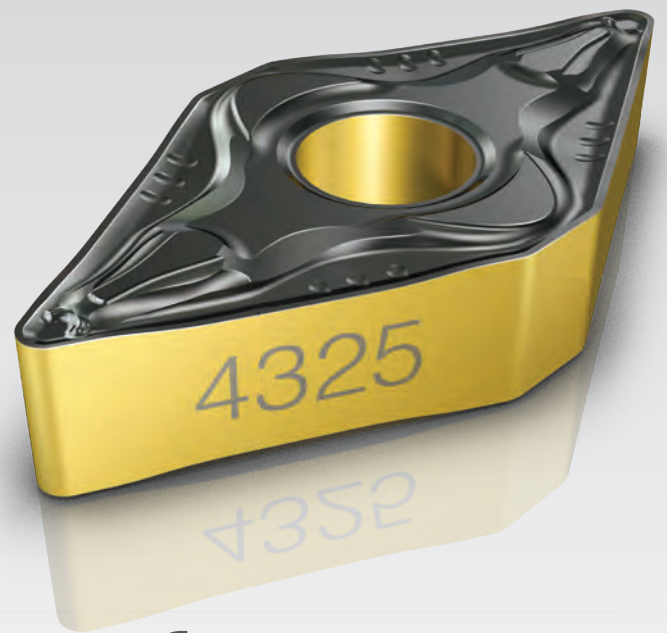




Inveio™

Uni-directional crystal orientation

SANDVIK
Coromant

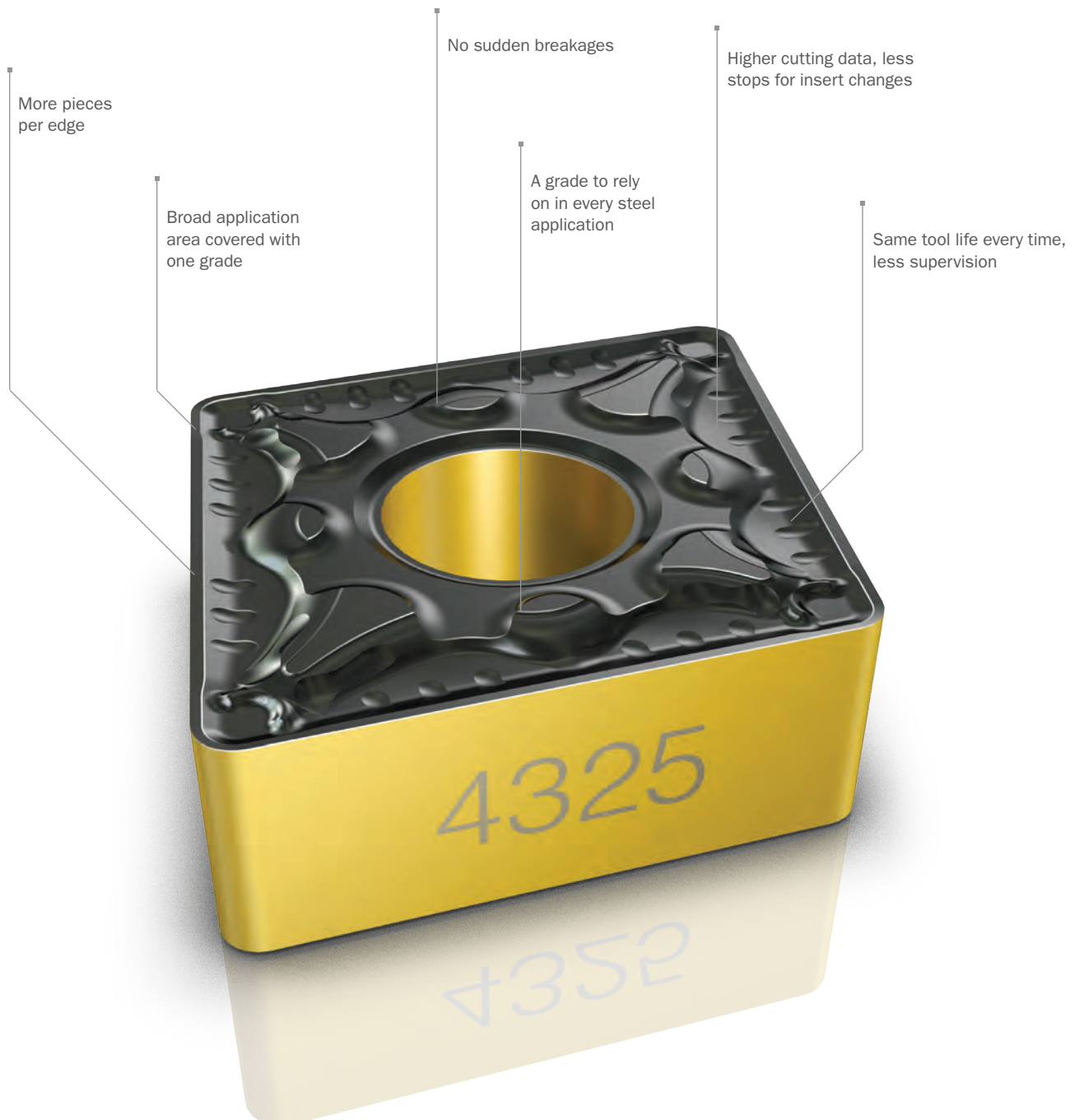


GC4325 – built to last longer

Steel turning endurance

Edges to rely on

A team of experts at Sandvik Coromant was facing the challenge of creating a grade that would last longer than ever before in the broadest possible range of steel turning applications. The result could not have been better.





“The challenge was to understand how to control the crystal growth direction during the CVD-process.”

Åke Östlund, Senior Project Manager GC4325
Västberga, Sweden

Its secrets revealed

At a glance, the insert does not reveal anything. Despite its appearance, it is in fact completely different in every single detail. Follow its story from the inner carbide material to the cutting edge.

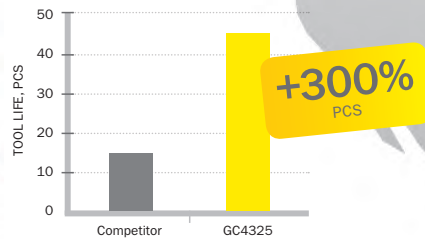
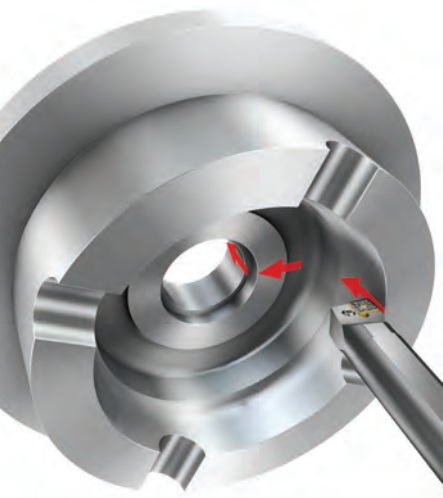
On the inside its cemented carbide material is made to withstand even higher loads and temperatures. A fine cobalt-enriched surface gradient acts as a crack-inhibitor for security against breakages.

Coatings add wear resistance. For the highest possible wear resistance, grade GC4325 has several coating layers. One of these layers carries a secret that ensures that every crystal turns its most tightly-packed atom layer towards the top surface. With more tightly-packed atoms, strength and wear resistance is greatly improved. That is why the crystal direction is important and why it has such a great impact on tool life.

On the edge, where it truly matters, the effect of this coating is combined with every other detail; the carbide, the coatings, the shape of the cutting edge and the post treatment process. GC4325 demonstrates more controlled wear and longer tool life than ever before, in the most varying conditions and at highly productive cutting data.

