

New Product Information

TC threading – Substitution of GM213 and GM240 with new grades

2017-04

Reason for the substitution

The familiar carbide grades GM213 (introduced in 1996) and GM240 (introduced in 1999) are being replaced by newer carbide grades/layers, which are being produced using more modern technologies and have a broader application range. The layer system is being switched from CVD to PVD without impeding the recognised advantages such as temperature resistance.

Chip breakers are not affected by this change and, in combination with the new carbide qualities, continue to be a state-of-the-art grade.

As part of this substitution, the product range is also being streamlined. Indexable inserts with a very low movement rate will not be offered in the new grades. The range has been adapted to ensure that all existing pitches (P) are still covered.

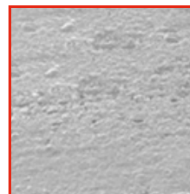
Coating technology

The new PVD coating process, which is used for the CTPP520 and CTPP535 grades, boasts a number of technical advantages over the conventional PVD process. For example, the surface quality is many times higher, while the tendency for droplets to form is reduced considerably. What is more, the layer thickness along the cutting edge is purposefully kept constant. In conventional PVD coating processes, the thicknesses differ depending on the position of the tool in the coating chamber.

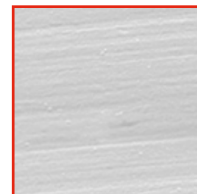
Advantages of the process

- Excellent surface quality
 - Reduces friction
 - Decreases built-up edge formation
- Highly uniform layer thicknesses
 - Improves the stability of the cutting edge
 - Enhances the surface quality of the component
- Low risk of the layer cracking
 - Reduces layer failures
 - Protects the carbide from wear mechanisms
- Excellent coating adhesion
 - No chipping during the process
 - Homogeneous wear rate

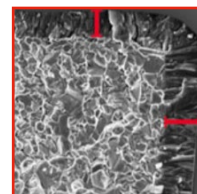
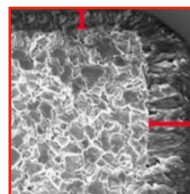
Traditional arc of PVD process



New PVD process



Layer surfaces magnified 2000x



Cutting edge magnified significantly

Silverstar CTPP520 and CTPP535

An innovative PVD AlTiN-based high-performance layer is applied to both grades. The low layer thickness and extremely high layer hardness enable performance to be enhanced, even in the case of low cutting depths and cutting edge loads, such as when turning threads. Another outstanding characteristic is their suitability for materials that are difficult to machine from the super alloy and stainless steels subsegment.

Grade designation	Standard designation	ISO application range							Steel	Stainless steel	Cast iron	Non-ferrous metals	Heat-resistant
		05	15	25	35	45							
		01	10	20	30	40	50						
								P	M	K	N	S	
CTPP520	HC-P20							●					
	HC-M15								●				
	HC-K25									●			
	HC-N25										●		
	HC-S25											○	
CTPP535	HC-P35							●					
	HC-M30								●				
	HC-N30										○		
	HC-S30											●	

Application fields

Familiar advantages of the TC threading system are retained, such as:

- Turning threads without compensating for the helix angle
- Thread production in front of or behind a flange
- Reducing the width of thread undercuts
- Good accessibility in restricted spaces

Furthermore, the combination of a new, wear-resistant layer and perfectly tailored base substrates, coupled with the chip breaker geometry, opens up application areas in the medical and dental industry as well as on sliding head lathes, without compromising suitability for the traditional fields of application.

Cutting Data

The new coatings have brought about changes to the cutting values compared to the existing grades GM213 and GM240.

