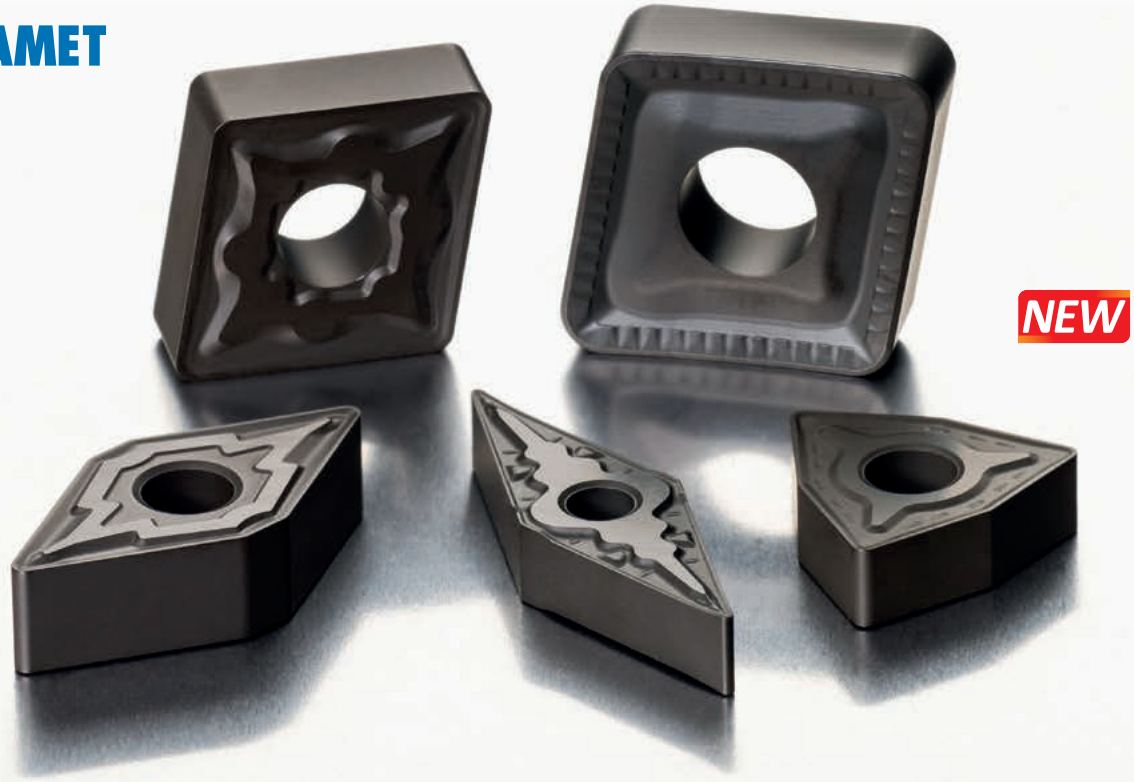
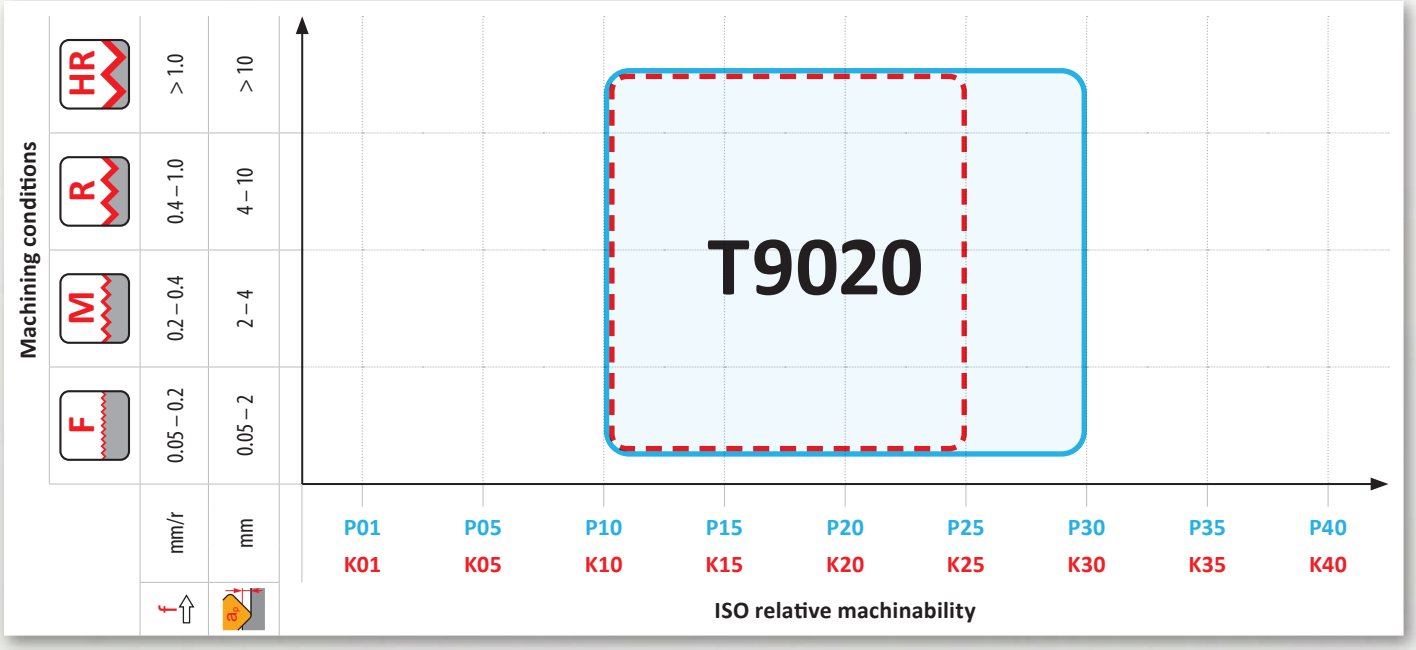
T9020 VERSATILE TURNING GRADE

INTRODUCTION

A new, cost effective turning grade, the Pramet T9020 offers a reliable and versatile solution over a multitude of other grades, resulting in cash savings by reduction of inventory. The broad application range of T9020 makes the grade suitable for both continuous and interrupted cutting in a variety of working conditions. The T9020 grade combines a hard gradient substrate and MT-CVD coating offering high levels of wear resistance, thus long tool life. The Pramet T9020 assortment range includes tailor-made geometries for steel machining covering finishing, medium and roughing operations. The grade is ideal for General machining and Automotive components.

