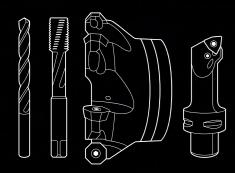
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Industry-specific solutions

Aerospace

_EXPERTISE IN AEROSPACE APPLICATIONS

Achieve ambitious goals with ease.



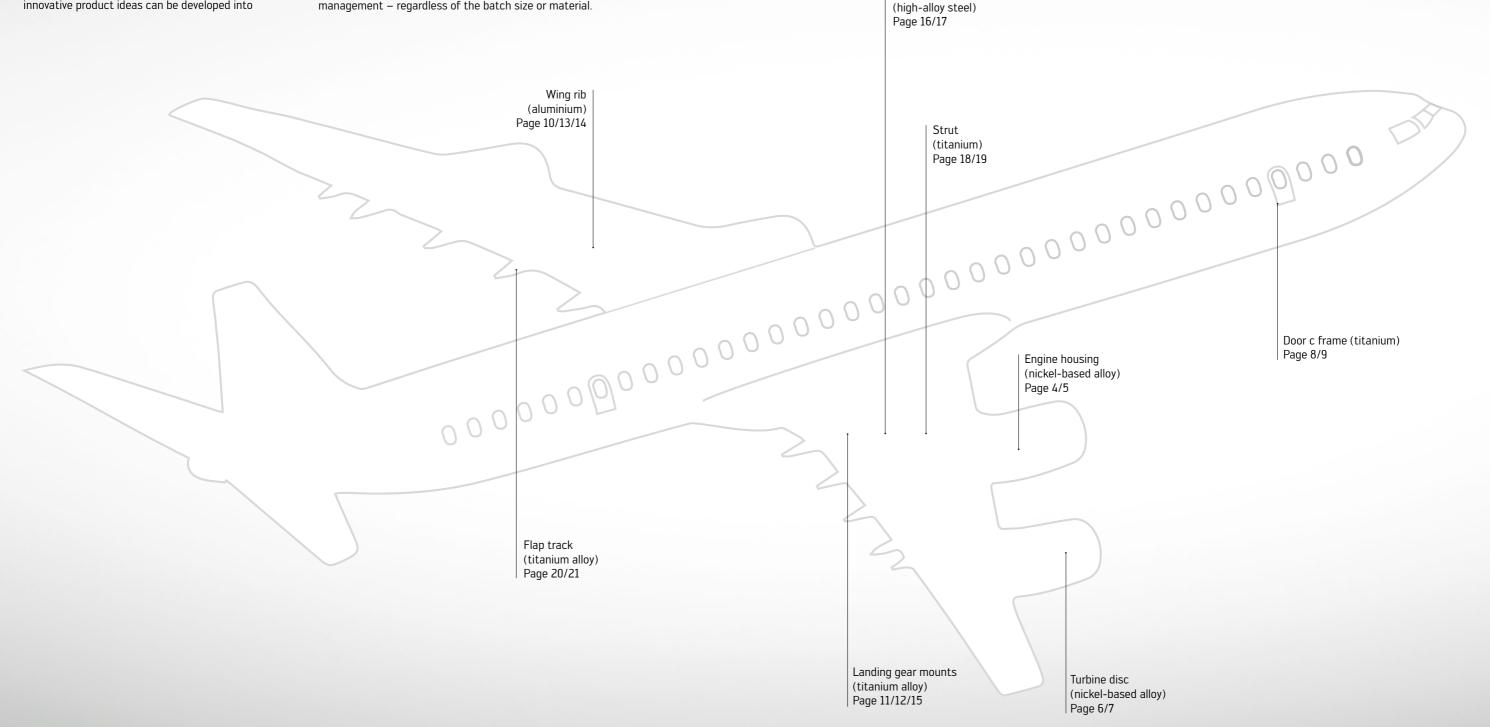
COMPREHENSIVE KNOWLEDGE OF COMPONENTS

for your machining tasks

Any discussion on machining in the aerospace industry inevitably involves high-tech solutions and innovations. This is because the ability to machine new materials with a high level of process reliability and precision is not the only thing that matters – the development of technically and economically viable solutions is of equal importance. With Walter's Engineering Kompetenz, you can rest assured that innovative product ideas can be developed into

