



AEROSPACE

TOOLS & SOLUTIONS FOR THE AEROSPACE INDUSTRY

SECO 



TOOLING SOLUTIONS FOR AEROSPACE COMPONENTS

High quality precision engineering demands premium tools. At Seco we understand the specific challenges of the aerospace industry and we have the know-how to keep your production at the leading edge of this competitive segment.

We provide optimized machining solutions and cutting tools for your specific requirements. Seco technology is available worldwide through a network of Technical Centres and aerospace machining specialists.

AIRFRAMES

Many years of development work in the area of tooling for airframe production places Seco in a unique position to offer a complete range of solutions.

The many challenges faced in the machining of ribs, stringers, spars and bulkheads from materials renowned for their strength to weight ratio have now been met.

We are able to fine tune processes from the initial bulk metal removal through to the high speed machining of thin wall components.



ENGINES

Accuracy and precision are vital requirements at every stage of engine production. Through many years of close cooperation with world leaders in engine production we are able to offer an unrivalled range of tooling and machining strategies for all the key components in a modern jet engine.

Hubs, engine cases, blades and blisks are all now part of our aerospace machining technology programme.

LANDING GEAR

Landing gear depends on high strength sophisticated materials in its manufacture. These materials are becoming increasingly difficult to machine.

The key to Seco's success in this area has been largely down to our ability to put together international teams of experts willing to develop new carbide grades, machining strategies and tooling systems. Many of these development are now a part of our standard range for landing gear machining.



BUSINESS SOLUTIONS

Manufacturing aerospace components is not all about tools and materials. It is also about efficient component production, controlling tooling inventories and reducing all other costs.

This is where Seco's Component Engineered Tooling, Secopoint tooling dispensing and Productivity Cost Analysis systems offer many advantages to the manufacturing process.

DESIGNED FOR AEROSPACE MANUFACTURING



JETSTREAM TOOLING enables high velocity coolant to be delivered close to the cutting edge eliminating chip evacuation issues in a wide range of difficult to machine materials.



SECO FEEDMAX™ is a range of solid carbide drills that has set new performance standards in drilling high temperature resistant materials, with elevated feeds and speeds and long, consistent tool life.



JABRO SOLID END MILLS Our Seco Jabro range of solid carbide milling tools is a perfect example of successful cooperation within the aerospace industry.




R217/220.97 Designed for High Speed Machining performance, R217/220.97 leads the way in meeting the extreme demands found in the machining of airframe components.

TOOLING SOLUTIONS




WING RIB

Material	7010 Aluminium alloy	
Operation	Rough milling with solid carbide endmill	
Criterion	Surface finish, metal removal rate	
Tool	Jabro JH421 endmill diameter 12mm	
Cutting data	v_c	1100 m/min
	f_z	0.18 mm/tooth
	a_p	12 mm
	Coolant	Air blasting
RESULT	Productivity increased by 35%	




ENGINE MOUNT

Material	Titanium alloy	
Operation	Drilling with Perfomax	
Criterion	Application security and productivity	
Tool	Perfomax SD55-48-144-40R7, T400D, T250D	
Cutting data	v_c	50 m/min
	f_z	0.11 mm/tooth
	a_p	98 mm
	Coolant	Emulsion
RESULT	Cycle time 11 minutes for 4 holes (392 mm)	



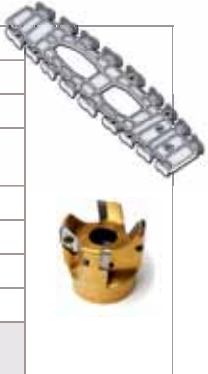
FLAP TRACK

Material	Ti 6Al 4V (Ti 6-4)	
Operation	Helical side milling, roughing	
Criterion	Metal removal rate	
Tool	R217.69-2532.3S-044-12.3A, XOEX120431R-M07, F40M	
Cutting data	v_c	60 m/min
	f_z	0.12 mm/tooth
	a_p	40 mm, $a_e = 32$ mm
	Coolant	Emulsion, 25 bar
RESULT	2.5 times faster than previous method	



WING SPAR



Material	7010 Aluminium alloy	
Operation	Rough milling, pocketing	
Criterion	Metal removal rate, productivity	
Tool	R220.97-0050-V22.3A	
Cutting data	v_c	860 m/min
	f_z	0.3 mm/tooth
	a_p	10 mm
	Coolant	Air blasting
RESULT	Productivity increase 25%	





