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.
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.

**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**
Finishing burn 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.

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**
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**
Producing connection hole counterbores

**OUR SOLUTION**
MODCO® back counterbore

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

**BENEFITS FOR YOU**
Back counterboring, even under unfavourable conditions. No need to change counterbore tools.

Alloy and cast steels

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Turbine Housing

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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.

**ELECTRICAL SHAFT**

Alloy steel

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**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.

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**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.

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**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 x D–5.5 x 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.

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**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
Roughing the blade root, turbine blade and blade head

OUR SOLUTION
Walter M2471 round insert milling cutter

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)

YOUR APPLICATION
Roughing and semi-finish machining curved fir-tree grooves

OUR SOLUTION
Modular bell-type milling cutter

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

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

Eight precision cartridge seats

Patent-pending tool concept

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

Eight usable cutting edges (four per side)

Perfect for roughing and Z-level machining turbine blades

Powered by Tiger-tec® Silver

Positive cutting characteristics

Watch the product animation: Scan this QR code or go directly to http://goo.gl/mMPeMu
TURBINE BLADE

**Difficult-to-machine materials**

- Turbine blades are subjected 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. Turbine blades are exposed to extremely high 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, our customers can meet these two challenges and keep to their deadlines and costs in the competitive environment against the backdrop of rising energy costs.

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**OUR SOLUTION**

Prototyp Protostar N50 multi-flute

**YOUR APPLICATION**

- Roughing the blade root,
- Finishing the transition radius and platform

**BENEFITS FOR YOU**

- Long tool life and excellent surface quality on the component.
- Easy retrofit solutions for existing machines.
- Real high-performance cutting (HPC) for demanding applications.
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**OUR SOLUTION**

Walter Prototyp conical ball-nose end mills

**YOUR APPLICATION**

- Machining fir-tree grooves
- Machining fir-tree grooves

**BENEFITS FOR YOU**

- Cost-efficient semi-finishing and finishing of fir-tree grooves
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**OUR SOLUTION**

Walter back counterbore

**YOUR APPLICATION**

- Back counterboring the coupling holes
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**BENEFITS FOR YOU**

- Available as back counterbore or circular shell or bayonet interface
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**OUR SOLUTION**

Walter finishing face milling cutters

**YOUR APPLICATION**

- Finishing fir-tree grooves
- Finishing fir-tree grooves

**BENEFITS FOR YOU**

- Cost-efficient finishing of the firm-groove bands and vibration are practically eliminated by the tool solutions, we ensure that your tool changes are an additional challenge. With comprehensive tool solutions, our customers can meet these two challenges and keep to their deadlines and costs in the competitive environment against the backdrop of rising energy costs.

- Difficult-to-machine materials
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**OUR SOLUTION**

Indexable inserts for semi-finishing and finishing

**YOUR APPLICATION**

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

**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 tool solutions, we ensure that your tool changes are an additional challenge. With comprehensive tool solutions, our customers can meet these two challenges and keep to their deadlines and costs in the competitive environment against the backdrop of rising energy costs.

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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 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.

**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 optimum chip spaces and a new type of land design.

**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 WSP455 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 WSP455.

**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.

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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

- TiAl 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

- 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 WSP455.

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: RO.X 10T3, or RO.X 1204.

BENEFITS FOR YOU
Long tool life thanks to new indexable insert grades.