2

competitive series-production solutions. Walter offers you the most comprehensive range of metal cutting tools for metal and composite materials available from a single source global supplier. Flexible machining solutions for the aerospace industry that set benchmarks, whether for turning, drilling, threading or milling, with the highest possible levels of productivity and process reliability – from technical support through to tool management – regardless of the batch size or material.



Landing gear main cylinder

ENGINE HOUSING

Nickel-based alloy

Turbine housings are designed for maximum stability. They are therefore manufactured using materials such as Inconel, titanium alloys or Waspaloy. Nickel-based alloys in particular are very difficult to machine due to their high toughness and temperature stability. In addition, it must be ensured that finishing work does

not cause any structural changes or damage to the edge zones. Multi-axis turn/mill centres and vertical turret lathes are primarily used for machining these materials. Our turning, milling, drilling and threading tools enable you to machine engine housings with maximum efficiency, precision and process reliability.



YOUR APPLICATION

Roughing housing mating faces

OUR SOLUTION

Walter BLAXX M3024 heptagon face milling cutter



- 14 cutting edges per indexable insert
- Stable, negative indexable inserts
- Optimum support face and high feed per tooth thanks to solid carbide shim
- High cutting depth
- Powered by Tiger·tec® Silver

BENEFITS FOR YOU

Extremely reliable and, above all, cost-efficient tool with high stability and process reliability.

YOUR APPLICATION

Roughing external surfaces

OUR SOLUTION

Walter Cut turning toolholder with precision cooling



- CNGN1207 ceramic insert
- Rake face cooling for ideal surface quality
- Extremely high cutting speeds

BENEFITS FOR YOU

Can be used universally with high machining speed and long tool life. Perfect surface quality thanks to high stability and optimum cooling in the cutting zone.



Thread tapping the mating face

OUR SOLUTION

Walter Prototyp Prototex® TiNi Plus



- Innovative hard material coating and stable cutting edges
- Special geometry for machining ISO S alloys with emulsion
- High flank clearance angle reduces friction in materials that tend to cause jamming
- Wear-resistant, titanium-free ACN coating prevents weld formations

BENEFITS FOR YOU

Flexible machining of nickel and titanium alloys with just one tool. Long tool life and high process reliability due to tool stability.



Drilling the connecting bores

OUR SOLUTION

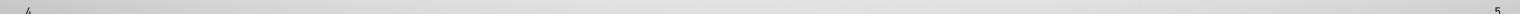
Walter Titex X-treme Plus



- Wear-resistant DPL coating
- Stable main cutting edge for maximum tool life and process reliability

BENEFITS FOR YOU

Drilling and reaming tool for universal use, guaranteeing the best possible surface quality on the workpiece thanks to high cutting data.

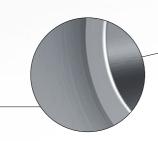


TURBINE DISC

Nickel-based alloy

Turbine discs are engine components manufactured from titanium 64 or heat-resistant high-temperature alloys such as Inconel 718 and Udimet 720. These complex workpieces with chambers and grooves are rarely easily accessible. For this reason, our aerospace specialists develop individual machining solutions

according to the shape of the component. Our focus is on ensuring that implementation of these solutions is cost-effective and reliable – which is where our cutting tools and processes can prove their worth. This enables you to carry out extremely cost-effective production, even under unfavourable conditions.



YOUR APPLICATION

HSC roughing disc contours

OUR SOLUTION

Walter Turn with claw clamping and ceramic indexable insert



- Ceramic substrate for machining nickelbased alloys
- Indexable insert geometry with stable design, adapted for nickel-based alloys

BENEFITS FOR YOU

Long tool life and high cutting speed when machining nickel-based alloys.

