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LAMINA TECHNOLOGIES

IMAGINE...
Your cutting tools stock reduction

IMAGINE...
Having the right tool at the right time all the time

IMAGINE...
Your savings of production costs

The Lamina Multi-Mat™ Concept

Steel	Stainless Steel	Cast Iron	High Temp Alloys	Aluminium & Non-Ferrous Alloys

Focused range of Multi Material inserts

Each insert performs on all materials as good as, or better than the dedicated insert of the competition

Top Swiss quality

ALL YOU NEED IS ONE GRADE...
THE LAMINA GRADE

The Lamina Multi-Mat® Concept in more applications

New Inserts + More Geometries



MILLING Our top quality Milling inserts from Lamina Multi-Mat® LT-30 Grade and tight tolerance Milling bodies.



TURNING Our top quality Turning inserts from Lamina Multi-Mat® LT-10 grade.



PARTING Our revolutionary Parting line is available for ordering.



ALUMINIUM Our Aluminium line for Milling and Turning applications with LT-05 Grade.



DRILLING Our Drilling line of inserts with Lamina Multi-Mat® LT-30 Grade.

MULTI-MAT™, LAMINA ALTERNATIVE
TODAY, TOMORROW, ALWAYS !

As a new user of the revolutionary Lamina Multi-Mat® (Multi Material) inserts, we would like to present to you a short machining guide to insure your satisfaction from our product.
The cutting data specified in this guide should be considered as a good starting point. Each insert is able to perform in a wider range of cutting conditions.
For complete cutting data please see our catalog or our online catalog at our web site www.lamina-tech.ch

Milling

1. Select the material group to be machined. In case of doubt, refer to material reference pages in the catalog.
2. Check machining recommendations with or without coolant.
3. Select feed as a function of the tool lead angle.
4. The cutting speed is indicated in the right-hand column.

Turning

1. Select the material group to be machined. In case of doubt, consult material reference pages in the catalog.
2. Select the insert nose radius.
3. Select cutting depth and feed according to radius.
4. The cutting speed is indicated in the right-hand column.

Turning tips

- The cutting conditions are Lamina Technologies guidelines for optimal machining, however our inserts can work in a wider range of cutting conditions to meet special machining needs.
- If working according to our recommended cutting conditions A-max should be respected.
- For Stainless Steel, work over the minimum speed, as machining Stainless Steel at low speeds causes material sticking.
- Coolant recommendations:

Use coolant with materials from groups 6, 7, 8, 9, 10, 11, 12.

Do not use coolant with materials from groups 1, 2, 4. Use coolant with materials from groups 3, 5 - depending on the application.

- Always verify that the tool holder and shim are in good condition (not damaged).
- If cutting chips are too long, we recommend increasing feed rate.
- If cutting chips are not controlled (vary in shape and size), we recommend increasing feed rate and reducing depth of cut.
- For internal boring operation, the tool holder should be as short as possible and shank as wide as possible.
- In any case of vibrations, we recommend reducing cutting speed, and increasing feed rate.
- In strong interrupted cut, feed rate should be reduced.

Basic cutting conditions for first time user - Milling

Material Group	Group No	Material Examples	hardness HB	Coolant	feed per tooth 45°	feed per tooth 90°	Initial Vc(m/min)
Low Carbon Steel	1	XC 12 S 250 Pb	150	No	0.30	0.22	300
			180				270
			210				230
Alloy Steel	2	42 CrMo 4 100 Cr 6 32 NiCrMo 14.5	180	No	0.25	0.18	230
			230				190
			280				170
			320				150
High Alloy Steel	3	X38 CrMoV 5 X210 CrW 12 X90 CrMoV 8	220	Yes Yes no	0.22	0.15	150
			280				110
			320				100
			350				70
Austenitic Stainless Steel	4	303 / 304 304 L	Annealed	No	0.27	0.18	230
	5	316 / 316 L	Annealed	Yes / No	0.25	0.15	210
	6	316 Ti 630 (F16PH)	Annealed	Yes	0.23	0.12	90
Ferritic Stainless Steel	7	430 / 439 / 444	Annealed	No	0.25	0.15	210
Martensitic Stainless Steel	8	410 / 420	Annealed	No	0.25	0.15	210
			Treated				130
Grey Cast Iron	9	EN-GJL 200	140 to 250	Yes	0.30	0.18	250
		EN-GJL 250					230
		EN-GJL 300					190
Nodular Cast Iron	10	EN-GJL 400	210	Yes	0.25	0.15	190
		EN-GJL 600	260				150
		EN-GJL 800	310				130
Nickel Based Alloys	11	Inconel 625	--------	Yes	0.23	0.15	32
		Inconel 718					32
		Hastelloy C					55
Titanium Based Alloys	12	TiAl 6 V4	--------	Yes	0.23	0.15	48
		T40					38
Aluminium	13	Si < 4%	----	Yes	0.25	0.15	800
		4% < Si < 8%	----		0.18	0.12	450
			For Alu group 13, please use our Alu line grade LT-05				
Aluminium	14	Si > 8%	----	Yes	0.25	0.15	250
			For Alu group 14, please use inserts grade LT-10				