	Index	Material	Strength N/mm ² / HB / HRC	CTPP520	CTPP535
				v _c (m/min)	v _c (m/min)
P	1.1	General construction steel	< 800 N/mm ²	150-200	80-150
	1.2	Free cutting steel	< 800 N/mm ²	150-240	110-170
	1.3	Hardened steel, non alloyed	< 800 N/mm ²	100-200	80-150
	1.4	Alloyed hardened steel	< 1000 N/mm ²	130-180	70-130
	1.5	Tempering steel, unalloyed	< 850 N/mm ²	140-220	70-130
	1.6	Tempering steel, unalloyed	< 1000 N/mm ²	100-160	60-170
	1.7	Tempering steel, alloyed	< 800 N/mm ²	140-190	70-130
	1.8	Tempering steel, alloyed	< 1300 N/mm ²	100-150	60-110
	1.9	Steel castings	< 850 N/mm ²	120-170	60-100
	1.10	Nitriding steel	< 1000 N/mm ²	120-170	70-120
	1.11	Nitriding steel	< 1200 N/mm ²	100-150	60-110
	1.12	Roller bearing steel	< 1200 N/mm ²	100-150	60-110
	1.13	Spring steel	< 1200 N/mm ²		60-110
	1.14	High-speed steel	< 1300 N/mm ²		
	1.15	Cold working tool steel	< 1300 N/mm ²	60-100	60-100
	1.16	Hot working tool steel	< 1300 N/mm ²	60-100	60-100
M	2.1	Cast steel and sulphured stainless steel	< 850 N/mm ²	110-180	50-150
	2.2	Stainless steel, ferritic	< 750 N/mm ²	110-180	50-140
	2.3	Stainless steel, martensitic	< 900 N/mm ²	70-140	50-130
	2.4	Stainless steel, ferritic / martensitic	< 1100 N/mm ²	70-100	50-80
	2.5	Stainless steel, austenitic / ferritic	< 850 N/mm ²	70-100	50-90
	2.6	Stainless steel, austenitic	< 750 N/mm ²	70-100	50-90
	2.7	Heat resistant steel	< 1100 N/mm ²		50-80
K	3.1	Grey cast iron with lamellar graphite	100–350 N/mm ²	180-220	
	3.2	Grey cast iron with lamellar graphite	300–500 N/mm ²	140-180	
	3.3	Gray cast iron with spheroidal graphite	300–500 N/mm ²	160-200	
	3.4	Gray cast iron with spheroidal graphite	500–900 N/mm ²	120-180	
	3.5	White malleable cast iron	270–450 N/mm ²	180-240	
	3.6	White malleable cast iron	500–650 N/mm ²	160-200	
	3.7	Black malleable cast iron	300–450 N/mm ²	180-240	
	3.8	Black malleable cast iron	500–800 N/mm ²	160-200	
N	4.1	Aluminium (non alloyed, low alloyed)	< 350 N/mm ²	100-1000	100-500
	4.2	Aluminium alloys < 0.5% Si	< 500 N/mm ²	100-800	100-500
	4.3	Aluminium alloys 0.5-10% Si	< 400 N/mm ²	100-500	100-500
	4.4	Aluminium alloys 10–15% Si	< 400 N/mm ²	100-500	100-300
	4.5	Aluminium alloys > 15% Si	< 400 N/mm ²	100-350	100-300
	4.6	Copper (non alloyed, low alloyed)	< 350 N/mm ²		100-300
	4.7	Copper wrought alloys	< 700 N/mm ²		100-300
	4.8	Special copper alloys	< 200 HB		100-300
	4.9	Special copper alloys	< 300 HB		100-300
	4.10	Special copper alloys	> 300 HB		100-300
	4.11	Short-chipping brass, bronze, red bronze	< 600 N/mm ²	80-250	100-500
	4.12	Long-chipping brass	< 600 N/mm ²		100-370
	4.13	Thermoplastics			
	4.14	Duroplastics		80-500	80-180
	4.15	Fibre-reinforced plastics		80-200	60-150
	4.16	Magnesium and magnesium alloys	< 850 N/mm ²		
	4.17	Graphite			
	4.18	Tungsten and tungsten alloys			
	4.19	Molybdenum and molybdenum alloys			
S	5.1	Pure nickel		25-45	
	5.2	Nickel alloys		20-40	20-35
	5.3	Nickel alloys	< 850 N/mm ²	15-25	20-40
	5.4	Nickel molybdenum alloys		15-25	20-40
	5.5	Nickel-chromium alloys	< 1300 N/mm ²	10-20	15-25
	5.6	Cobalt Chrome Alloys	< 1300 N/mm ²	10-20	15-25
	5.7	Heat resistant alloys	< 1300 N/mm ²	10-20	10-20
	5.8	Nickel-cobalt-chromium alloys	< 1400 N/mm ²	10-20	10-20
	5.9	Pure titanium	< 900 N/mm ²		50-120
	5.10	Titanium alloys	< 700 N/mm ²		30-50
	5.11	Titanium alloys	< 1200 N/mm ²		30-50
H	6.1		< 45 HRC		
	6.2		46–55 HRC		
	6.3	Tempered steel	56–60 HRC		
	6.4		61–65 HRC		
	6.5		65–70 HRC		

