the harshest conditions. Outstanding cutting performance as a result of optimum chip spaces and the maximum number of teeth.

ROTOR HUB

Ductile cast iron

The rotor hub is the interface between the rotor and the drivetrain. The bearings for the enormous rotor blades are bolted onto it. It is part of the rotor and closely linked to the mechanical drivetrain at the same time, as all of the rotor forces and torques are virtually concentrated in this component.

The stresses to which they are exposed are correspondingly high. A completely robust machining process is essential for the fault-free manufacture of operational rotor hubs for wind turbines.

YOUR APPLICATION

Circular interpolation milling of the large bores

OUR SOLUTION

Walter BLAXX F5141 shoulder mill



- Wear-protected body as a result of special surface treatment
- Internal coolant supply
- Torx Plus screw
- Four usable, precise 90° cutting edges

BENEFITS FOR YOU

Higher level of process reliability due to a more stable design. High cost efficiency (four cutting edges per indexable insert, up to 30 % higher feed rate per tooth, more cutting edges per diameter). Powered by Tiger-tec® Silver.

YOUR APPLICATION

Producing blind hole threads

OUR SOLUTION

Walter Prototyp Paradur® ECO Plus



- THL coating with new type of surface treatment for long tool life and high cutting speed
- No machine stoppage due to chip packing on long-chipping materials.
- Standard product range with large dimensions

BENEFITS FOR YOU

High level of process reliability for deep blind holes and significantly reduced production costs as a result of a longer tool life and higher cutting speed.

YOUR APPLICATION

Machining the connection holes

OUR SOLUTION

Walter Xtra-tec® insert drill special tool



- Low cutting forces and excellent chip evacuation
- Wiper edge insert at periphery
- Available as a special tool within four weeks with Walter Xpress

BENEFITS FOR YOU

High level of process reliability due to low cutting forces and good chip evacuation. Outstanding workpiece quality thanks to wiper cutting edges.

YOUR APPLICATION

Producing threads

OUR SOLUTION

Walter T2711/T2712 indexable thread milling cutter



- Universal indexable insert thread milling cutter
- Designed for high cutting speeds and high feed rates per tooth
- Choice of radial or axial coolant outlets
- Tools from the T2712 series are designed for 2 x DN thread length and constructed with additional neck relief in order to bridge interference contours

BENEFITS FOR YOU

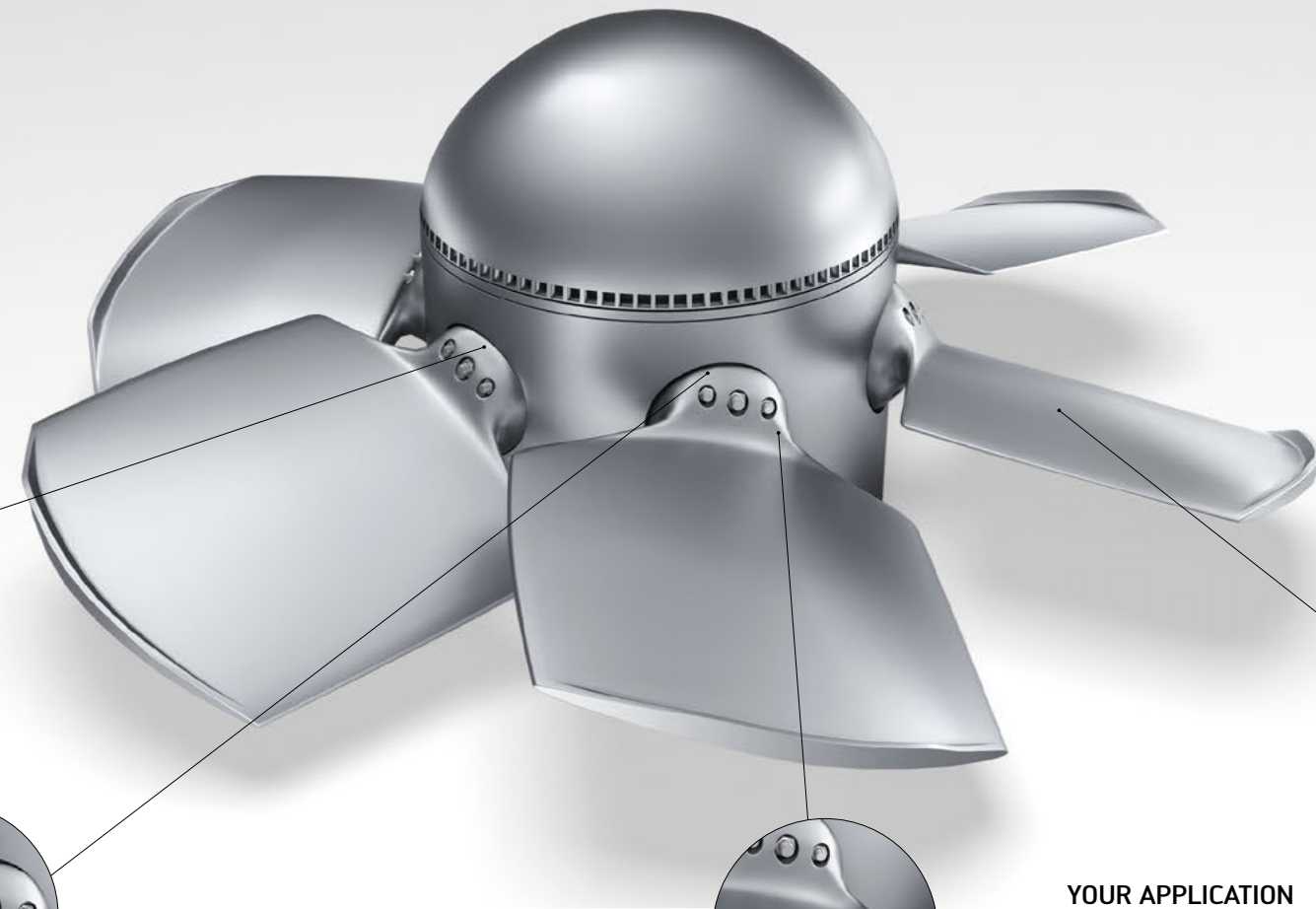
Extremely high level of productivity as a result of rapid machining and long tool life. High level of process reliability due to ease of handling and infrequent radius corrections. Excellent thread quality due to smooth operation. The thread remains free of chip residue.