Milling tips

- The cutting conditions are Lamina Technologies guidelines for optimal machining, however our inserts can work in a wider range of cutting conditions to meet special machining needs.
- It is always recommended to machine in ' Climb Milling' way.
- For Stainless Steel, work over the minimum speed, as machining Stainless Steel at low speeds causes material sticking.
- Coolant recommendations:
  Use coolant with materials from groups 11, 12.
  Do not use coolant with materials from groups 1, 2, 3, 4, 7, 9, 10. Use coolant with materials from groups 5, 6, 8 -depending on the application.
- Do not use coolant if it is not efficient enough.
- In any case of vibrations, we recommend reducing cutting speed and/ or Depth Of Cut, and increasing feed rate. Also always the Cutter's shank should be as short as possible and as wide as possible.
- Always check clamping stability.
- If chips are turning with the cutter, increase cutting speed, feed rate or both.
- If the work piece warms up, increase feed rate.
- Always verify that the tool holder is in good condition (not damaged).

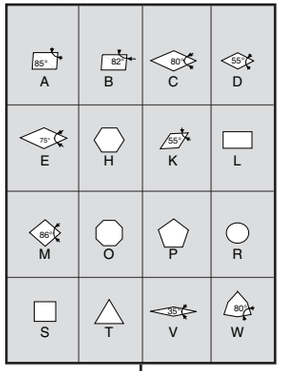
- The above values are indicated as functions of the cutting edge angle, i.e. kappa 45° or 90°. The high feed relates to cutting inserts for surfacing, attack angles 45° and 75°. The low feed relates to cutting inserts for surfacing, trimming angle 90°. The above-mentioned cutting conditions are indicated for each material group and the respective hardness.