YOUR APPLICATION

HSC milling of turbine blade grooves

OUR SOLUTION

Carbide body end mill with ceramic cutting head



- High stability and long tool life
- Ceramic head fused onto carbide shank
- Edge geometry designed for nickel-based alloy
- Also suitable for plunge milling

BENEFITS FOR YOU

High stability and a metal removal rate five times higher than for conventional carbide solutions thanks to high cutting speed using "High Speed Cutting" (HSC) parameters.



Contour turning of the disc profile

OUR SOLUTION

Walter Cut Capto™



- Tiger·tec® PVD coating
- Versatility thanks to diverse geometries
- Special solutions for modules and inserts

BENEFITS FOR YOU

Flexible grooving system for grooving and parting off, recessing and longitudinal turning – with indexable inserts that guarantee maximum wear and temperature resistance.

YOUR APPLICATION

Roughing and finish milling of blade root profiles

OUR SOLUTION

Walter Prototyp profile groove milling cutter



- Milling to closely match the required profile
- TiAIN coating

BENEFITS FOR YOU

High accuracy and custom design to match customer specifications so that the tool reproduces the profile required in each case.

DOOR C FRAME AREA

Titanium

Door frame areas refer to areas in the aircraft fuselage that surround cargo doors and passenger doors. These components are important for safety, and must compensate for the structural weaknesses created as a result of openings in the aircraft fuselage. For this reason, these frames not only need to be precisely manufactured, but also must not warp, even under heavy load. They are therefore mainly made of titanium. In order to prevent crack propagation, the titanium is beta-annealed, which significantly increases tool wear. The frames are also designed in lengths of up to 4 m and incorporate reinforcement bars, all requiring high machining volumes without causing the component to warp. The primary focus is therefore on process reliability.



Dynamic milling of titanium structures (High Performance Cutting)

OUR SOLUTION

Ti40 high-performance milling cutter



- Solid carbide tool for full slotting, dynamic milling, semi-finishing and finishing operations
- All-rounder with five cutting edges
- Microgeometry with cylindrical stabilising land
- New PVD coating technology

BENEFITS FOR YOU

Higher productivity for roughing, semi-finishing, finishing and dynamic high-feed milling. 50% longer tool life compared to the previous aluminium chromium nitride solution.

YOUR APPLICATION

Finishing pocket bases and walls (High Performance Cutting)

OUR SOLUTION

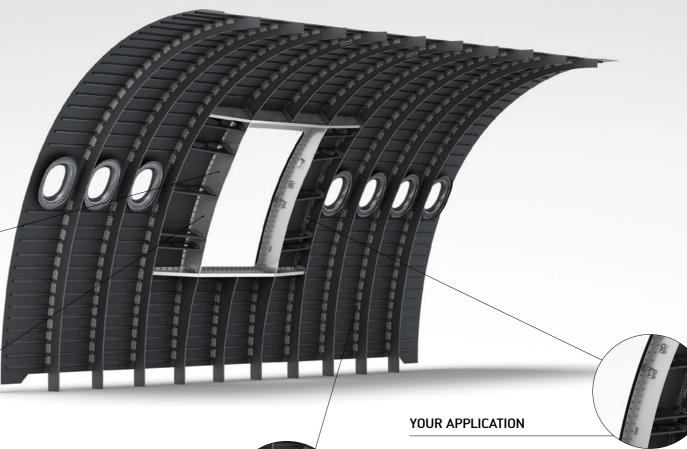
Ti45 high-performance milling cutter



- New PVD coating technology
- Long reach for machining deep pockets
- Finishing with close pitch options

BENEFITS FOR YOU

Short machining times when finishing with the highest possible tool life thanks to new PVD coating. 50% longer tool life compared to the previous aluminium chromium nitride solution.



