

Aerospace structural components – aluminium

The background image shows a close-up of a CNC lathe machining a large, cylindrical aluminium part. The tool is in contact with the workpiece, creating a fine, spiral chip. The lighting is dramatic, highlighting the metallic textures and the precision of the manufacturing process.

When machining aluminium components, a key factor is to combine a stable and reliable machining process with high speed and high metal removal rates. A vital element is to achieve low cutting forces, which allows for low power consumption, less vibration tendencies and a good quality surface finish.

Speed is the key to success

Optimized tools and processes are the solution to achieve high metal removal rates and trouble-free machining. Sandvik Coromant offers a wide range of tools dedicated for aerospace structural frame components in aluminium.

For high metal removal rates

The RAL90 aluminium milling cutter is designed for extremely high metal removal rates. The extra robust cutter body with optimized insert seats sets the standard for a new stability level in high speed milling.

RAL90 is dedicated for heavy roughing to semi-finishing pocketing of aerospace frame components in aluminium alloys. The accuracy of the insert seat interface secures the position of the cutting edge, minimizing total tool run-out. The optimized insert geometry provides a smooth cutting action, reduced vibrations and good chip formation.

It is also designed for high pressure coolant or for minimum quantity lubrication (MQL).



RAL90 Super MRR

In applications requiring even higher metal removal rates, the new RAL90 Super MRR can reach extra high spindle rotation, e.g. up to 33000 RPM for DC 50 mm compared to 23500 RPM for RAL90. This means a 40% productivity increase.

Exceptional performance can be reached thanks to the secure iLock™ tip seat interface, which prevents micro movements and ejection of the insert.

RAL90 Super MRR is designed with couplings dedicated for specific machine tool makers.



Aluminium milling with solid carbide tools

When smaller diameters are required, solid carbide tools is the solution. With a geometry and grade optimized for aluminium, the CoroMill Plura end mill and CoroMill 316 end mill with exchangeable cutting head deliver long tool life at high metal removal rates.

The flutes are designed with a large chip space for great chip evacuation. Furthermore, the specific cylindrical land reduces tool vibration and minimizes chipping problems, leading to an excellent surface finish.



High speed drilling with solid carbide tools

CoroDrill 863 is designed specifically for drilling in aerospace structural and frame components. The drill exhibits high speed, precision hole diameters, mirror-like surface finish and zero exit burr in holes up to 3 x D. For applications in the range of 3–6xD an engineered solution is readily available.



Customer case 1: RAL90 Super MRR

Customer: Aerotech manufacturer, Germany, May 2016

Machine tool: DST "Ecospeed F HT" 120 kW and 30 000 RPM

Purpose: Test to validate the tool on the machine in comparison to brazed PCD tools

Material: Alu7050, Oil-mist coolant



	Competitor	RAL90 Super MRR
Tool	DC 32 mm Brazed PCD	203 219972R0175
Insert		KPHX 15 04 40 FR-CM H13A
Z_n	3	3
n , rpm	28000	27000
v_c , m/min (ft/min)	2814 (9232)	2714 (8904)
v_f , mm/min (in/min)	13440 (529.1)	19440 (765.4)
f_z mm/z (in/z)	0.16 (0.006)	0.24 (0.009)
a_p mm (inch)	12 (0.472)	12 (0.472)
a_e mm (inch)	32 (1.26)	32 (1.26)
MRR cm ³ /min (in ³ /min)	5160 (314.9)	7465 (456.5)

Customer case 2: RAL90 Super MRR

Makino (MAG 3.W): 120 kW and 33 000 RPM

DC: 50 mm; Z=4

n : 33000 RPM

a_p : 7 mm (0.276 inch)

a_e : 40 mm (1.57 inch)

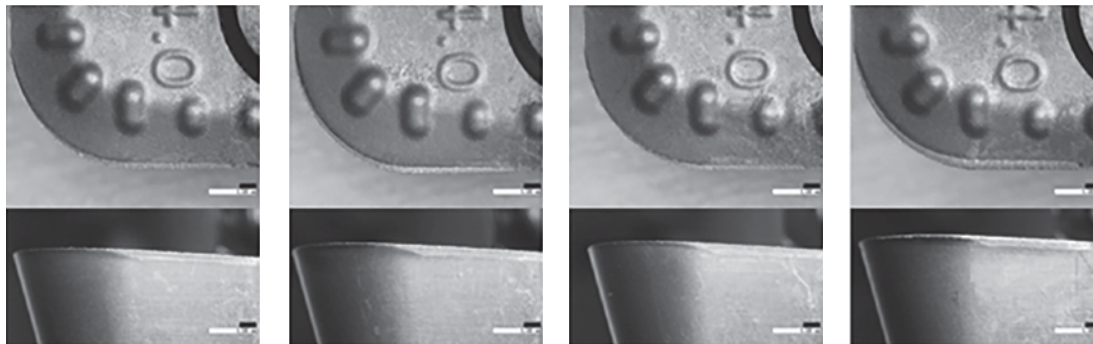
f_z : 0.19 mm/tooth (0.007 in/tooth)

v_f : 25000 mm/min (984 in/min)

MRR=7000 cm³/min (427 in³/min)



Insert wear after 60 min and 420000 cm³ (25630 in³) of aluminium removal:



Vb: 0.09 mm

Vb: 0.09 mm

Vb: 0.06 mm

Vb: 0.11 mm

For more information please contact your local Sandvik Coromant representative.

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