Basic cutting conditions for first time user - Turning

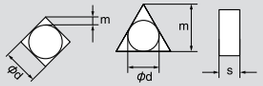
Material Group	Group No	Material Examples	hardness HB	Nose radius 04 (04) d.o.c	Nose radius 04 (04) f	Nose radius 08 (08) d.o.c	Nose radius 08 (08) f	Nose radius 12 (12) d.o.c	Nose radius 12 (12) f	Initial Vc(m/min)
Low Carbon Steel	1	XC 12 S 250 Pb	150	0.50 to 1.50	0.10 to 0.15	1.00 to 3.00	0.22 to 0.28	1.50 to 5.0	0.35 to 0.50	350
			180							280
			210							250
Alloy Steel	2	42 CrMo 4 100 Cr 6 32 NiCrMo 14.5	180	0.50 to 1.50	0.10 to 0.12	1.00 to 3.00	0.22 to 0.28	1.50 to 4.0	0.32 to 0.45	270
			230							230
			280							190
			320							170
High Alloy Steel	3	X38 CrMoV 5 X210 CrW 12 X90 CrMoV 8	220	0.50 to 1.50	0.10	1.00 to 3.00	0.20 to 0.25	1.50 to 3.0	0.30 to 0.42	170
			280							130
			320							110
			350							90
Austenitic Stainless Steel	4	303 / 304 304 L	Annealed	0.50 to 1.50	0.12 to 0.15	1.00 to 3.00	0.18 to 0.32	1.50 to 5.0	0.35 to 0.52	230
	5	316 / 316 L	Annealed	0.50 to 1.50	0.10 to 0.12	1.00 to 3.00	0.18 to 0.25	1.50 to 4.0	0.32 to 0.48	190
	6	316 Ti 630 (F16PH)	Annealed	0.50 to 1.20	0.11	1.00 to 2.50	0.18 to 0.23	1.50 to 3.0	0.30 to 0.45	110
Ferritic Stainless Steel	7	430 / 439 / 444	Annealed	0.50 to 1.50	0.12 to 0.15	1.00 to 3.00	0.22 to 0.28	1.50 to 4.0	0.32 to 0.48	190
Martensitic Stainless Steel	8	410 / 420	Annealed	0.50 to 1.50	0.12 to 0.15	1.00 to 3.00	0.22 to 0.28	1.50 to 4.0	0.32 to 0.48	190
			Treated							150
Grey Cast Iron	9	EN-GJL 200	140 to 250	0.20 to 1.50	0.08 to 0.15	1.00 to 4.00	0.18 to 0.35	1.00 to 5.00	0.32 to 0.60	270
		EN-GJL 250								230
		EN-GJL 300								210
Nodular Cast Iron	10	EN-GJL 400	210	0.20 to 1.50	0.10 to 0.12	1.00 to 3.00	0.18 to 0.30	1.00 to 5.00	0.30 to 0.50	210
		EN-GJL 600	260							170
		EN-GJL 800	310							150
Nickel Based Alloys	11	Inconel 625	--------	0.20 to 1.20	0.10 to 0.12	1.00 to 3.00	0.18 to 0.28	1.00 to 3.00	0.30 to 0.42	35
		Inconel 718								38
		Hastelloy C								65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20 to 1.20	0.10 to 0.14	1.00 to 3.00	0.18 to 0.32	1.00 to 4.00	0.32 to 0.45	55
		T40								42
Aluminium	13	Si < 4%	----	0.20 to 5.00	0.12 to 0.25	0.20 to 5.00	0.15 to 0.50			800
		4% < Si < 8%	----							450
			For Alu group 13, please use our Alu line grade LT-05							
Aluminium	14	Si > 8%	----	0.50-5.00	0.12-0.20	0.50-5.00	0.15-0.40	0.50-5.00	0.20-0.60	250
			For Alu group 14, please use inserts grade LT-10							

ISO / ASA insert designation

1 Shape



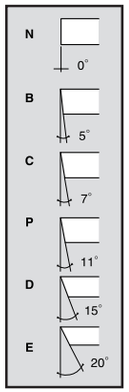
3 Tolerance Class



Symbol	d(mm)		m(mm)		s(mm)	
	D	M	S		D	M	S
A	± 0.025	± 0.005	± 0.025	J	± 0.05 a ± 0.15	± 0.005	± 0.025
C	± 0.025	± 0.013	± 0.025	K	± 0.05 a ± 0.15	± 0.013	± 0.025
E	± 0.025	± 0.025	± 0.025	L	± 0.05 a ± 0.15	± 0.025	± 0.025
F	± 0.013	± 0.005	± 0.025	M	± 0.05 a ± 0.15	± 0.08 a ± 0.20	± 0.13
G	± 0.025	± 0.025	± 0.013	N	± 0.05 a ± 0.15	± 0.08 a ± 0.20	± 0.025
H	± 0.013	± 0.013	± 0.025	U	± 0.08 a ± 0.25	± 0.13 a ± 0.38	± 0.13

METRIC	S	E	K	T
	1	2	3	4
INCH	S	E	K	T

2 Clearances



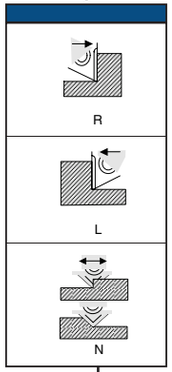
4 Type

Type	Symbol	Type	Symbol
	N (E)	70°–90°	H
	F		
	R	70°–90°	B
	A	40°–60°	T
	G		
	M	40°–60°	W
Special design	X		