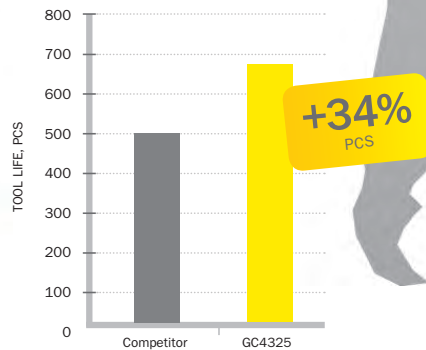
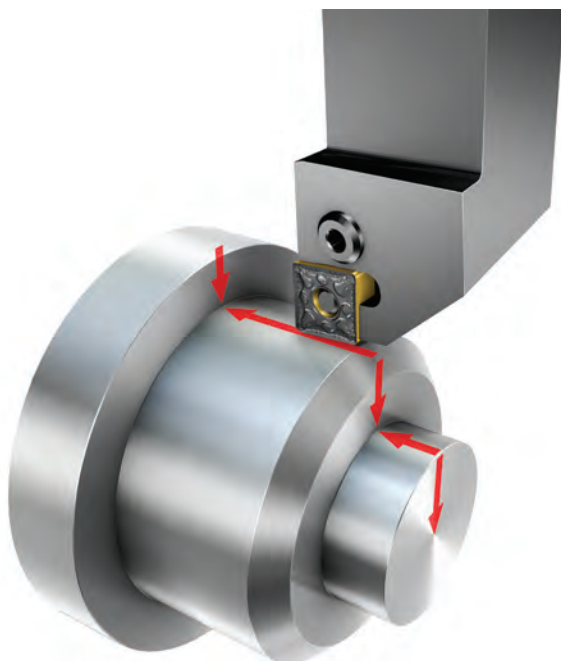
The new GC4325 offers

A solution for every situation



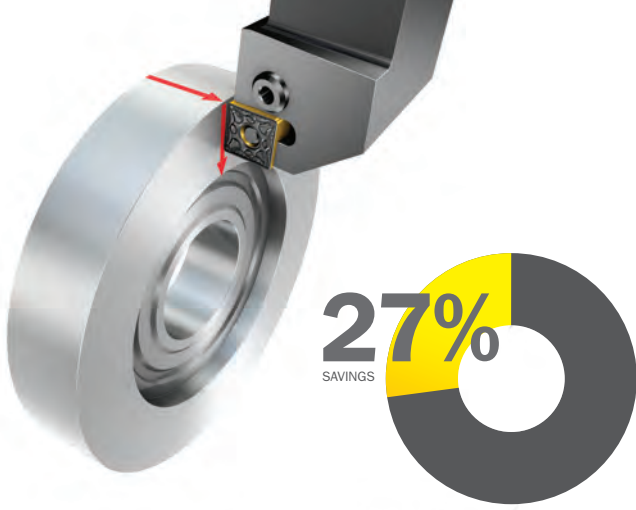
1. AUTOMOTIVE HOUSING

The GC4325 insert did not seem to wear out. The number of components per edge was tripled. We recommend +30% increased cutting data to save 28%.



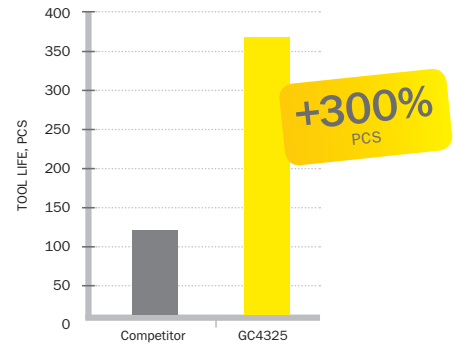
2. SPHERE HOUSING AUTOMOTIVE

This high-volume component was run-in carefully to balance high insert utilization with a good level of safety. GC4325 takes it to yet another level.