Substitution table

Old		New	
Cat. code	Old grade text	Cat. code	New grade text
274934	TC16-1E0,5 ISO GM213	12155054	TC16-1 E 0,5 ISO CTPP520
274935	TC16-1E0,75 ISO GM213	12155083	TC16-1 E 0,75 ISO CTPP520
274938	TC16-1E1,0 ISO GM213	12155086	TC16-1 E 1,0 ISO CTPP520
274939	TC16-1E1,25 ISO GM213	12155094	TC16-1 E 1,25 ISO CTPP520
274941	TC16-1E1,5 ISO GM213	12155099	TC16-1 E 1,5 ISO CTPP520
274943	TC16-2E1,75 ISO GM213	12155107	TC16-2 E 1,75 ISO CTPP520
274944	TC16-2E2,0 ISO GM213	12155498	TC16-2 E 2,0 ISO CTPP520
274945	TC16-2E2,5 ISO GM213	12155521	TC16-2 E 2,5 ISO CTPP520
274948	TC16-2E3,0 ISO GM213	12155523	TC16-2 E 3,0 ISO CTPP520
274950	TC16-3E3,5 ISO GM213	12155527	TC16-3 E 3,5 ISO CTPP520
274951	TC16-3E4,0 ISO GM213	12155535	TC16-3 E 4,0 ISO CTPP520
278026	TC16-3E5,0 ISO GM213	12155549	TC16-3 E 5,0 ISO CTPP520
274865	TC16-1I1,0 ISO GM213	12155893	TC16-1 I 1,0 ISO CTPP520
274893	TC16-1I1,25 ISO GM213	12155900	TC16-1 I 1,25 ISO CTPP520
274897	TC16-1I1,5 ISO GM213	12155905	TC16-1 I 1,5 ISO CTPP520
274901	TC16-2I1,75 ISO GM213	12155907	TC16-2 I 1,75 ISO CTPP520
274909	TC16-2I2,0 ISO GM213	12155935	TC16-2 I 2,0 ISO CTPP520
274916	TC16-2I3,0 ISO GM213	12155943	TC16-2 I 3,0 ISO CTPP520
274958	TC16-1EI-A60 GM213	12155970	TC16-1 EI-A60 CTPP520
274967	TC16-2EI-AG60 GM213	12155972	TC16-2 EI-AG60 CTPP520
274959	TC16-2EI-G60 GM213	12155973	TC16-2 EI-G60 CTPP520
274971	TC16-3EI-N60 GM213	12155974	TC16-3 EI-N60 CTPP520
278032	TC16-1EI28W GM213	12155979	TC16-1 EI 28 W CTPP520
278035	TC16-1EI20W GM213	12156531	TC16-1 EI 20 W CTPP520
274957	TC16-1EI19W GM213	12156539	TC16-1 EI 19 W CTPP520
278037	TC16-1EI16W GM213	12156542	TC16-1 EI 16 W CTPP520
274970	TC16-2EI 14W GM213	12156547	TC16-2 EI 14 W CTPP520
278043	TC16-2EI11W GM213	12156551	TC16-2 EI 11 W CTPP520
278062	TC16-1EI-A55 GM213	12156556	TC16-1 EI-A55 CTPP520
274968	TC16-2EI-AG55 GM213	12156559	TC16-2 EI-AG55 CTPP520
278061	TC16-2EI-G55 GM213	12156560	TC16-2 EI-G55 CTPP520
278063	TC16-3EI-N55 GM213	12156562	TC16-3 EI-N55 CTPP520
11039171	TC16-1E0,5 ISO GM240	12155053	TC16-1 E 0,5 ISO CTPP535
11039172	TC16-1E0,75 ISO GM240	12155913	TC16-1 E 0,75 ISO CTPP535
11039173	TC16-1E1,0 ISO GM240	12155937	TC16-1 E 1,0 ISO CTPP535
11039174	TC16-1E1,25 ISO GM240	12155940	TC16-1 E 1,25 ISO CTPP535
11039175	TC16-1E1,5 ISO GM240	12156519	TC16-1 E 1,5 ISO CTPP535
11039205	TC16-2E1,75 ISO GM240	12156524	TC16-2 E 1,75 ISO CTPP535
11039206	TC16-2E2,0 ISO GM240	12156525	TC16-2 E 2,0 ISO CTPP535
11039207	TC16-2E2,5 ISO GM240	12156528	TC16-2 E 2,5 ISO CTPP535
11039208	TC16-2E3,0 ISO GM240	12156532	TC16-2 E 3,0 ISO CTPP535
11039224	TC16-3E3,5 ISO GM240	12156540	TC16-3 E 3,5 ISO CTPP535
11039225	TC16-3E4,0 ISO GM240	12156543	TC16-3 E 4,0 ISO CTPP535
11039227	TC16-3E5,0 ISO GM240	12156549	TC16-3 E 5,0 ISO CTPP535
11039202	TC16-1I1,0 ISO GM240	12156552	TC16-1 I 1,0 ISO CTPP535
11039204	TC16-1I1,5 ISO GM240	12157538	TC16-1 I 1,5 ISO CTPP535
11039221	TC16-2I2,0 ISO GM240	12157543	TC16-2 I 2,0 ISO CTPP535
11039223	TC16-2I3,0 ISO GM240	12157548	TC16-2 I 3,0 ISO CTPP535
11039177	TC16-1 EI-A60 GM240	12157551	TC16-1 EI-A60 CTPP535
11039210	TC16-2 EI-AG60 GM240	12157566	TC16-2 EI-AG60 CTPP535
11039212	TC16-2 EI-G60 GM240	12157567	TC16-2 EI-G60 CTPP535
11039229	TC16-3 EI-N60 GM240	12157569	TC16-3 EI-N60 CTPP535
11039199	TC16-1EI28W GM240	12157572	TC16-1 EI 28 W CTPP535
11039195	TC16-1EI19W GM240	12157573	TC16-1 EI 19 W CTPP535
11039216	TC16-2EI14W GM240	12157577	TC16-2 EI 14 W CTPP535
11039215	TC16-2EI12W GM240	12157584	TC16-2 EI 12 W CTPP535
11039214	TC16-2EI11W GM240	12157591	TC16-2 EI 11 W CTPP535
11039176	TC16-1EI-A55 GM240	12157594	TC16-1 EI-A55 CTPP535
11039209	TC16-2EI-AG55 GM240	12157604	TC16-2 EI-AG55 CTPP535
11039211	TC16-2EI-G55 GM240	12157608	TC16-2 EI-G55 CTPP535
11039228	TC16-3EI-N55 GM240	12157619	TC16-3 EI-N55 CTPP535