KAPLAN BLADES

Manganese-nickel steel or chromium-nickel steel

Kaplan turbines are water turbines against which water flows in an axial direction and which have a degree of efficiency of 80-95 %. They were developed by Viktor Kaplan, based on the Francis turbine, and are particularly suitable for large hydraulic power stations

located on calm bodies of water. Their adjustable wheel is similar to a ship's propeller. To manufacture them, Walter provides powerful metal cutting tools and ideally matched machining processes.



YOUR APPLICATION

Roughing external diameters on the blade flange

OUR SOLUTION

Walter Xtra-tec® F4238 porcupine milling cutter



- Large range of cutting depths can be covered
- Extremely soft-cutting geometry
- High material removal rates

BENEFITS FOR YOU

High level of productivity as a result of outstanding cutting values, high level of process reliability as a result of the extremely soft-cutting geometry and use of the new Tiger-tec® Silver grade WSP45S.

YOUR APPLICATION

Finishing mating faces on the flange

OUR SOLUTION

Walter F2010 adjustable face milling cutter



- Adjustable runout
- Exchangeable cartridges, only one basic body
- Tiger-tec® Silver cutting tool materials for long tool life and a high level of process reliability

BENEFITS FOR YOU

Always up-to-date with the latest developments in machining technology thanks to the cartridge construction. The insert seat cartridges can be easily exchanged.

YOUR APPLICATION

Pre-drilling connecting holes on the blade flange

OUR SOLUTION

Walter Xtra-tec® B4213 insert drill



- Force-fit insert clamping
- Ideal insert position ensures forces are balanced during the machining process
- Optimised chip space and robust tool body
- Hard-nickel-plated surface provides protection against wear and corrosion
- Wiper edge inserts at periphery

BENEFITS FOR YOU

Increased productivity as a result of higher workpiece values; low drilling tolerance; reduced costs due to four cutting edges; higher cutting parameters; and fewer subsequent operations. Excellent surface quality and high level of process reliability.

YOUR APPLICATION

Roughing turbine blades

OUR SOLUTION

F2334R round insert cutter



- Optimised insert seat design
- Reinforced tool body adaption
- Direct coolant supply to the cutting edge
- Four cutting edges per indexable insert
- Insert sizes: R0.X.10T3.. or R0.X.1204..

BENEFITS FOR YOU

Long tool life thanks to new indexable insert grades.