



SANDVIK
Coromant

Steel milling Grade GC1130



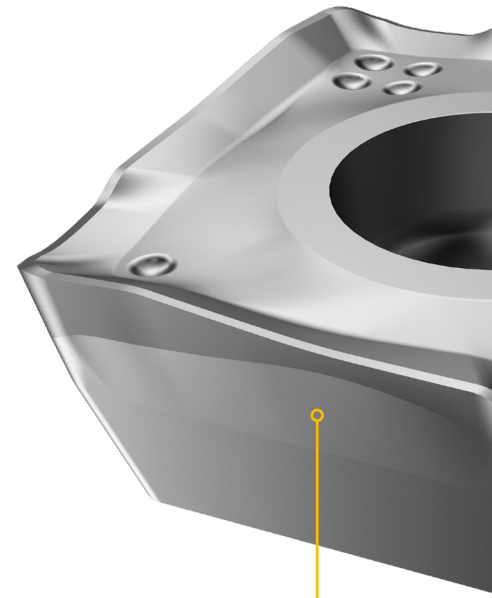
The image shows a close-up of a milling process. A metal workpiece is being milled by a tool, creating a smooth, cylindrical surface. The background is dark, and the lighting highlights the metallic surfaces and the precision of the manufacturing process.

Steel milling evolution

Bringing you peace of mind with Zertivo™ grade GC1130

Flaking and chipping that result in a short insert tool life and unstable production are some of the most common milling issues. This is especially true when machining complex tool paths with long overhang, deep cavities, or when using coolant. With GC1130, the new steel milling grade, chipping and flaking are no longer a problem.

Zertivo™ grade GC1130 is a highly reliable grade designed to withstand difficult machining conditions. Produced with Zertivo, a unique PVD production technology that amplifies the grade's exceptional benefits, GC1130 inserts provide longer tool life, making your production process much more predictable and secure.



Benefits of GC1130

- Clean and intact edge offers secure machining with long and predictable insert life
- High metal removal rate even in difficult and unstable conditions
- Great performance in both dry and wet machining

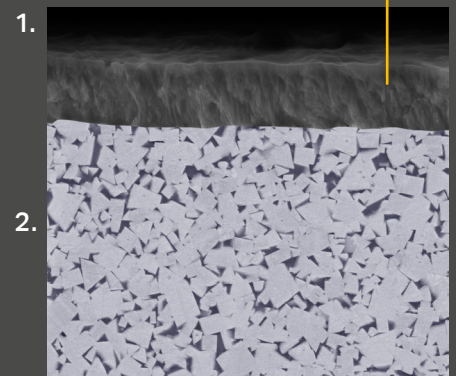
What goes into GC1130?

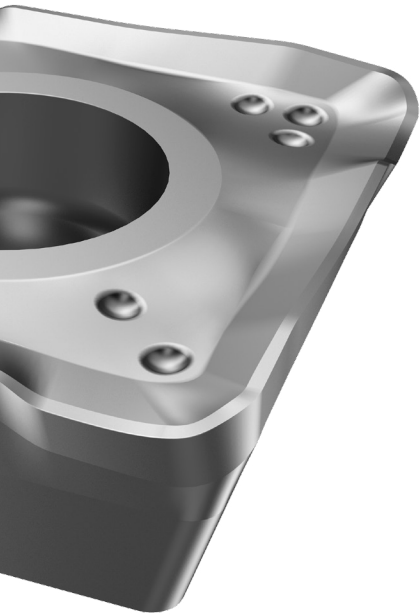
1. Next generation PVD coating

The new PVD coating in GC1130 is optimized for steel milling. Produced with Zertivo technology, giving great edge-line security and reduced flaking, it is designed to offer customers the perfect balance between abrupt chipping and continuous wear resistance.

2. High-Cr-content substrate

The high-Cr-content fine-grain substrate is optimized to withstand edge-line chipping and cracks arising from difficult and demanding machining conditions, such as temperature variations.





Application area

GC1130 is optimized for steel machining in all conditions. First choice for shoulder milling within the ISO P area.

- Challenging machining e.g., unfavorable tool paths, deep cavities, and long overhangs
- Roughing to finishing
- Wet and dry machining (dry machining is recommended)
- Good choice for mixed material production

This grade is initially available for shoulder and chamfer milling operations with CoroMill® 390, CoroMill® 490, and CoroMill® 495. Soon to be available in most CoroMill concepts.