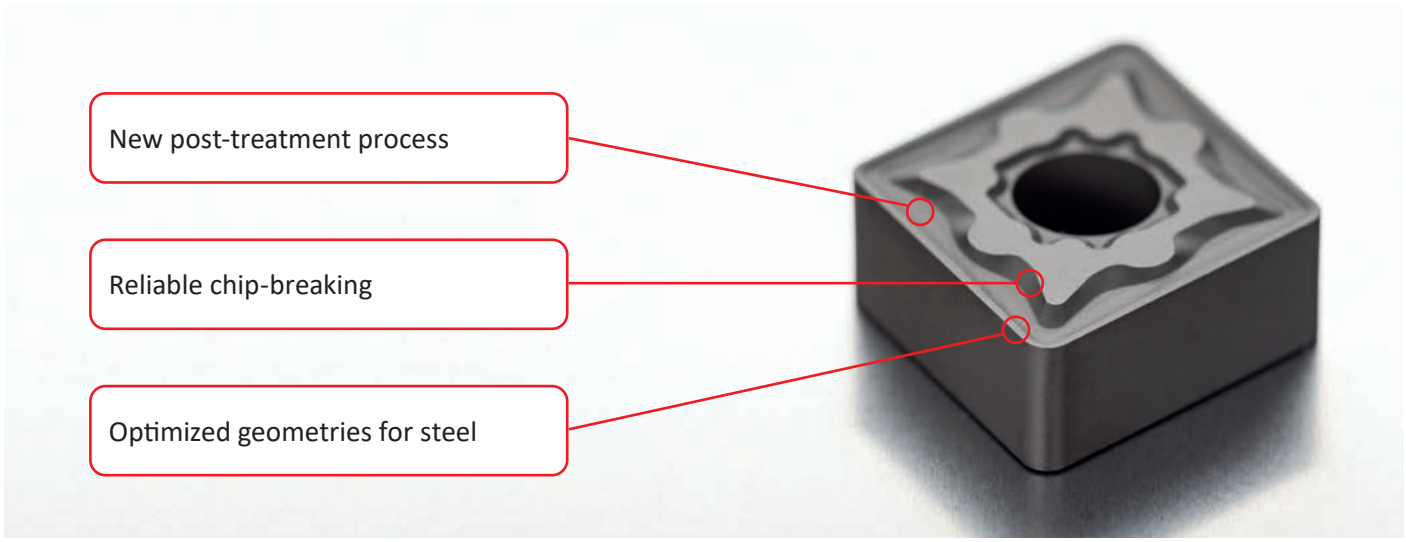
PRAMET





FEATURES AND BENEFITS

New hard substrate paired with specific MT-CVD coating.	**WIDE APPLICATION AREA** covering ISO groups P10 – P30 and K10 – K25.
Tailor made multi-layer MT-CVD coating with new post-treatment process.	**LONG TOOL LIFE** during steels and cast irons turning.
Excellent wear resistance vs. toughness ratio.	**VERSATILE USAGE** in both continuous and interrupted cuts.
Simple offer of chip-breakers optimized for steel parts turning.	**SIMPLE SELECTION** and reliable chip-breaking.



TECHNICAL INFORMATION

Grade identification	Area of application	Application	Feed	Cutting speed	Resistance to adverse working conditions	Coating	Colour	Substrate	Coolant benefit
T9020	P10 – P30	■				MT-CVD (Medium temperature chemical vapour deposition)		FGM (Functionally gradient material)	Recommended
	K10 – K25	◪							

Grade description:

A versatile grade with excellent wear resistance vs. toughness ratio. Reliable in wide range of cutting conditions, when suitable also in interrupted cuts. Ideal for application area ISO – P, mainly machining of carbon steel. The use of coolant is usually advisable for continuous cuts.

SUCCESS STORIES – T9020

Segment: Automotive sub-contractor
Component: Gear blank
Material: Forged steel (P2.2)
Hardness: 160 – 220 HB
Coolant: Yes, water soluble
Application: Outer diameter and face turning on CNC lathe.
Previous results: With previous competitor insert, 25 workpieces were produced, with tool life at 16 min.

Result with T9020: A total of 35 workpieces completed, with tool life increased by 40 %!

Dormer Pramet solution
DNMG 150608-UF:T9020

Machining data		
v_c	f_n	a_p
200	0.15	0.5



Segment: General engineering - bearings
Component: Outer bearing
Material: SAE52100 (P3.1)
Hardness: 200 HB
Coolant: Yes, water soluble
Application: Face, outer diameter and internal diameter turning on CNC machine center.
Previous results: Using previous competitor insert, 48 workpieces were created, with surface roughness a factor in tool life.

Result with T9020: Consistent and predictable tool wear with increased tool life by 14.5 %, producing 55 workpieces!

Dormer Pramet solution
TNMG 160408-UR:T9020

Machining data		
v_c	f_n	a_p
350	0.3	1



Segment: Automotive sub-contractor
Component: Differential case
Material: Forged steel (P2.2)
Hardness: 35 HRC
Coolant: Yes, water soluble
Application: Inner diameter and face roughing on CNC lathe.
Previous results: Customer faced issues with unstable tool life. Competitor insert was set to complete 28 workpieces to avoid premature failure.