TOOLING SOLUTIONS



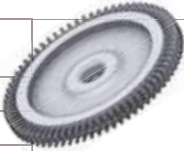

FRONT CASE

Material	M152								
Operation	Rough turning and finish top profile								
Criterion	Surface finish and dimensions								
Tool	DNMG150612-MF5, TP2500								
Cutting data	<table border="1"> <tr> <td>v_c</td> <td>120 m/min</td> </tr> <tr> <td>f_z</td> <td>0.25 mm/rev</td> </tr> <tr> <td>a_p</td> <td>2.25 mm</td> </tr> <tr> <td>Coolant</td> <td>Emulsion</td> </tr> </table>		v_c	120 m/min	f_z	0.25 mm/rev	a_p	2.25 mm	Coolant
v_c	120 m/min								
f_z	0.25 mm/rev								
a_p	2.25 mm								
Coolant	Emulsion								
RESULT	Tool life increased by 100%								



ENGINE CASE

Material	Ti 6Al 4V								
Operation	Rough milling								
Criterion	Metal removal								
Tool	R220.29-0050-06.5A, RP12, F40M								
Cutting data	<table border="1"> <tr> <td>v_c</td> <td>55 m/min</td> </tr> <tr> <td>f_z</td> <td>0.12 mm/tooth</td> </tr> <tr> <td>a_p</td> <td>2 mm, $a_e = 35$ mm</td> </tr> <tr> <td>Coolant</td> <td>Yes</td> </tr> </table>		v_c	55 m/min	f_z	0.12 mm/tooth	a_p	2 mm, $a_e = 35$ mm	Coolant
v_c	55 m/min								
f_z	0.12 mm/tooth								
a_p	2 mm, $a_e = 35$ mm								
Coolant	Yes								
RESULT	Tool life 25–45 minutes								

BLISK

Material	Inconel 718 aged and hardened 48 HRc								
Operation	End milling, slotting								
Criterion	Surface finish								
Tool	Jabro JHP750 diameter 8 mm								
Cutting data	<table border="1"> <tr> <td>v_c</td> <td>18 m/min</td> </tr> <tr> <td>f_z</td> <td>0.03 mm/tooth</td> </tr> <tr> <td>a_p</td> <td>4.8 mm</td> </tr> <tr> <td>Coolant</td> <td>Emulsion</td> </tr> </table>		v_c	18 m/min	f_z	0.03 mm/tooth	a_p	4.8 mm	Coolant
v_c	18 m/min								
f_z	0.03 mm/tooth								
a_p	4.8 mm								
Coolant	Emulsion								
RESULT	Tool life increased by 100%								

HUB

Material	Inconel 718 forged								
Operation	Rough Turn Internal Features								
Criterion	Reduce Cycle Time								
Tool	Various SECO C6-Capto Jetstream Tooling								
Cutting data	<table border="1"> <tr> <td>v_c</td> <td>80 m/min</td> </tr> <tr> <td>f_z</td> <td>0.35 mm/rev</td> </tr> <tr> <td>a_p</td> <td>8,0-12,0mm</td> </tr> <tr> <td>Coolant</td> <td>Emulsion</td> </tr> </table>		v_c	80 m/min	f_z	0.35 mm/rev	a_p	8,0-12,0mm	Coolant
v_c	80 m/min								
f_z	0.35 mm/rev								
a_p	8,0-12,0mm								
Coolant	Emulsion								
RESULT	60% Reduction in Cycle time								

TOOLING SOLUTIONS



LANDING GEAR

Material	Ti 6Al 4V (Ti 6-4)		
Operation	Slotting		
Criterion	Metal removal rate, tool life		
Tool	Jabro JHP750, solid carbide end mill dia 16mm, r = 3.1 mm		
Cutting data	v_c		45 m/min
	f_z		0.05 mm/tooth
	a_p		32 mm
	Coolant	Emulsion	
RESULT	93 cm ³ /min metal removal rate		

LANDING GEAR

Material	Ti 5Va 5Mo 5Al 3Cr (Ti 5-5-5-3)		
Operation	3D Milling, roughing		
Criterion	Metal removal rate, tool life		
Tool	R218.20-5050.3-70.150, Insert R218.20-250ER-ME12, T350M		
Cutting data	v_c		20–22 m/min
	f_z		0.15 mm/tooth
	a_p		5–10 mm, ae = 10–25 mm
	Coolant	Emulsion	
RESULT	5 cm ³ /min metal removal rate		