P ISO application area

"When developing Zertivo technology, we focused on creating a platform that would make it possible to offer the perfect balance between various properties depending on customer need. A grade is about the interplay of several elements. How you make one influences the properties of the others. This is what we take heights for with Zertivo technology."

Emmanuelle Göthelid, Developer of Zertivo technology, R&D

Zertivo in a nutshell

- Sandvik Coromant's unique production technology developed for PVD grades
- Enables increased control of the grade production process
- Improved adhesion between substrate and coating and optimized cutting edge integrity
- Zertivo technology amplifies each grade's unique benefits, resulting in longer tool life and secure machining

The importance of Zertivo™ technology

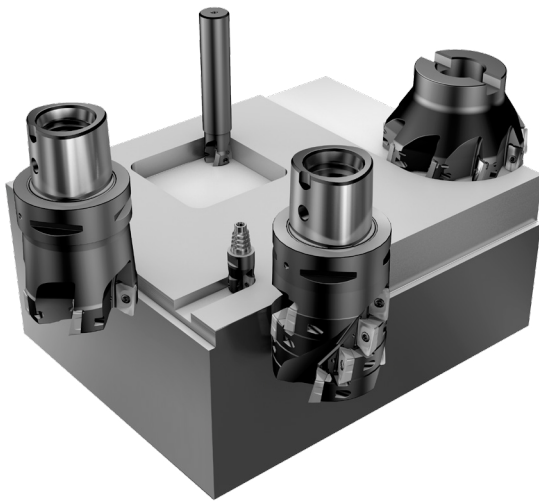
The whole insert in focus – not just a coating.

Discover the art of creating optimum PVD grades. That is where carefully combined grade ingredients are merged with precisely controlled process conditions, resulting in grades with unbeatable edge-line security. Zertivo is a unique technology developed to bring out the full potential of the insert. With Zertivo, the whole insert is taken into consideration. Not just a coating.

For more information about Zertivo and other grades produced with this technology, visit www.sandvik.coromant.com/zertivo

Merging grade innovation with superior tooling

Bringing dramatic improvements in tool performance, the new GC1130 grade is available in various insert sizes for several milling concepts, introducing Zertivo™ technology innovation for shoulder milling and chamfering.



GC1130 is the first choice for steel milling. CoroMill 390 offers various grades and geometries, covering all material groups.

CoroMill® 390 – Versatile concept for mixed production

CoroMill 390 is ideal for mixed production and perfectly suited to machining of varied component features and materials. The assortment includes many different types of tools and a wide selection of corner radii.

In combination with GC1130

GC1130 is highly reliable and performs brilliantly in unstable or challenging conditions. This makes it a perfect grade for the versatile CoroMill 390, bringing an added dimension of security and predictability to steel milling operations.

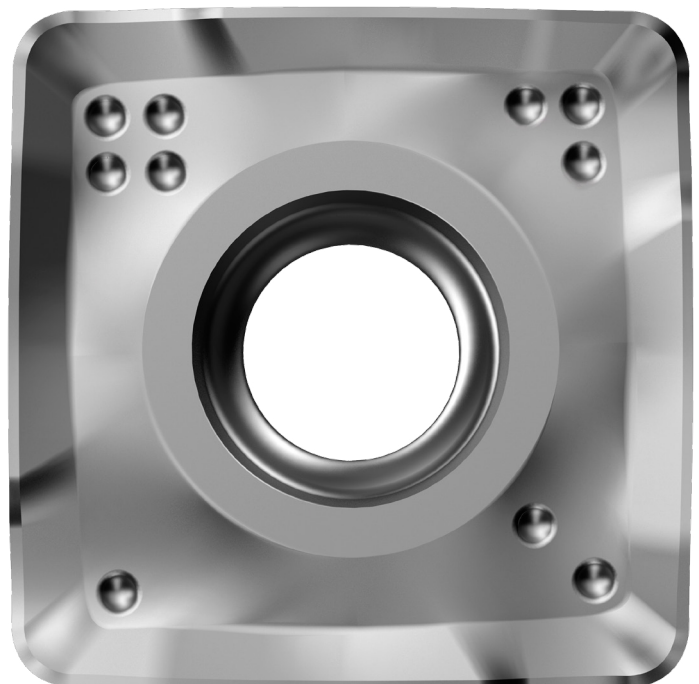
Learn more at www.sandvik.coromant.com/coromill390