Discontinuation table

Cat. code	Grade text
274919	TC16-3 I 3,5 ISO GM213
274923	TC16-3 I 4,0 ISO GM213
274912	TC16-2 I 2,5 ISO GM213
278029	TC16-3 I 5,0 ISO GM213
278078	TC16-3 EI 6 W GM213
278030	TC16-1 I 0,5 ISO GM213
278080	TC16-3 EI 5 W GM213
278031	TC16-1 I 0,75 ISO GM213
278033	TC16-1 EI 26 W GM213
278034	TC16-1 EI 24 W GM213
278036	TC16-1 EI 18 W GM213
278041	TC16-2 EI 12 W GM213
278058	TC16-2 EI 10 W GM213
278059	TC16-2 EI 9 W GM213
278060	TC16-2 EI 8 W GM213
278015	TC16-3 E 4,5 ISO GM213
278028	TC16-3 I 4,5 ISO GM213
278074	TC16-3 EI 7 W GM213
11039230	TC16-3 EI 5 W GM240
11039232	TC16-3 EI 7 W GM240
11039233	TC16-3 I 3,5 ISO GM240
11039234	TC16-3 I 4,0 ISO GM240
11039235	TC16-3 I 4,5 ISO GM240
11039236	TC16-3 I 5,0 ISO GM240
11039213	TC16-2 EI 10 W GM240
11039192	TC16-1 EI 16 W GM240
11039194	TC16-1 EI 18 W GM240
11039220	TC16-2 I 1,75 ISO GM240
11039196	TC16-1 EI 20 W GM240
11039197	TC16-1 EI 24 W GM240
11039222	TC16-2 I 2,5 ISO GM240
11039198	TC16-1 EI 26 W GM240
11039200	TC16-1 I 0,5 ISO GM240
11039201	TC16-1 I 0,75 ISO GM240
11039226	TC16-3 E 4,5 ISO GM240
11039203	TC16-1 I 1,25 ISO GM240

Customer benefits

- Optimum performance thanks to the new substrate/coating combination
- Universal application range
- General advantages of the TC threading system

Sales support

- New Product Information Ceratizit
- See the Ceratizit e-Techstore for prices and availability