YOUR APPLICATION

Drilling CFRP rivet holes (carbon fibre reinforced plastic)

OUR SOLUTION

Walter Titex AF1D twist drill



- Self-centring AF1D geometry
- Diamond coating for long tool life
- Specially designed for carbon fibre composite materials
- Usable in CNC systems and drill feed units

BENEFITS FOR YOU

Perfect for drilling in unidirectional and multidirectional carbon fibre composite materials. Even with drill feed units, the geometry provides excellent roundness and dimensional accuracy.

Drilling stacks

OUR SOLUTION

Walter Titex AFT4A solid carbide drill



- Designed for Automatic Drilling Units (ADU's) and CNC systems
- Stable design with large coolant-through channels
- Smooth, heat-resistant aluminium chromium nitride coating

BENEFITS FOR YOU

Specially developed for use with Automatic Drilling Units. Polished flutes and the heat-resistant aluminium chromium nitride (ACN) coating ensure optimal chip evacuation.

Watch the application video: Scan this QR code or go directly to https://goo.gl/C9ov2x



M2131 RAMPING MILLING CUTTER

M3255 PORCUPINE MILLING CUTTER

Titanium

Aluminium

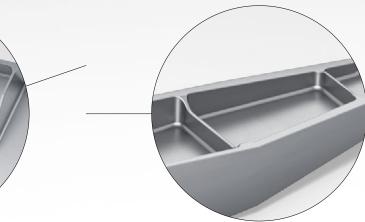
YOUR APPLICATION

Rough milling and semi-finishing of pockets generating high chip volumes

OUR SOLUTION

Walter M2131 ramping milling cutter





YOUR APPLICATION

Roughing (slot, corner, profile and pocket milling) of titanium alloys

OUR SOLUTION

Walter BLAXX M3255 porcupine milling cutter



BENEFITS FOR YOU

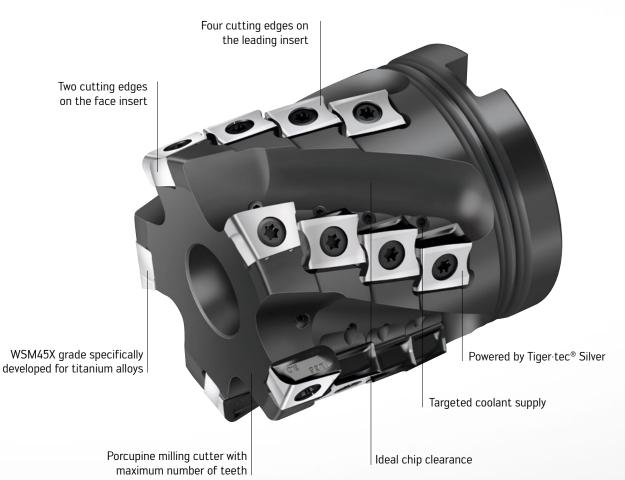
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High level of concentricity and process reliability even at maximum speeds thanks to centrifugal force protection. Maximum machining volumes and tool life thanks to minimum formation of workpiece material build up on the cutting edge.

Watch product animation: Scan this QR code or go directly to https://goo.gl/W1tzqY



Watch product animation: Scan this QR code or go directly to https://goo.gl/nemqxl



BENEFITS FOR YOU

High level of process reliability thanks to excellent chip removal, optimum chip space and stable design. Positive cutting characteristics thanks to soft-cutting geometry – and short machining times thanks to the maximum number of teeth and the highest possible metal removal rate. High cost efficiency thanks to four or two cutting edges per indexable insert.

WING RIB

Titanium alloy

Landing gear mounts are complex structural components that are situated horizontally in the wing structure above the landing gear. These elements connect the wing and the landing gear and act as a shock absorber in conjunction with the main cylinder of the landing gear. These are solid forged components with numerous 3-axis and 5-axis pockets, and mainly consist of titanium alloys. Machining titanium

produces high temperatures at the tool cutting edge. Uncontrolled heat transfer creates tension in the component that can subsequently cause it to warp, even after weeks have passed. Optimum cooling when machining, controlled chip removal and high-quality tools and fixturing are therefore crucial for ensuring process reliability.