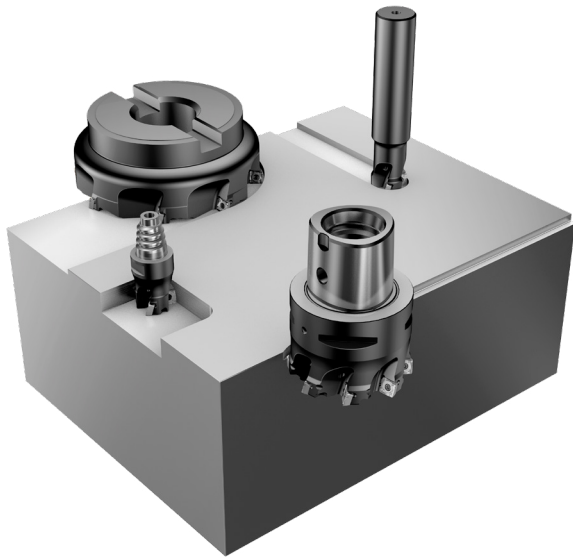
Application

- Shoulder milling
- Repeated shoulder milling
- Linear and helical ramping
- Turn milling
- Deep shoulder milling
- Edging



ISO application area





CoroMill® 490 – First choice for general and repeated shoulder milling

CoroMill 490 provides light cutting action thanks to the positive insert geometry. Together with inserts that have four true cutting edges, the milling cutter produces a smooth profile, efficiently reducing need for a finishing operation.

Equipped with GC1130

GC1130 simply takes the performance of the CoroMill 490 to a new level. Get your green light on when milling steel with this new insert grade.

Learn more at www.sandvik.coromant.com/coromill490



ISO application area

Application

- Shoulder milling
- Repeated shouldering
- Circular interpolation
- Face milling

Benefits with CoroMill® 390 and CoroMill® 490

- High precision providing good tolerances and excellent surface finish
- Light and quiet cutting with low cutting forces
- High productivity
- Sharp edge lines and burr-free, smooth profiles
- Component feature finished in one pass

NOTE! For ramping, choose CoroMill 390. For general shoulder milling, use CoroMill 490 with four true cutting edges.

CoroMill® 495 – Chamfer milling cutter

CoroMill 495 performs multiple kinds of chamfering in several materials, ideal for keeping downtime low and machine utilization high. Combine with GC1130 for trouble-free chamfering in various steel types.

Learn more at www.sandvik.coromant.com/coromill495



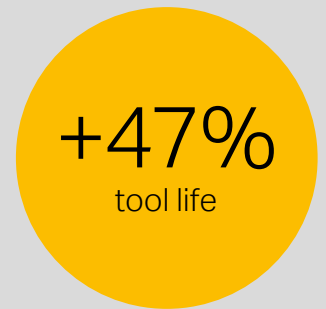
Test cases using various tools

When developing GC1130 grade, the ambition was to solve three common issues that cause machining problems: chipping, insert flaking, and thermal cracks. The enhanced properties of GC1130 were verified by a large number of tests in customer workshops.

Performance: CoroMill® 390 with size 07 inserts

To achieve acceptable component quality, maximum cutting depth was restricted in this application. After switching to the CoroMill 390 cutter with size 07 inserts, the cutting depth could be increased, generating higher productivity. With GC1130 inserts, the tool life was improved by 47%, significantly reducing cost per component.

Component	Die and mold	
Workpiece material	P2.5.Z.HT	
Operation	Slot and pocket milling	
	GC1130	Existing solution
Tool	R390-012A12-07M	
Insert	390R-070204M-PM 1130	
z_n	3	3
n rpm	4005	3979
v_c m/min (ft/min)	151 (495)	150 (492)
v_f mm/min (in/min)	853 (33.583)	900 (35.433)
f_z mm (inch)	0.07 (0.003)	0.075 (0.003)
a_p mm (inch)	1.5 (0.059)	1 (0.039)
a_e mm (inch)	12 (0.472)	12 (0.472)
Result	Tool life 44 minutes	Tool life 30 minutes

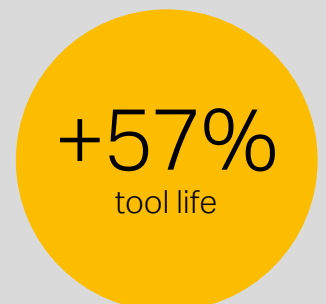


Performance: Slot and shoulder milling with long overhang

Unstable conditions with long overhang combined with a forged surface and coolant were causing some challenges for the insert tool life in this application. Surface quality issues, caused by flaking of the coating, set the limitation on insert tool life. By exchanging the existing solution with GC1130 inserts, flaking was significantly reduced and 57% more components could be machined.