Result with T9020: Result with T9020: Uniform, consistent and predictable wear, increasing tool life by 43 %. The customer completed 40 workpieces with T9020!

Dormer Pramet solution
CNMG 120408-UM:T9020

Machining data		
v_c	f_n	a_p
205	0.2	1.5



v_c = cutting speed (m/min), f_n = feed per revolution (mm/r), a_p = depth of cut (mm)

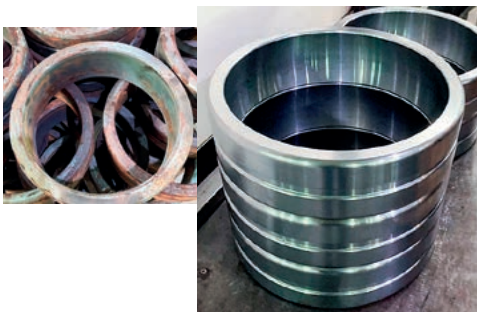
SUCCESS STORIES – T9020

Segment: General machining
Component: Bearing inner ring
Material: GCr15 (P3.1)
Hardness: 150 – 170 HB
Coolant: Yes, water soluble
Application: Axial external turning and facing on horizontal CNC lathe.
Previous results: Competitor tool life produced three workpieces, with fast wear on face and flank of insert.

Result with T9020: Keeping the same cutting conditions, a total of eight workpieces were produced, increasing tool life by 166 %!

Dormer Pramet solution
WNMG 080412-RP:T9020

Machining data		
v_c	f_n	a_p
205 – 230	0.27	1 – 2

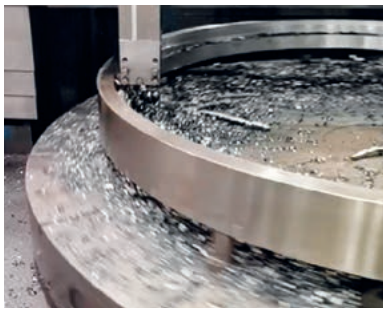


Segment: Energy generation
Component: Gear ring (diameter 3.1 m)
Material: 42CrMo (P3.2)
Hardness: 280 HB
Coolant: No
Application: Axial boring and facing on big vertical CNC lathe.
Previous results: Cutting depth had to be divided in two passes, competitor's tool life was unstable with one cut.

Result with T9020: Our insert completed the required depth of cut in one pass, resulting in increased productivity by 40 % and tool life by 50 %!

Dormer Pramet solution
CNMG 190616-RP:T9020

Machining data		
v_c	f_n	a_p
77	0.4 – 0.7	12 – 17



Segment: Energy generation
Component: Gear bearing ring
Material: 42CrMo (P3.2)
Hardness: 270 HB
Coolant: No
Application: Roughing of end face on big vertical CNC lathe.
Previous results: Competitor insert delivered a tool life of 63 min, when machining by fn = 0.63 mm/r.

Result with T9020: Consistent and slower tool wear, helping to increase feed rate and tool life to 90 min, resulting in greater productivity by 43 %!

Dormer Pramet solution
CNMM190624E-HR:T9020

Machining data		
v_c	f_n	a_p
60	0.9	7 – 8



v_c = cutting speed (m/min), f_n = feed per revolution (mm/r), a_p = depth of cut (mm)

P / K

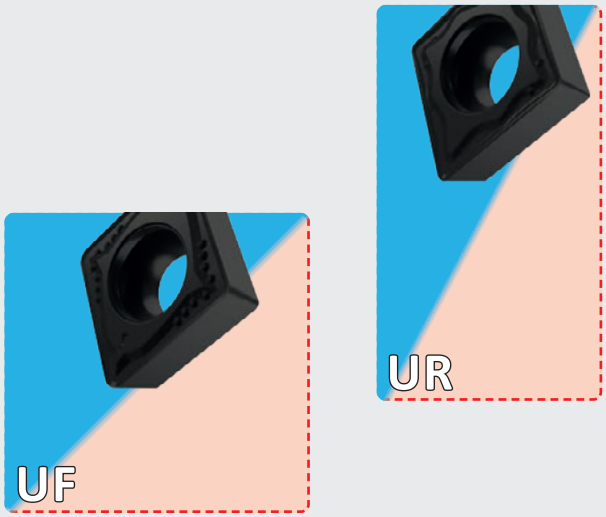
1st choice (ISO-P)
Possible use (ISO-P)
Possible use (ISO-K)

Very unstable working conditions

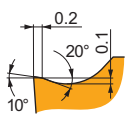
Unstable working conditions

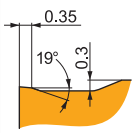
Stable working conditions

Thin -walled and slim workpieces



	FF	F	M	R	HR
f ⇨	0.05 – 0.2 mm/rev		0.2 – 0.4 mm/rev	0.4 – 1.0 mm/rev	> 1.0 mm/rev
a_p	0.05 – 2 mm		2 – 4 mm	4 – 10 mm	> 10 mm

UF		Designed for finish to semi-rough machining, steels and stainless steels, potentially cast irons and non ferrous materials, continuous and moderately interrupted cuts.

UR		Designed for semi-rough machining, steels, stainless steels and cast irons, potentially super alloys and hardened materials, continuous and interrupted cuts.

P / K

1st choice (ISO-P)
Possible use (ISO-P)
Possible use (ISO-K)

Very unstable working conditions

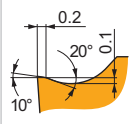
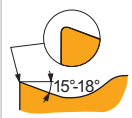
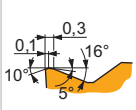
Unstable working conditions

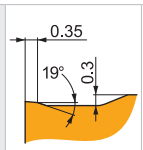
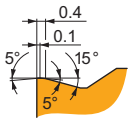
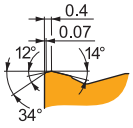
Stable working conditions

Thin -walled and slim workpieces



	FF	F	M	R	HR
f	0.05 – 0.2 mm/rev		0.2 – 0.4 mm/rev	0.4 – 1.0 mm/rev	> 1.0 mm/rev
a_p	0.05 – 2 mm		2 – 4 mm	4 – 10 mm	> 10 mm

UF		Designed for finish to semi-rough machining, steels and stainless steels, potentially cast irons and non ferrous materials, continuous and moderately interrupted cuts.
SI		Positive geometry for fine finish to semi-rough machining, steels, stainless steels and cast irons and potentially non ferrous materials, continuous cuts.
UM		Designed for finish and semi-rough machining, cast irons, potentially steels and hard materials, continuous and interrupted cuts.