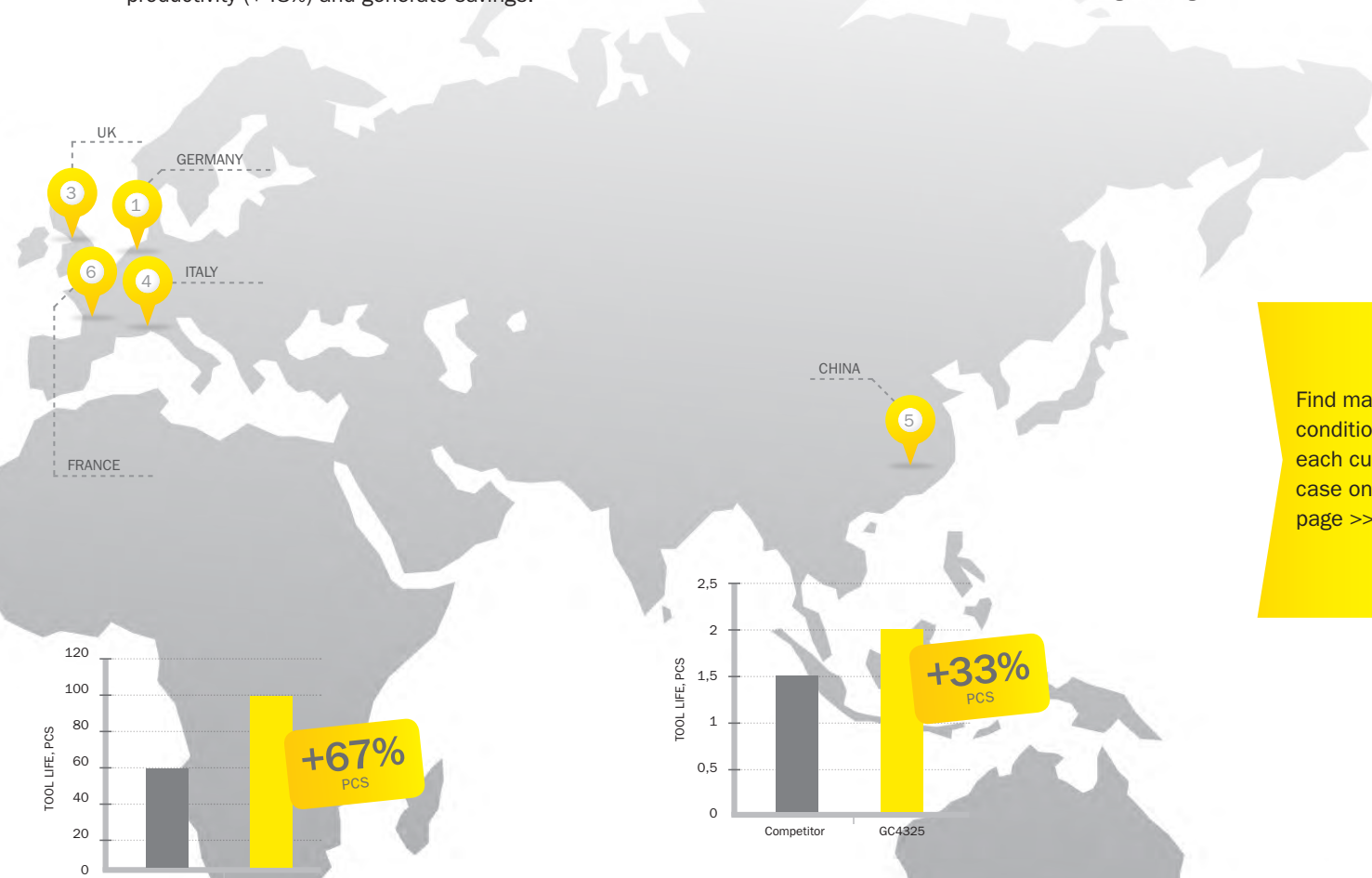
6. PINION

After 400 components GC4325 was still not worn out. We recommend high speed to improve productivity (+48%) and generate savings.

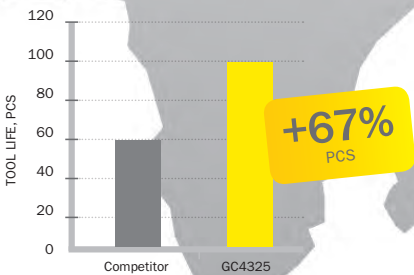


5. SHAFT

The cut is just 9 seconds, but GC4325 made 370 of those cuts without losing its edge line.