High-feed milling of mating faces

OUR SOLUTION

Walter M4002 high-feed milling cutter



- Face milling cutter with a 15° approach angle Four-edged Universal system inserts in
- three sizes Wave-form finish along the flank face facilitates the choice of geometry

BENEFITS FOR YOU

Cost-efficient high-feed milling thanks to Universal system inserts with four cutting edges and the highest possible metal removal rate. Up to 100 percent longer tool life thanks to the new WSM45X cutting tool material for

Tools on this page are available as:



High-feed milling of pocket structures

OUR SOLUTION

YOUR APPLICATION

ConeFit Flash



- Four cutting edges
- Internal coolant supply
- Special microgeometry for high-feed milling
- Ideal for long tool projections

BENEFITS FOR YOU

Cost-efficient high-feed milling with changeable head system: ConeFit with maximum number of teeth for the highest possible metal removal rate.

Wall finish operation using the waterline process

OUR SOLUTION

YOUR APPLICATION

Ti50 high-performance milling cutter 1.5 x D



OUR SOLUTION

YOUR APPLICATION

Finishing pocket base

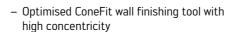
Ti50 high-performance milling cutter



- Flexible ConeFit changeable head system - Can be used for finishing the base of pockets
- up to 7 x D New design for ideal transitions when
- carrying out base face finish machining
- New PVD coating technology

BENEFITS FOR YOU

Cost-effective base face finishing with maximum tool life thanks to new PVD coating technology. 50% longer tool life compared to the previous aluminium chromium nitride (ACN) solution.



- For semi-finishing and finishing operations with a large radius at the rear for step-free transitions on the walls
- Minimal deflection up to a length of 7 x D New PVD coating technology

BENEFITS FOR YOU

Optimised finishing tool for cost-effective machining strategies (waterline) for semi-finishing and finishing with just one tool. 50% longer tool life compared to the previous aluminium chromium nitride (ACN) solution.

Watch the application video: Scan this QR code or go directly to https://goo.gl/MTxsSB



YOUR APPLICATION

HPC pocket and base finishing

OUR SOLUTION

Walter Prototyp HPC Al30 close pitch cutter



- Microgeometry of the centre cutting edge ensures low axial cutting forces
- Vibration-free thanks to the microgeometry of the secondary cutting edge
- Coolant thro' for MQL Constant helix angle

BENEFITS FOR YOU

Extremely short machining times for unstable structural components.

Tools on this page are available as:



YOUR APPLICATION

HPC rough/finishing milling of

Walter Protoyp MB 266 Supreme

WJ30UU grade (uncoated)

metal removal rate

BENEFITS FOR YOU

- Thro' coolant for emulsion/MQL

with maximum process reliability.

- Al 30 geometry for finishing and maximum

Centre cutting edge for reliable roughing

Combination tool for rough and finish machining

pocket structures

OUR SOLUTION

HPC rough milling of pocket

OUR SOLUTION

YOUR APPLICATION

structures

Walter Protoyp MB 265 Supreme



- WJ30UU grade (uncoated),
- WJ30CA grade (CrN-coated)
- Thro' coolant for emulsion or MQL
- AI-RAPAX G30 geometry for maximum metal removal rate
- Centre cutting edge for reliable roughing

BENEFITS FOR YOU

Extremely high machining volumes on high-end machines.

Wall finishing machining **OUR SOLUTION**

The wing ribs are structural components within the

frame for the wing skin. Wing ribs are predominantly

manufactured from aluminium wrought alloys. These

are light, have a high load-bearing capacity and are

extremely robust. This applies in particular for new

generations such as the 2050 aluminium-lithium

alloy. In order to enable this alloy to be machined

wing. Together with the longerons, they form the

tools or PCD tools.