UR		Designed for semi-rough machining, steels, stainless steels and cast irons, potentially super alloys and hard-ened materials, continuous and interrupted cuts.
RP		Designed for semi-rough and rough machining, cast irons, potentially steel and hard materials, continuous and interrupted cuts.
UH		Designed for semi-rough and rough machining, steels, stainless steels and cast irons, potentaily super alloys, continuous and interrupted cuts.

ISO INSERTS POSITIVE – NAVIGATOR

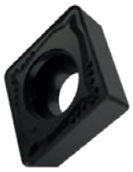
CCMT	DCMT	TCMT	VBMT
			
11	13	14	16

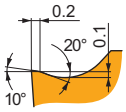
ICONS OVERVIEW

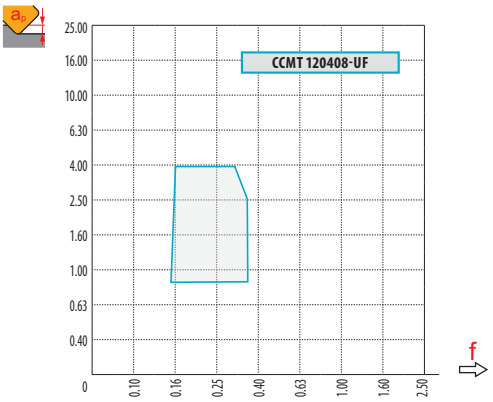
a_p Depth of cut (mm)	Very high cutting speed, excellent system rigidity (stable working conditions)	Medium cutting speed, system rigidity limited (slightly interrupted cut)
f Feed (mm/rev)	High cutting speed, high system rigidity (stable working conditions)	Low cutting speed, low system rigidity (interrupted cut)
Grade	High cutting speed, system rigidity slightly limited (depth of cut changing)	Very low cutting speed, very low system rigidity (very unstable working conditions)