5 Cutting Edge Length

Inscribed Circle (inch)	Inch	Metric C	D	R	S	T	V	W
1/4"	2	06	07	06		11	11	04
3/8"	3	09	11	09		16	16	06
1/2"	4	12	15	12		22	22	08
5/8"	5	16	19	15		27	27	10
3/4"	6	19	23	19		33	33	13
1"	8	25	31	25		44	44	17

9 Cutting direction



	12	04	AF	T	N
	5	6	7	8	9
	4	3	AF	T	N

6 Thickness

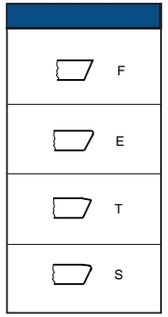
Thickness S(inch)	Inch	Metric
3/32"	1.5	02
1/8"	2	03
5/32"	2.5	T3
3/16"	3	04
1/4"	4	06
5/16"	5	07
3/8"	6	09
1/2"	8	12

7 Nose Radius / Corner configuration



Corner Radius	Inch	Metric		A	F	
1/64"	1	04	45°	A	A	3°
1/32"	2	08	60°	D	B	5°
3/64"	3	12	75°	E	C	7°
			85°	F	D	15°
1/16"	4	16	90°	P	E	20°
			Other angle	Z	F	25°
5/64"	5	20			G	30°
					N	0°
3/32"	6	24			P	11°
					Z	Other angle
1/8"	8	32				

8 Edge preparation



LAMINA TECHNOLOGIES

LAMINA TECHNOLOGIES

In order to assist you, our customer, to obtain the best productivity using our cutting tools, we enclose some relevant comments and tips. Each comment is symbolized by an icon and the relevant icons appear for each insert.

We hope that you find these comments and tips helpful.



In machining Stainless Steel, please verify and respect the cutting speed recommended for the insert, as there is a tendency to machine at speeds that are too low.



In machining Stainless Steel or Exotic materials, P geometry inserts (CNMP, TNMP, WNMP), are recommended as first choice.



In machining Exotic materials, it is important to verify cutting conditions of the specific insert.



P geometry inserts (CNMP, TNMP, WNMP) are not recommended when machining with interrupted cut.



It is important to verify and respect Amax (see column 9 in the cutting data tables), which is the maximum chip section .
Feed x d.o.c must be lower than the number noted as Amax.



Wiper inserts will give better surface quality at higher feeds, only when used on a stable machine with rigid clamping (no vibrations).



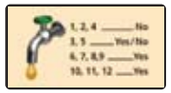
To increase machining productivity, it is recommended to increase speed (Vc) while respecting chip size calculation (Amax).



Appropriate for boring operation.



To increase productivity it is recommended to increase feed (f) and respect cutting speed.



When machining materials from groups 1, 2, 4 it is recommended not to use coolant. When machining material from groups 3, 5 – using coolant or not, depends on the application. When machining material from groups 6, 7, 8, 9, 10, 11, 12 it is recommended to use coolant.

LAMINA TECHNOLOGIES

TURNING

Cutting speed m/min	$Vc = \frac{Dm \times \pi \times n}{1000}$
Rotation Rev/min	$n = \frac{Vc \times 1000}{Dm \times \pi}$
Chip Removal Rate cm^3/min	$Q = Vc \times ap \times f$
Cutting time in min	$Tc = \frac{lm}{f \times n}$
Surface roughness µm	$Rmax = \frac{f^2 \times n}{r_\varepsilon} \times 125$

MILLING

Cutting speed m/min	$Vc = \frac{n \times \pi \times D}{1000}$
Rotation Rev/min	$n = \frac{Vc \times 1000}{\pi \times D}$
Table feed mm/min	$Vf = n \times z \times fz$
Cutting output cm^3/ min	$Q = \frac{ae \times ap \times Vf}{1000}$
Feed per rotation	$f = Z \times fz$ $f = K \times fz$

Symbol	Designation	Unit	Symbol	Designation	Unit
D_m	Machining diameter	mm	V_c	Cutting speed	m/min
f	Feed	mm	a_p	Depth of cut	mm
l_m	Machining length	mm	a_e	Radial depth of cut	mm
n	Rotation	rev/min	D	Cutter diameter	mm
Q	Chip Removal Rate	cm^3/min	f_z	Feed per tooth	mm/tooth
A_{max}	d.o.c x feed	mm^2	K	Actual number of teeth for calculation feed rate of feed per revolution.	
r_ε	Nose radius	mm	V_f	Feed rate	mm/min
T_c	Cutting time	min	Z	Number of teeth	No.