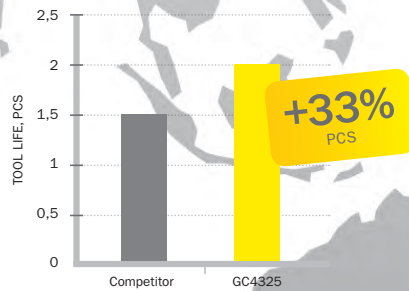


Find machining conditions for each customer case on next page >>



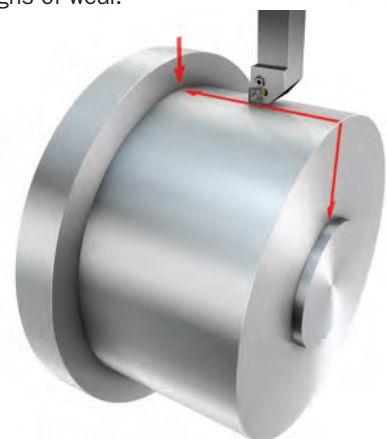
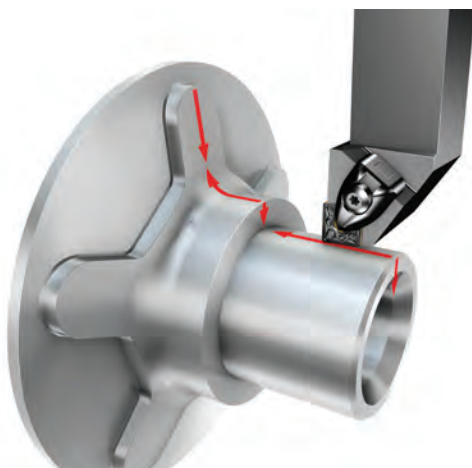
3. WHEEL HUB

GC4325 machined 100 pcs per edge instead of 60. The next step is to speed it up.



4. VALVE, OIL/GAS

At this high speed, 1148 ft/min (350 m/min), we do not expect an insert to last more than one component. GC4325 lasts two, with only small signs of wear.



CUSTOMER CASE DETAILS

Cutting conditions and insert wear photos at end of tool life for each of the customer cases on previous pages.

GC4325 (CNMG 433 -PR)



45 pcs (30 min)

COMPETITOR



15 pcs (14 min)

1

AUTOMOTIVE HOUSING

Carbon steel C60V, forged (250 HB)
Wet machining (emulsion)
 $v_c = 590$ ft/min (180 m/min)
 $f_n = .016$ in/rev (0.4 mm/r)
 $a_p = .118$ in (3 mm)

GC4325 (CNMG 432 -PM)



670 pcs (154 min)

COMPETITOR



500 pcs (115 min)

2

SPHERE HOUSING, AUTOMOTIVE

Carbon steel SAE 1045, forged (235 HB)
Wet machining (emulsion)
 $v_c = 820$ ft/min (250 m/min)
 $f_n = .014$ in/rev (0.35 mm/r)
 $a_p = .0202$ in (0.5 mm)

GC4325 (CNMG 433 -PR)



100 pcs (49 min)

COMPETITOR



60 pcs (29 min)

3

WHEEL HUB

Alloy steel DIN38MnVS6, cast (250 HB)
Wet machining (emulsion)
 $v_c = 590$ ft/min (180 m/min)
 $f_n = .016$ in/rev (0.37 mm/r)
 $a_p = .079$ in (2 mm)

GC4325 (CNMG 544 -PR)



2 pcs (23 min)

COMPETITOR



1.5 pcs (17 min)

4

VALVE OIL/GAS

Carbon steel, LF2, rolled (125 HB)
Wet machining (emulsion)
 $v_c = 1148$ ft/min (350 m/min)
 $f_n = .016$ in/rev (0.39 mm/r)
 $a_p = .118$ in (3 mm)

GC4325 (CNMG 432 -PM)



370 pcs (32 min)