GEOMETRY OF POSITIVE INSERTS – CLAMPING DESIGNATION ISO S

UF

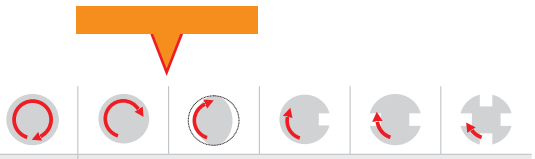






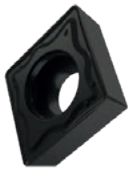
P	M	K	N	S	H
■		◪			

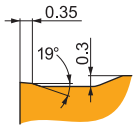
f	0.08 – 0.35
a_p	0.2 – 4.0

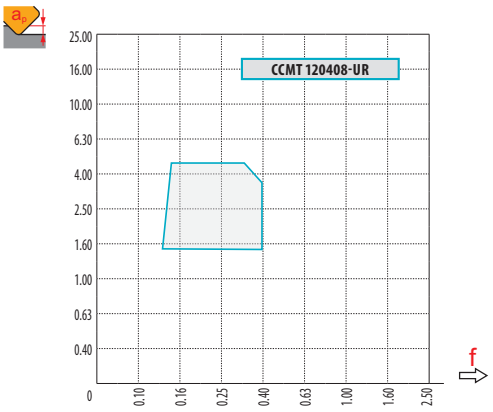


CCMT, DCMT, TCMT, VBMT

UR

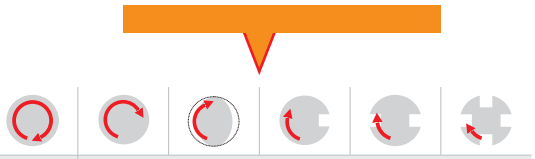






P	M	K	N	S	H
■		◪			

f	0.15 – 0.40
a_p	1.0 – 4.5



CCMT, TCMT

ISO INSERTS NEGATIVE – NAVIGATOR

CNMG  11

CNMM  12

DNMG  13

SNMG  14

TNMG  15

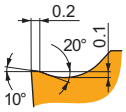
VNMG  16

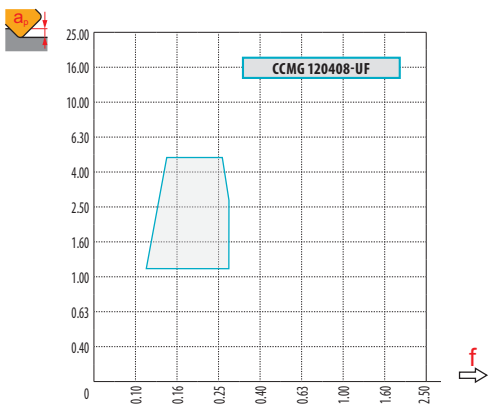
WNMG  17

GEOMETRY OF NEGATIVE INSERTS – CLAMPING DESIGNATION ISO P, M, D

UF







P	M	K	N	S	H
■		◪			

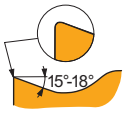
f 0.10 – 0.45

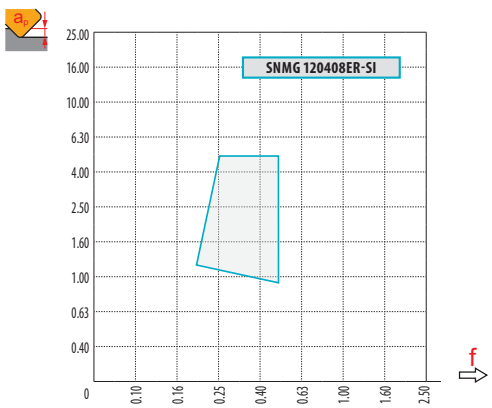
a_p 0.5 – 3.0

CNMG, DNMG, TNMG, VNMG, WNMG

SI







P	M	K	N	S	H
■					

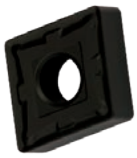
f 0.20 – 0.50

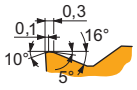
a_p 0.8 – 5.0

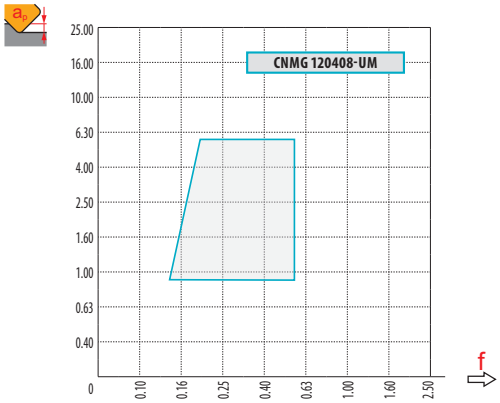
SNMG

GEOMETRY OF NEGATIVE INSERTS – CLAMPING DESIGNATION ISO P, M, D

UM







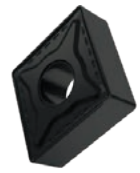
P	M	K	N	S	H
■		◪			

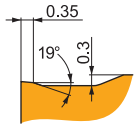
f: 0.17 – 0.80

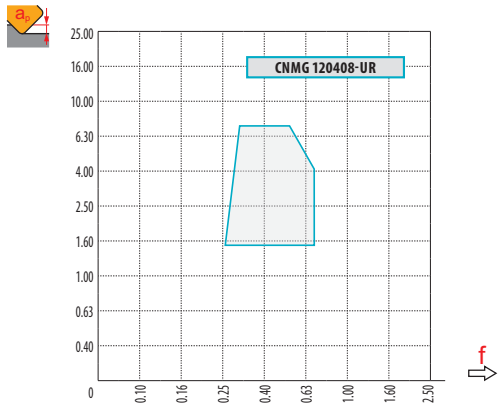
a_p: 0.8 – 6.0

CNMG, DNMG, TNMG, VNMG, WNMG

UR







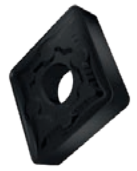
P	M	K	N	S	H
■		◪			

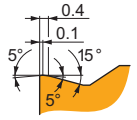
f: 0.25 – 0.80

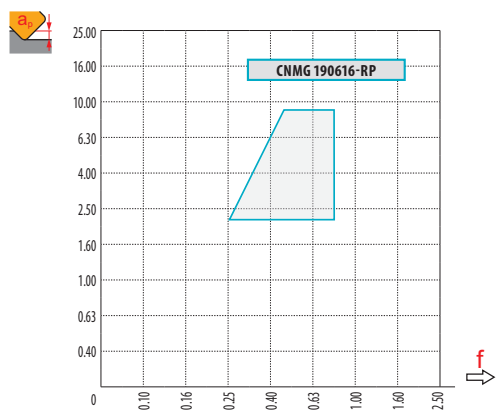
a_p: 1.0 – 8.0

CNMG, DNMG, TNMG, WNMG

RP







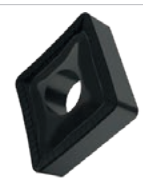
P	M	K	N	S	H
■		◪			

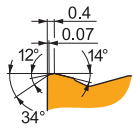
f: 0.25 – 0.70

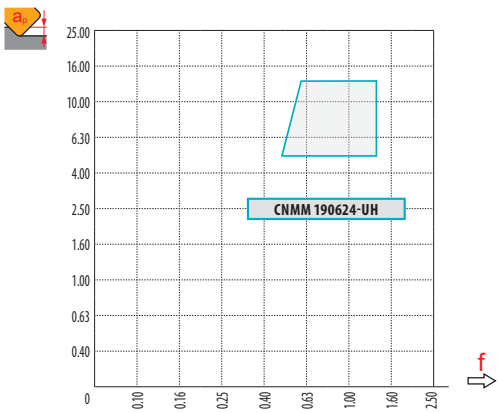
a_p: 2.0 – 9.0

CNMG, DNMG, TNMG, WNMG

UH







P	M	K	N	S	H
■		◪			

f: 0.50 – 1.40

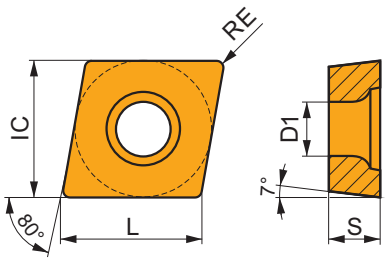
a_p: 5.0 – 13.3

CNMM

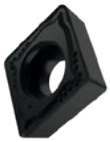
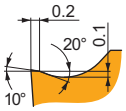
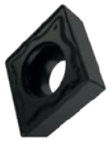
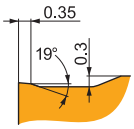
CCMT

PRAMET

	IC (mm)	D1 (mm)	L (mm)	S (mm)
09T3	9.525	4.40	9.70	3.97
1204	12.700	5.50	12.90	4.76



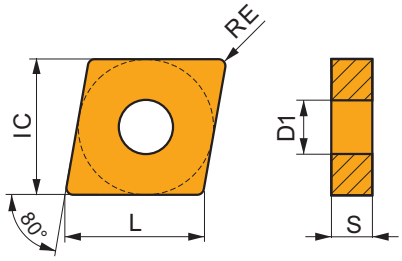
Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE (mm)	P vc (m/min)	P f (mm/rev)	P ap (mm)	M vc (m/min)	M f (mm/rev)	M ap (mm)	K vc (m/min)	K f (mm/rev)	K ap (mm)	N vc (m/min)	N f (mm/rev)	N ap (mm)	S vc (m/min)	S f (mm/rev)	S ap (mm)	H vc (m/min)	H f (mm/rev)	H ap (mm)
																				