Component	Rear spindle	
Workpiece material	P2.5.Z.HT	
Operation	Slot and shoulder milling	
	GC1130	Existing solution
Tool	R390-020A20-11M	
Insert	R390-11 T3 08M-PM 1130	
z_n	3	3
n rpm	2400	2400
v_c m/min (ft/min)	151 (495)	151 (495)
v_f mm/min (in/min)	864 (34.016)	864 (34.016)
f_z mm (inch)	0.12 (0.005)	0.12 (0.005)
a_p mm (inch)	3.5 (0.138)	3.5 (0.138)
a_e mm (inch)	20 (0.787)	20 (0.787)
Result	Tool life 440 components	Tool life 280 components



Performance: Shoulder milling in unalloyed steel

Thermal cracks and flaking were causing short insert tool life. Inserts in grade GC1130 were introduced to tackle the problem. Conducted tests have shown that these inserts lasted much longer with a lot less wear than the existing solution, resulting in reduced costs and improved security.

Component	Plate, General Engineering	
Workpiece material	P1.1.Z.AN	
Operation	Shoulder milling	
	GC1130	Existing solution
Tool	490-044C4-08H	
Insert	490R-08T308M-PM 1130	
z_n	6	6
n rpm	1912	1912
v_c m/min (ft/min)	264 (866)	264 (866)
v_f mm/min (in/min)	1722 (67.795)	1722 (67.795)
f_z mm (inch)	0.15 (0.006)	0.15 (0.006)
a_p mm (inch)	1.5 (0.059)	1.5 (0.059)
a_e mm (inch)	22 (0.866)	22 (0.866)
Result	Not worn out after 42 minutes	Tool life 42 minutes

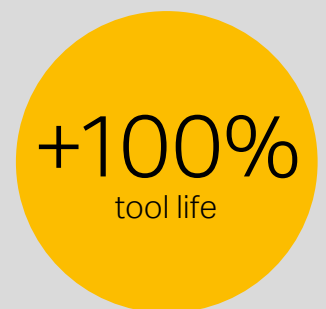


Performance: Face milling of connecting rod

In this application, the currently used insert was worn out after 27 minutes. Thermal cracks and chipping of the insert caused bad surface quality and could result in potential insert breakage. In order to tackle the challenge, GC1130 inserts were tested, reaching 100% longer tool life and improved production economy.



Component	Connecting rod	
Workpiece material	P2.2.Z.AN	
Operation	Face milling	
	GC1130	Existing solution
Tool	R390-032A32-17L	
Insert	R390-17 04 31M-PM 1130	
z_n	2	2
n rpm	2636	2636
v_c m/min (ft/min)	265 (869)	265 (869)
v_f mm/min (in/min)	791 (31.142)	791 (31.142)
f_z mm (inch)	0.15 (0.006)	0.15 (0.006)
a_p mm (inch)	5 (0.197)	5 (0.197)
a_e mm (inch)	26 (1.024)	26 (1.024)
Result	Worn out after 54 minutes	Worn out after 27 minutes



Your milling challenge:

Difficult tool paths or difficult to machine materials cause edge-line chipping, leading to bad surface finish and tool failure.

Machining adhesive materials causes flaking of the coating, leading to crater formation and breakage of the edge line.

Thermal fluctuation during machining, especially under wet conditions, causes crack formation, leading to sudden breakages and unpredictable tool life.

Our solution with GC1130:

GC1130 insert offers high edge-line security which improves the tool life and makes the production process predictable and secure.

The new PVD coating with Zertivo technology improves the tool life of GC1130 insert thanks to superior flaking resistance.

GC1130 insert with high-Cr-content fine grain substrate has a high resistance to thermal cracks, guaranteeing a long reliable tool life.

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