LANDING GEAR

Material	Ti 5Al 5Mo 5Al 3Cr (Ti 5-5-5-3)		
Operation	Rough milling by plunge contouring		
Criterion	Metal removal rate, tool life		
Tool	R220.29-0063-06.6A, RP1204 insert, T350M		
Cutting data	v_c		45 m/min
	f_z		0.1 mm/tooth
	a_p		15 mm (Z-Axis) ae = 7 mm
	Coolant	Emulsion	
RESULT	13 cm ³ /min metal removal rate, 65 minutes tool life		

LANDING GEAR

Material	Ti 6Al 4V (Ti 6-4)		
Operation	Square shoulder milling		
Criterion	Metal removal rate, tool life		
Tool	R220.69-0040-12-5A, XOEX120416R-M07, F40M		
Cutting data	v_c		40 m/min
	f_z		0.14 mm/tooth
	a_p		2 mm, ae = 15 mm
	Coolant	Coolant pressure 10 bar	
RESULT	Tool life 230 minutes		

TOOLS DEDICATED TO PRODUCTIVITY



MILLING

Innovation has always been an integral part of Seco's milling range and all areas of aerospace machining can benefit from our expertise in carbide grade development, coating technologies, edge geometries, cutter body design and application knowledge.

Cutters for helical interpolation, steep ramping, face milling, square shoulder, plunge milling, high speed machining and many more are available along with the advice needed for their successful application.

TURNING

Always viewed as an area of machining with a long and traditional history turning has, in recent years, undergone some radical changes. Beginning with the introduction of Multi-Directional-Turning and through to the very recent introduction of Jetstream Tooling for machining difficult materials.

We work with our customers on a daily routine of ensuring that only the very latest in turning technology is committed to the aerospace industry.



HOLEMAKING

The Seco holemaking range has expanded rapidly over the last few years and provides all the tools and technology needed in aerospace manufacturing. The key to aerospace machining is in achieving the correct balance between the cutting edge, grade and geometry and the material being machined.

On the smaller diameters this is provided in the Feedmax range, and in the larger diameters Seco Crownloc and Perfomax drills meet all the demands for accuracy and performance. Bifix, Precifix and EPB complete the picture for reaming and boring operations.



40,000 STANDARD PRODUCTS

TOOLING SYSTEMS

Tooling systems must always reach the highest levels of accuracy and quality to be really effective. The Seco EPB range draws on years of experience in producing some of the world's most advanced spindle tooling.

A full range of solid and modular systems are available in all the common taper types and they are complemented by EPB boring heads that meet the stringent demands required by aerospace manufacturing. The increasingly popular concept of shrink grip and shrink release tool holding is now provided by Seco's Easy Shrink system.



CUSTOM TOOLING

Our aerospace customers often test our capabilities by exhausting all the numerous possibilities available in our standard range and then continuing to press for novel solutions. We welcome these challenges and turn them into an opportunity to try out new ideas or modify existing solutions which can often result in completely new product ranges.

We can offer you access to the whole of the Seco knowledge base and manufacturing capability to discuss, design, develop and produce your own unique solution to a manufacturing problem.

ENGINEERED SOLUTIONS

We have a global network of engineers specifically assigned to supporting your local projects. We can offer advice concerning tooling set-up, project documentation and definition of machining strategies.

We are also able to offer Seco Technical Education Programmes which are designed to encourage your engineers to actively participate in the rapid advances that are being made in this dynamic and fast growing industry.



OPTIMIZING PRODUCTION

Premium tooling solutions are just one part of the equation – Seco Tools also offers training, technical support and innovations designed to streamline your production costs and maximize your productivity. By working in partnership with our customers we are often able to achieve significant improvements in productivity, efficiency and quality.

COMPONENT ENGINEERED TOOLING – OPTIMIZED PRODUCTION

Our Component Engineered Tooling engineers can provide turnkey solutions for any type of component manufacturing scenario. After analysing all the pieces of the puzzle, they will put together the best elements to make sure you are working in the most cost effective way.



SECOPOINT – THE INDUSTRY’S MOST INNOVATIVE DISPENSING TECHNOLOGY

SecoPoint is an advanced web-enabled point-of-use tool management and dispensing system. It helps you to control, track and manage tooling inventories and usage.

PCA – THE ‘GPS’ SYSTEM OF THE PRODUCTION PLANT

Seco Tools computer based PCA (Productivity and Cost Analysis) system enables measurement, control and management of manufacturing processes.

Using the system, we take a wider view of your manufacturing methods, focusing not only on the tooling costs, but the total cost of production.



Evaluations conducted in a wide range of industries using PCA have shown that reductions in total cost of 15-30% and improvements in productivity of up to 40% are achievable.



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