			UF geometry for finish to semi-rough machining, and continuous to slightly interrupted cuts.																	
CCMT 09T308-UF	T9020	0.8	270	0.20	1.2	–	–	–	255	0.20	1.2	–	–	–	–	–	–	–	–	–
CCMT 120408-UF	T9020	0.8	260	0.20	1.7	–	–	–	245	0.20	1.7	–	–	–	–	–	–	–	–	–
																				
			UR geometry for semi-rough to rough machining, and continuous to interrupted cuts.																	
CCMT 120408-UR	T9020	0.8	220	0.30	2.7	–	–	–	205	0.30	2.7	–	–	–	–	–	–	–	–	–

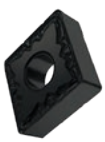
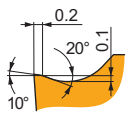
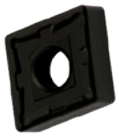
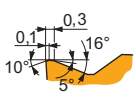
CNMG

PRAMET

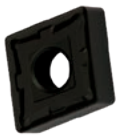
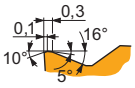
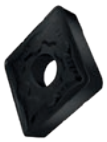
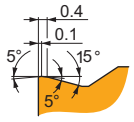
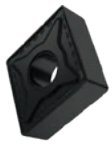
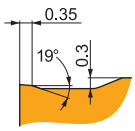
	IC (mm)	D1 (mm)	L (mm)	S (mm)
1204	12.700	5.16	12.90	4.76
1606	15.880	6.35	16.10	6.35
1906	19.050	7.94	19.30	6.35



Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE (mm)	P vc (m/min)	P f (mm/rev)	P ap (mm)	M vc (m/min)	M f (mm/rev)	M ap (mm)	K vc (m/min)	K f (mm/rev)	K ap (mm)	N vc (m/min)	N f (mm/rev)	N ap (mm)	S vc (m/min)	S f (mm/rev)	S ap (mm)	H vc (m/min)	H f (mm/rev)	H ap (mm)
																				
			UF geometry with positive design for finish to semi-rough machining, and continuous to slightly interrupted cuts.																	
CNMG 120404-UF	T9020	0.4	240	0.20	2.1	–	–	–	225	0.20	2.1	–	–	–	–	–	–	–	–	–
CNMG 120408-UF	T9020	0.8	285	0.20	2.1	–	–	–	270	0.20	2.1	–	–	–	–	–	–	–	–	–
																				
			UM geometry for finish to semi-rough machining and continuous to interrupted cuts.																	
CNMG 120404-UM	T9020	0.4	220	0.20	2.1	–	–	–	205	0.20	2.1	–	–	–	–	–	–	–	–	–

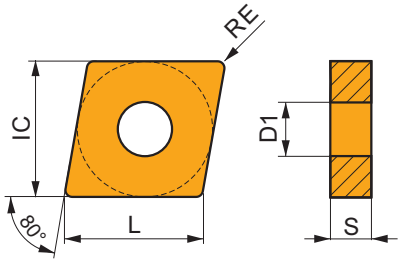
Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE	P			M			K			N			S			H		
			vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)
																				
UM geometry for finish to semi-rough machining and continuous to interrupted cuts.																				
CNMG 120408-UM	**T9020**	0.8	210	0.32	2.1	–	–	–	195	0.32	2.1	–	–	–	–	–	–	–	–	–
CNMG 120412-UM	**T9020**	1.2	205	0.40	2.1	–	–	–	190	0.40	2.1	–	–	–	–	–	–	–	–	–
CNMG 160608-UM	**T9020**	0.8	200	0.32	3.6	–	–	–	190	0.32	3.6	–	–	–	–	–	–	–	–	–
																				
RP geometry for semi-rough to rough machining, and continuous to interrupted cuts.																				
CNMG 120408-RP	**T9020**	0.8	180	0.40	4.0	–	–	–	170	0.40	4.0	–	–	–	–	–	–	–	–	–
CNMG 120412-RP	**T9020**	1.2	185	0.45	4.0	–	–	–	175	0.45	4.0	–	–	–	–	–	–	–	–	–
CNMG 160608-RP	**T9020**	0.8	175	0.40	5.5	–	–	–	165	0.40	5.5	–	–	–	–	–	–	–	–	–
CNMG 160612-RP	**T9020**	1.2	175	0.45	5.5	–	–	–	165	0.45	5.5	–	–	–	–	–	–	–	–	–
CNMG 190608-RP	**T9020**	0.8	170	0.40	7.0	–	–	–	160	0.40	7.0	–	–	–	–	–	–	–	–	–
CNMG 190612-RP	**T9020**	1.2	175	0.45	7.0	–	–	–	165	0.45	7.0	–	–	–	–	–	–	–	–	–
CNMG 190616-RP	**T9020**	1.6	170	0.50	7.0	–	–	–	160	0.50	7.0	–	–	–	–	–	–	–	–	–
																				
UR geometry for semi-rough to rough machining, and continuous to interrupted cuts.																				
CNMG 120408-UR	**T9020**	0.8	205	0.40	4.0	–	–	–	190	0.40	4.0	–	–	–	–	–	–	–	–	–
CNMG 120412-UR	**T9020**	1.2	210	0.45	4.0	–	–	–	195	0.45	4.0	–	–	–	–	–	–	–	–	–
CNMG 160608-UR	**T9020**	0.8	200	0.40	6.0	–	–	–	190	0.40	6.0	–	–	–	–	–	–	–	–	–
CNMG 160612-UR	**T9020**	1.2	200	0.45	6.0	–	–	–	190	0.45	6.0	–	–	–	–	–	–	–	–	–
CNMG 190608-UR	**T9020**	0.8	195	0.40	7.5	–	–	–	185	0.40	7.5	–	–	–	–	–	–	–	–	–
CNMG 190612-UR	**T9020**	1.2	195	0.45	7.5	–	–	–	185	0.45	7.5	–	–	–	–	–	–	–	–	–
CNMG 190616-UR	**T9020**	1.6	195	0.50	7.5	–	–	–	185	0.50	7.5	–	–	–	–	–	–	–	–	–