COMPETITOR



120 pcs (10 min)

5

SHAFT

Alloy steel (330 HB)
Wet machining (emulsion)
 $v_c = 312$ ft/min (95 m/min)
 $f_n = .016$ in/rev (0.4 mm/r)
 $a_p = .118$ in (3 mm)

GC4325 (CNMG 433 -PR)



400 pcs

COMPETITOR



400 pcs

6

PINION

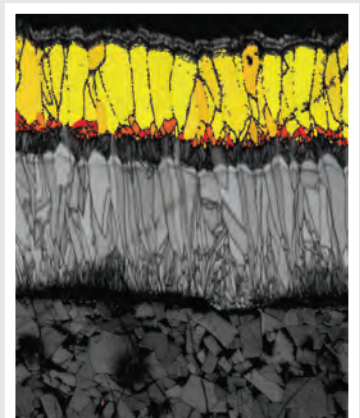
Carbon steel AFNOR23MCD5 (180 HB)
Wet machining (emulsion)
 $v_c = 722$ ft/min (220 m/min)
 $f_n = .011$ in/rev (0.28 mm/r)
 $a_p = .098$ in (2.5 mm)

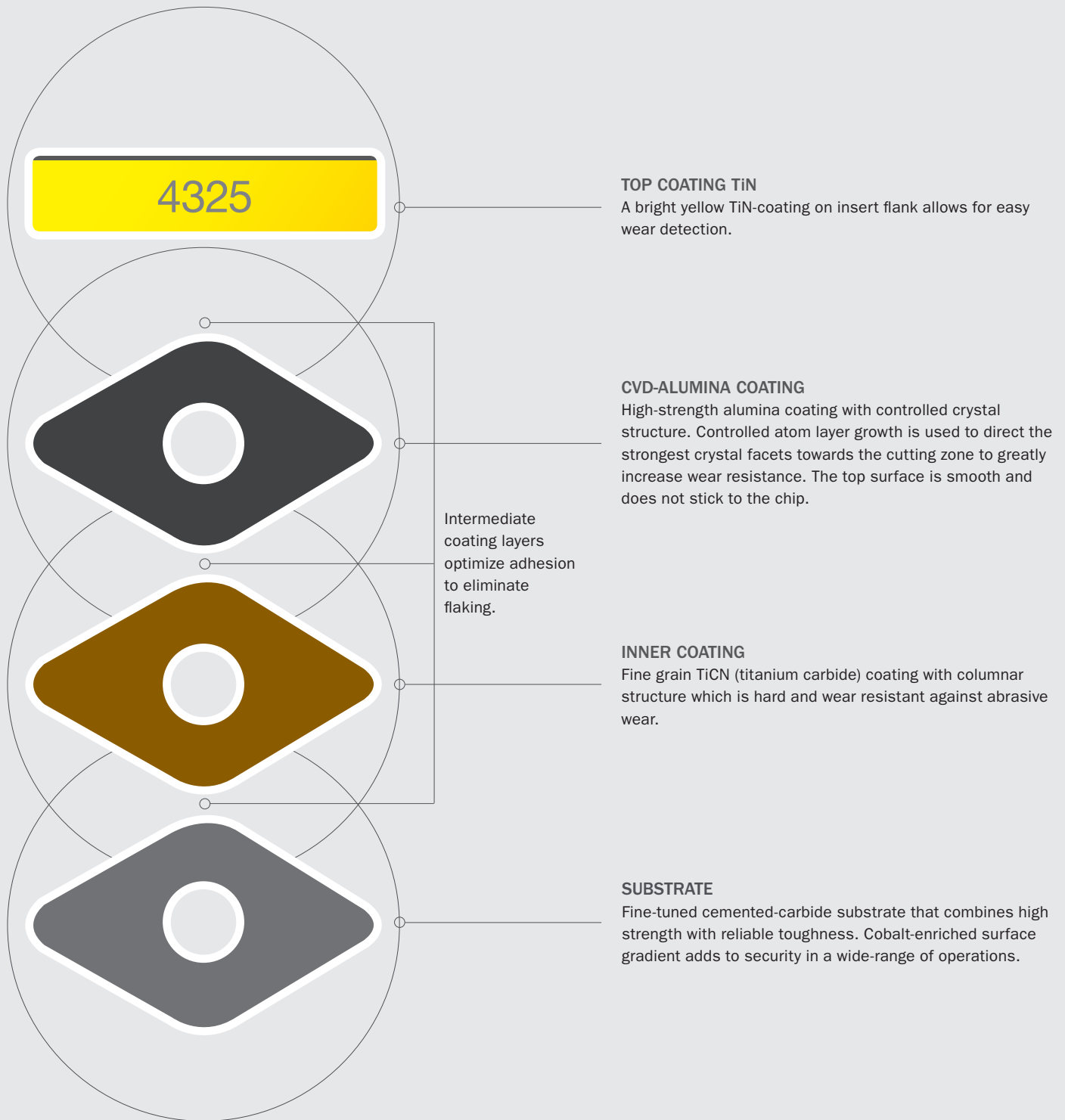
LOOKING AT THE DETAILS

An electron microscope is needed to see details of the grade. This cross-section shows the different layers of the coating and the carbide substrate, seen in the lower part of the picture.

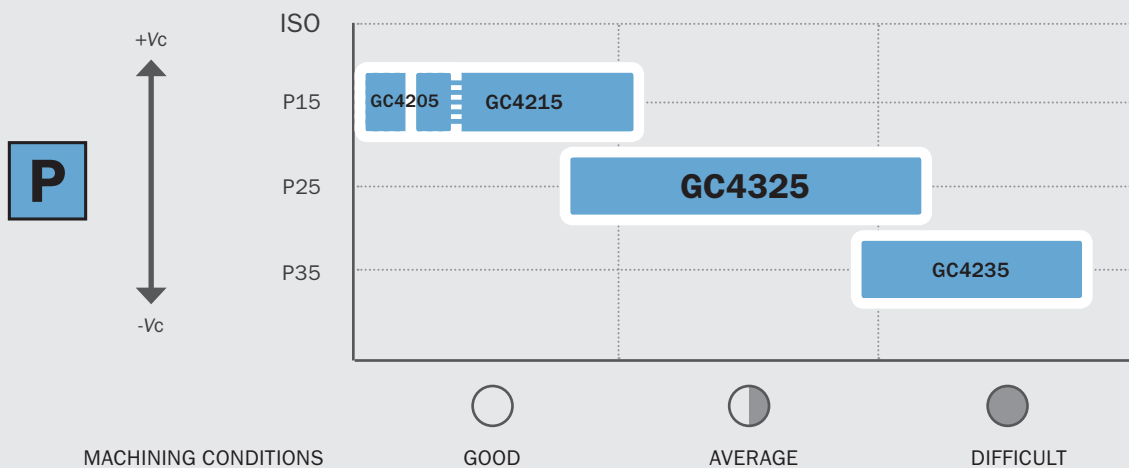
If you look closely, you see the gradient zone in the carbide as a zone of white tungsten carbide crystals and black cobalt binder where all cubic-carbide particles (gray) have been depleted. You can also make out the fine, uni-directional crystals of the alumina coating, in the dark gray band on the top.

Take a look at the crystals!





STEEL TURNING GRADES



Your future in good hands

Balancing the need for technological advancement with the need for global sustainability is a difficult challenge, but the Sandvik Coromant carbide recycling service makes it easier. By buying, collecting and recycling hundreds of tons of used carbide from our customers every year, we help reduce the environmental impact of our industry; we also make sure that recycled carbide is put to good use.

GC4325 is a shining example of this. Not only has GC4325 been improved in all performance areas, its carbide substrate contains a guaranteed 50% recycled carbide material. Just one more good reason to choose GC4325 and Sandvik Coromant as the partner to meet your future challenges.



*Visit the GC4325
website and be amazed!*

www.sandvik.coromant.com/GC4325

www.sandvik.coromant.com
E-mail: us.coromant@sandvik.com

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