Walter Prototyp HPC AI38

YOUR APPLICATION



successfully, the machine, tool, processes and

milling strategies must be designed to perfectly suit

the material. Walter high-performance solutions for

HPC and HSM aluminium machining meet the high-

est requirements for quality and process reliability,

whether working with indexable insert tools, carbide

- Four cutting edges differential pitch for wall finishing operations
- Transition radius on the circumference
- Optimised cutting edge micro-geometry Internal coolant supply – also suitable
- for MQL

BENEFITS FOR YOU

Vibration-free finishing operations and step-free waterline milling.

Watch the application video: Scan this QR code or go directly to https://goo.gl/WuvMab





LANDING GEAR – MAIN CYLINDER

High-alloy steels (300M, 4340)

The landing gear main cylinder cushions impacts during landing and enables the landing gear to be extended and retracted. The number and size of this central element may vary depending on the size of the aircraft. However, all landing gear main cylinders must always meet the highest safety standards. For this reason, only a small number of materials are suitable for producing these components, mainly titanium alloys and high-alloy steels such as 300M.

However, the material is not the only demanding aspect of these components, as their complexity is also constantly increasing. An ever-expanding number of add-on parts are being integrated into the forged blank for new models. For this reason, an optimal machining strategy is required alongside the tool technology. The most important types of machining operations include contour milling, turning and drilling.



YOUR APPLICATION

Roughing and semi-finishing of transitional radii.

OUR SOLUTION

F2339 ball nose mill



- Available with and without peripheral cutting edges
- Integrated fail-safe device for easy and secure tool handling
- Soft-cutting, circumference-sintered indexable inserts
- Modern Tiger·tec® Silver cutting tool material grades for optimum tool life and excellent cutting data

BENEFITS FOR YOU

High stability, process reliability and long tool life. Maximum cost-effectiveness thanks to soft-cutting indexable inserts with low power consumption.

YOUR APPLICATION

5-axis contour milling

OUR SOLUTION

F2334R round insert cutter



- Round inserts with location flats ensure high-stability insert clamping
- Designed for maximum feed rates and cutting efficiency
- Powered by Tiger·tec® Silver

BENEFITS FOR YOU

High process reliability and cost reduction. Ideal for roughing steels and difficult-to-cut materials such as titanium alloys.



Drilling connection holes

OUR SOLUTION

Walter Xtra·tec® B4013 point drill



- Drill with exchangeable carbide insert
- Internal coolant supply ensures cooling directly on the drill insert
- High positive geometry

BENEFITS FOR YOU

High productivity thanks to rapid drilling cycles and process reliability due to zero vibration as a result of insert positive locking.



Profiling of the mating face

OUR SOLUTION

Walter Xtra·tec® F4030 high-performance milling cutter



- Surface milling, plunge milling and copy milling cutter with double sided Trigon indexable insert
- Long tools and stable indexable insert with Tiger·tec® Silver cutting tool material
- Six usable cutting edges per indexable insert
- Feed per tooth rates of up to f_z 3.5 mm are possible

BENEFITS FOR YOU

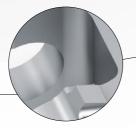
High productivity, process reliability and long tool life thanks to high machining volume with low cutting depths and high feed per tooth rates. Lower process costs and reduced vibrations

STRUT

Titanium

One of the major components of any aircraft is the landing gear. It absorbs the enormous forces on take-off and especially during landing. Besides the engine, the components used here are subject to the strictest demands in terms of reliability and functionality under extreme conditions. The strut provides the landing gear with support against the longitudinal movement of the wheel. It is positioned in the middle

of the landing gear and enables it to be retracted into the aircraft fuselage. There are particular challenges when machining this component as a result of the material: Struts are predominantly manufactured from titanium materials that are difficult to machine such as Ti5553 or Ti10-2-3. Walter milling cutters enable you to accomplish this task reliably and cost-effectively while still ensuring ideal quality.