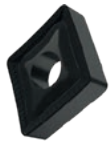
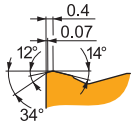
CNMM

PRAMET

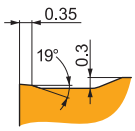
	IC (mm)	D1 (mm)	L (mm)	S (mm)
1906	19.050	7.94	19.30	6.35



Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE	P			M			K			N			S			H		
			vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)
																				
UH geometry for rough to heavy-rough machining, and continuous to interrupted cuts.																				
CNMM 190624-UH	**T9020**	2.4	155	0.65	10.0	–	–	–	145	0.65	10.0	–	–	–	–	–	–	–	–	–

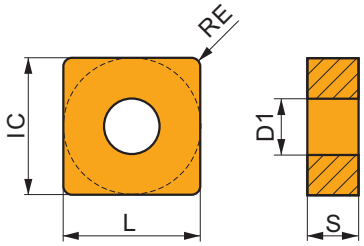
Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE (mm)	P vc (m/min)	P f (mm/rev)	P ap (mm)	M vc (m/min)	M f (mm/rev)	M ap (mm)	K vc (m/min)	K f (mm/rev)	K ap (mm)	N vc (m/min)	N f (mm/rev)	N ap (mm)	S vc (m/min)	S f (mm/rev)	S ap (mm)	H vc (m/min)	H f (mm/rev)	H ap (mm)
																				
			UR geometry for semi-rough to rough machining, and continuous to interrupted cuts.																	
DNMG 150612-UR	T9020	1.2	■ 180	0.40	3.0	–	–	–	◪ 170	0.40	3.0	–	–	–	–	–	–	–	–	–

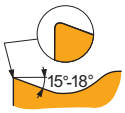
SNMG

PRAMET

	IC (mm)	D1 (mm)	L (mm)	S (mm)
1204	12.700	5.16	12.70	4.76



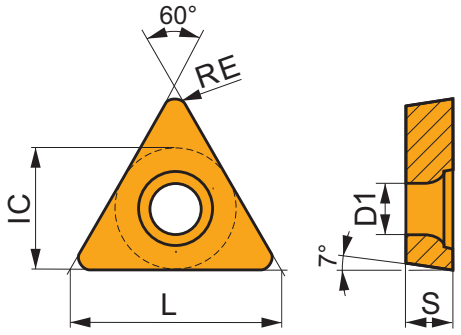
Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE (mm)	P vc (m/min)	P f (mm/rev)	P ap (mm)	M vc (m/min)	M f (mm/rev)	M ap (mm)	K vc (m/min)	K f (mm/rev)	K ap (mm)	N vc (m/min)	N f (mm/rev)	N ap (mm)	S vc (m/min)	S f (mm/rev)	S ap (mm)	H vc (m/min)	H f (mm/rev)	H ap (mm)
																				
			ER-SI geometry with positive right-handed design for fine-finish to semi-rough machining, and continuous cuts.																	
SNMG 120408ER-SI	T9020	0.8	■ 270	0.35	1.7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

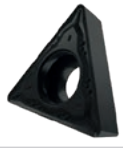
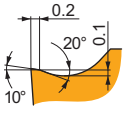
TCMT

PRAMET

	IC (mm)	D1 (mm)	L (mm)	S (mm)
1102	6.350	2.80	11.00	2.38
16T3	9.525	4.40	16.50	3.97



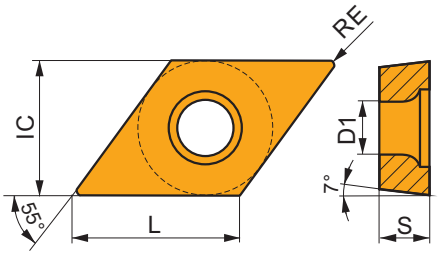
Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE (mm)	P vc (m/min)	P f (mm/rev)	P ap (mm)	M vc (m/min)	M f (mm/rev)	M ap (mm)	K vc (m/min)	K f (mm/rev)	K ap (mm)	N vc (m/min)	N f (mm/rev)	N ap (mm)	S vc (m/min)	S f (mm/rev)	S ap (mm)	H vc (m/min)	H f (mm/rev)	H ap (mm)
																				
			UF geometry for finish to semi-rough machining, and continuous to slightly interrupted cuts.																	
TCMT 110204-UF	T9020	0.4	■ 250	0.12	0.8	–	–	–	◪ 235	0.12	0.8	–	–	–	–	–	–	–	–	–
TCMT 16T308-UF	T9020	0.8	■ 235	0.17	1.7	–	–	–	◪ 220	0.17	1.7	–	–	–	–	–	–	–	–	–

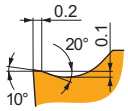
DCMT

PRAMET

	IC	D1	L	S
	(mm)	(mm)	(mm)	(mm)
11T3	9.525	4.40	11.60	3.97



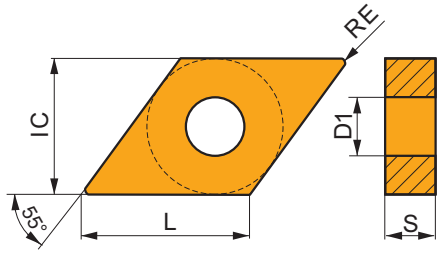
Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE	P			M			K			N			S			H		
			vc	f	ap	vc	f	ap	vc	f	ap	vc	f	ap	vc	f	ap	vc	f	ap
		(mm)	(m/min)	(mm/rev)	(mm)	(m/min)	(mm/rev)	(mm)	(m/min)	(mm/rev)	(mm)	(m/min)	(mm/rev)	(mm)	(m/min)	(mm/rev)	(mm)	(m/min)	(mm/rev)	(mm)
																				