LAMINA TECHNOLOGIES

Frequently Asked Questions

Is it true that Lamina inserts can be used with any type of working material?
Lamina inserts have been tested in countless applications around the world, and are suitable for practically any type of Turning or Milling metal cutting operation. It is noteworthy that, while Lamina inserts will work in Aluminum production jobs in Aluminum frequently require tailored designed chip-control optimization. Please refer to Lamina Alu-Line.

What speeds and feeds should Lamina inserts be run at?
In this catalog, specific recommendations are provided for each individual insert, indicating the speeds and feeds that are required for most of the material groups. In order to achieve the maximum advantage from Lamina's grade technology it is important to always run the inserts according to the recommended conditions. In general, the best results are normally achieved at the high range of the recommended cutting speeds.

What can we expect regarding the quality and consistency of Lamina inserts?
Due to Lamina's unique production methods and Quality Control procedures, you can expect inserts with much higher accuracy and consistency than you have been accustomed up to now: insert to insert, box to box and batch to batch. This advantage improves the unattended operation of your machines.

What percentage of my tooling requirements can Lamina supply?
In most regular shops Lamina's insert program should cover about 80% of all inserts needed for CNC machines from 20 Hp and down. The insert program covers a full range of standard turning and milling operations from Semi-Roughing to Super-Finishing.

Will the performance of Lamina grades be better than the specialized and dedicated grades available from the market?
Lamina has extensive know-how in sub-micron powder technology as well as in state of the art PVD coating. This know –how combined with unique chip breaker geometry and the into depth application understanding, enabled Lamina to offer the Multi - Mat Concept; a simple concept of using one insert to work on many materials. The same insert can be used on the next job and the job after and so on, replacing the hundreds of specialized and confusing insert choices that are being used.

In machine shops that run Lamina inserts, what do they find as the biggest benefits?
• Time saving- ability to always have the right insert available for any job. This reduces the number of setups and idle time.
• Cost saving- 80% reduction in insert inventory, ordering and stocking cost.

Are Lamina inserts coated the same as other PVD inserts?
Lamina's state of the art PVD coating has significant differences compared to other suppliers. Our coating process produces thicker and stronger coating – with better adhesion, higher performance and longer tool life.

What about turning tool holders and boring bars?
Lamina's ANSI / ISO standard turning inserts are designed to fit all industrial standard turning tools and boring bars, using the tool holders you have in your stock.

In turning, when should I use the _NMP style inserts rather than the _NMG style inserts?
Most customers find that High-Positive _NMP style inserts (CNMP, TNMP and WNMP) deliver the best results in sticky materials, such as 316 Stainless Steel, Inconel, and Titanium (high heat and corrosion resistant properties). This is achieved by our unique combination of our grades and geometry.

How does the 4 corners Alu-line perform in Low Silicon Aluminum?
Our Alu-line insert's geometry is specially designed for Aluminum with low Silicon content, creating chips that break instead of curl. The inserts are also coated and treated to reduce friction achieving unbeatable performance and tool life.