YOUR APPLICATION

Roughing, high-feed milling and plunge milling of mating faces

OUR SOLUTION

Walter M4002 high-feed milling cutter



- Four cutting edges per indexable insert
- System insert suitable for universal use
- Highly positive geometries with low power requirements
- Powered by Tiger·tec® Silver with CVD-coated WSM45X grade

BENEFITS FOR YOU

High productivity and tool life, high cost savings thanks to four useable cutting edges and reduced procurement and inventory costs. Soft and stable cutting action.



Drilling connection bores

OUR SOLUTION

Walter Xtra·tec® B4213 insert drill



- Low hole tolerance due to the optimum balance of forces
- Maximum cost efficiency thanks to indexable inserts with four real cutting edges
- Excellent component surface quality thanks to the wiper edge insert
- Maximum process reliability due to positive locking

BENEFITS FOR YOU

Two indexable inserts with four cutting edges each enable maximum productivity and low tolerances.



Roughing of pocket bases and radius transitions

OUR SOLUTION

F2139 profile milling cutter



- Extremely accurate indexable inserts that are ground on all surfaces
- Special grade for ISO S machining
- Symmetrical body for HSC machining
- Available with optional solid carbide shank for vibration damping when working with long projection lengths

BENEFITS FOR YOU

No line formation or cut spacing. Can be optimised to suit the specific machining situation. Maximum tool life and ideal surface quality on the workpiece.



Roughing titanium structures

OUR SOLUTION

Walter BLAXX M3255 porcupine milling cutter



- Process-reliable, stable design
- Precise coolant supply at every cutting edge
- Maximum number of teeth for maximum metal removal rate
- Four or two cutting edges per indexable insert
- Soft-cutting geometry
- Powered by Tiger·tec® Silver with CVD-coated WSM45X grade

BENEFITS FOR YOU

Soft cutting action, high productivity and process reliability. Extremely cost-effective thanks to long tool life, high metal removal rate and short machining times.

FLAP TRACK

Titanium alloy

The landing flaps situated at the rear edge of the wings provide the necessary lift when landing the aircraft. A variety of materials are used when manufacturing them: The flap track usually consists of 15-5 PH stainless steel, Carpenter C465 or TiAl6V4, but may also consist of titanium/aluminium or

CFRP/titanium combinations on newer aircraft. The machining of this component – which mainly involves pocket and contour milling – is generally carried out on CNC machining centres or multi-spindle portal milling machines. Walter tools offer optimal tool life and dimensional accuracy for these operations.



YOUR APPLICATION

HPC residual material machining in the corners and semi-finishing

OUR SOLUTION

Ti40 high-performance milling cutter



- Solid carbide tool for full slotting, dynamic milling, semi-finishing and finishing operations
- All-rounder with five cutting edges
- Micro-geometry with cylindrical stabilising land
- New PVD coating technology

BENEFITS FOR YOU

Higher productivity for roughing, semi-finishing, finishing and dynamic high-feed milling. 50% longer tool life compared to the previous ACN coating (aluminium chromium nitride) solution.



Roughing of pocket structures

OUR SOLUTION

Walter BLAXX M3255 porcupine milling cutter Monoblock HSK100A



- Full effective porcupine milling cutter
- Targeted coolant supply
- Reinforced core thanks to tangential indexable inserts interlocked axially in the body
- Four cutting edges on the circumference and two on the face insert

BENEFITS FOR YOU

Unique solution for optimum stability and tool life when roughing titanium alloys. High level of process reliability thanks to excellent chip removal and optimum chip space. Positive cutting characteristics thanks to soft-cutting geometry.