			1		E															
			UF geometry for finish to semi-rough machining, and continuous to slightly interrupted cuts.																	
DCMT 11T308-UF	T9020	0.8	240	0.17	0.8	–	–	–	225	0.17	0.8	–	–	–	–	–	–	–	–	–

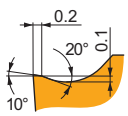
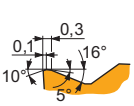
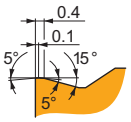
DNMG

PRAMET

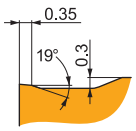
	IC	D1	L	S
	(mm)	(mm)	(mm)	(mm)
1506	12.700	5.16	15.50	6.35



Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE	P			M			K			N			S			H		
			vc	f	ap	vc	f	ap	vc	f	ap	vc	f	ap	vc	f	ap	vc	f	ap
		(mm)	(m/min)	(mm/rev)	(mm)	(m/min)	(mm/rev)	(mm)	(m/min)	(mm/rev)	(mm)	(m/min)	(mm/rev)	(mm)	(m/min)	(mm/rev)	(mm)	(m/min)	(mm/rev)	(mm)
																				
			1		S															
			UF geometry with positive design for finish to semi-rough machining, and continuous to slightly interrupted cuts.																	
DNMG 150604-UF	T9020	0.4	195	0.20	1.7	–	–	–	185	0.20	1.7	–	–	–	–	–	–	–	–	–
DNMG 150608-UF	T9020	0.8	230	0.20	1.7	–	–	–	215	0.20	1.7	–	–	–	–	–	–	–	–	–
																				
					P															
			UM geometry for finish to semi-rough machining and continuous to interrupted cuts.																	
DNMG 150608-UM	T9020	0.8	175	0.30	1.9	–	–	–	165	0.30	1.9	–	–	–	–	–	–	–	–	–
DNMG 150612-UM	T9020	1.2	165	0.40	1.9	–	–	–	155	0.40	1.9	–	–	–	–	–	–	–	–	–
																				
					P															
			RP geometry for semi-rough to rough machining, and continuous to interrupted cuts.																	
DNMG 150612-RP	T9020	1.2	160	0.40	3.0	–	–	–	150	0.40	3.0	–	–	–	–	–	–	–	–	–

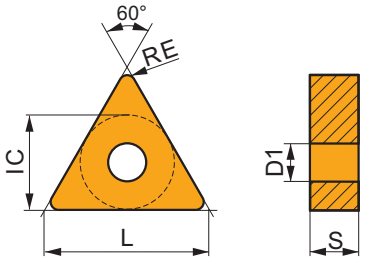
Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE	P			M			K			N			S			H		
			vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)
																				
			UR geometry for semi-rough to rough machining, and continuous to interrupted cuts.																	
TCMT 16T308-UR	T9020	0.8	■ 200	0.27	1.9	–	–	–	◪ 190	0.27	1.9	–	–	–	–	–	–	–	–	–

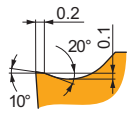
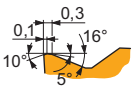
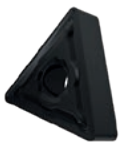
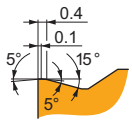
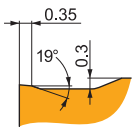
TNMG

PRAMET

	IC	D1	L	S
	(mm)	(mm)	(mm)	(mm)
1604	9.525	3.81	16.50	4.76



Suitability and starting values for cutting speed (vc), feed (f) and depth of cut (ap). Refer to our Machining Calculator app for further calculations.

Product		RE	P			M			K			N			S			H		
			vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)	vc (m/min)	f (mm/rev)	ap (mm)
																				
			UF geometry with positive design for finish to semi-rough machining, and continuous to slightly interrupted cuts.																	
TNMG 160404-UF	T9020	0.4	■ 205	0.20	1.7	–	–	–	◪ 190	0.20	1.7	–	–	–	–	–	–	–	–	–
TNMG 160408-UF	T9020	0.8	■ 245	0.20	1.7	–	–	–	◪ 230	0.20	1.7	–	–	–	–	–	–	–	–	–
																				
			UM geometry for finish to semi-rough machining and continuous to interrupted cuts.																	
TNMG 160404-UM	T9020	0.4	■ 190	0.20	1.6	–	–	–	◪ 180	0.20	1.6	–	–	–	–	–	–	–	–	–
TNMG 160408-UM	T9020	0.8	■ 190	0.30	1.6	–	–	–	◪ 180	0.30	1.6	–	–	–	–	–	–	–	–	–
																				
			RP geometry for semi-rough to rough machining, and continuous to interrupted cuts.																	
TNMG 160408-RP	T9020	0.8	■ 160	0.40	3.0	–	–	–	◪ 150	0.40	3.0	–	–	–	–	–	–	–	–	–
TNMG 160412-RP	T9020	1.2	■ 170	0.40	3.0	–	–	–	◪ 160	0.40	3.0	–	–	–	–	–	–	–	–	–
																				
			UR geometry for semi-rough to rough machining, and continuous to interrupted cuts.																	
TNMG 160408-UR	T9020	0.8	■ 185	0.40	3.0	–	–	–	◪ 175	0.40	3.0	–	–	–	–	–	–	–	–	–
TNMG 160412-UR	T9020	1.2	■ 195	0.40	3.0	–	–	–	◪ 185	0.40	3.0	–	–	–	–	–	–	–	–	–