Finishing the pocket base

OUR SOLUTION

Ti50 high-performance milling cutter $0.55 \times D$



- Flexible ConeFit changeable head system
- Can be used for finishing the base of pockets up to 7 x D $\,$
- New design for ideal transitions when carrying out pocket base finish machining

BENEFITS FOR YOU

Cost-effective base finishing with maximum tool life thanks to new coating. 50% longer tool life compared to the previous aluminium chromium nitride (ACN) solution.



Wall finish operation using the waterline process

OUR SOLUTION

Ti50 high-performance milling cutter 1.5 \times D



- Optimised ConeFit wall finishing tool with high concentricity
- For semi-finishing and finishing operations with a large radius at the rear for step-free transitions on the walls
- Minimal deflection up to a length of 7 x D

BENEFITS FOR YOU

Optimised finishing tool for cost-effective machining strategies (waterline) for semi-finishing and finishing with just one tool. 50% longer tool life compared to the previous aluminium chromium nitride (ACN) solution.

Watch the application video: Scan this QR code or go directly to https://goo.gl/NY85ei

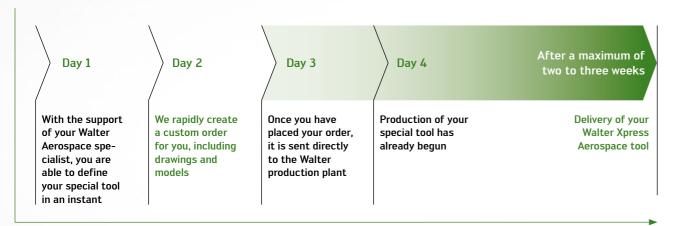


WALTER XPRESS AEROSPACE

Get off to a flying start

Challenging machining operations require customised processes. For this reason, Walter Xpress is now available in a version specially tailored to the aerospace industry. Walter Xpress Aerospace enables you to define your own personalised solid carbide milling cutter in an instant. A Walter Aerospace specialist is available at your request to provide you with on-site

assistance at your production facility. Your order is sent directly to the Walter production plant. Blanks that have been specially designed for the requirements of the aerospace industry provide the basis of your special tool. This enables us to ensure that your Walter Xpress Aerospace tool is available in the shortest possible time.

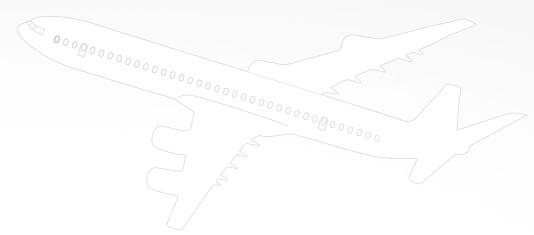


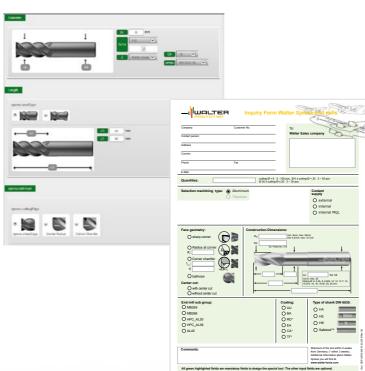
Process duration [t]

MAXIMUM DELIVERY TIME THREE WEEKS: Walter Xpress Aerospace aims for supersonic speed

ENJOY THE BENEFITS OF WALTER XPRESS AEROSPACE

The name itself says it all. Walter Xpress Aerospace stands out thanks to extremely short delivery times. For you, this means: Three weeks after order receipt at the latest – usually even sooner – you will receive custom-designed tools from the Walter Xpress Aerospace range of tools. This currently primarily includes Walter Prototyp solid carbide milling cutters. That allows you to keep your own tool stockholding at a low level, and reduce your capital commitment. An additional benefit for you is an extremely high degree of certainty when planning – right from the very start. If you place an enquiry concerning a Walter Xpress Aerospace tool today, you will have all the essential data on your desk by tomorrow.





Walter press

Use our special forms to define your special tools. These forms are available from our Field Service team or online at: walter-tools.com