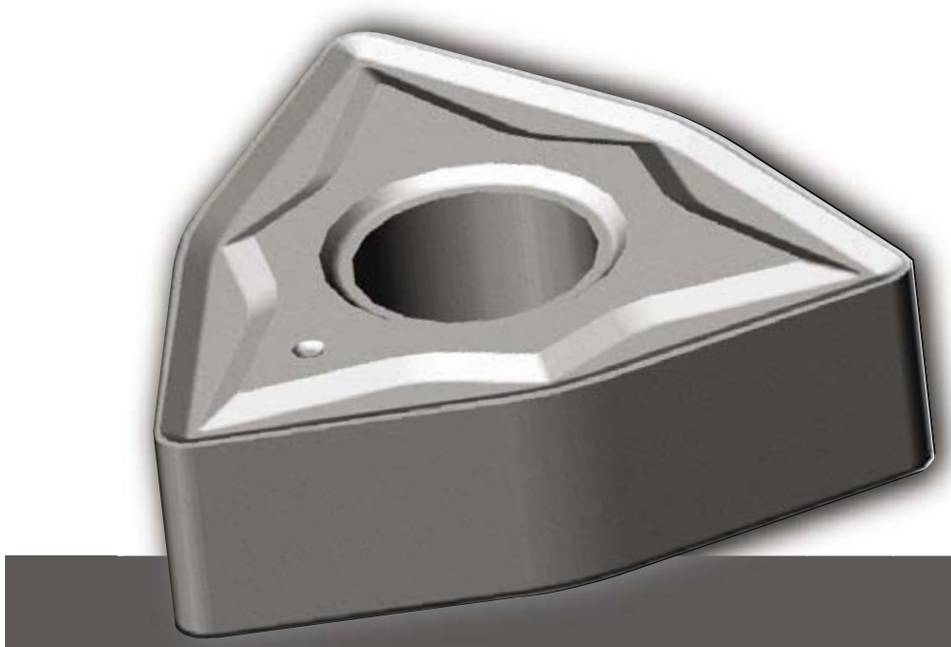
What is special about your Solid-Mill line?
Our know-how of inserts making was applied to our Solid Mills line. Our mills generate less friction and heat and therefore give better cut and longer tool life.

When should I use Star line?
Star line inserts are a good cost for positive turning inserts. Our Star Line inserts offer 3 cutting corners for the VBMT, CCMT, DCMT, and TCMT shapes instead of 2. Moreover, all the inserts can be mounted on the same tool holder.

Turning

LT - 10 Multi-Mat® Turning
LT - 05 Aluminium

MULTI-MAT® TURNING INSERTS

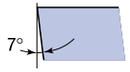




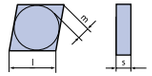
C C M T



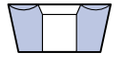
Shape
80° Diamond



Clearance Angle
7° Positive rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Screw Down Clamping
Single Sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
CCMT 060204 NN	LT 10	6	2,38	0,4	T0000055	13
CCMT 09T304 NN	LT 10	9	3,97	0,4	T0000056	14
CCMT 09T308 NN	LT 10	9	3,97	0,8	T0000117	15
CCMT 09T308 WM	LT 10	9	3,97	0,8	T0000057	16
CCMT 120404 NN	LT 10	12	4,76	0,4	T0001456	17
CCMT 120408 NN	LT 10	12	4,76	0,8	T0001457	18
CCMT 120412 NN	LT 10	12	4,76	1,2	T0001776	19

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CCMT 060204 NN					
CCMT 09T304 NN					
CCMT 09T308 NN					
CCMT 09T308 WM					
CCMT 120404 NN					
CCMT 120408 NN					
CCMT 120412 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent







80° Diamond shape inserts, with positive chip breaker geometry. Very popular and useful for Boring even of small diameters, Facing and external turning operations. Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.10	2.0	0.08	0.20	0.36	180	350	1.0	0.18
			180		2.0		0.18	0.29		280		
			210		2.0		0.16	0.29		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.10	2.0	0.08	0.18	0.29	120	280	1.0	0.15
			230		2.0		0.18	0.24		250		
			280		1.5	0.09	0.16	0.24		210		
			320		1.5		0.14	0.19		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.10	2.0	0.08	0.16	0.24	70	190	1.0	0.12
			280		1.5		0.14	0.24		150		
			320		1.5		0.13	0.17		130		
			350		1.5		0.13	0.14		100		
			400	0.10	1.3	0.05	0.11	0.12	50	90	0.9	0.10
			480		1.2		0.09	0.10	40	80	0.7	0.08
			550		1.0		0.08	0.08	30	70	0.6	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.10	2.0	0.08	0.16	0.22	170	270	1.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		1.8	0.08	0.14	0.17	160	210	1.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		1.5	0.08	0.13	0.14	70	150	1.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.10	2.0	0.08	0.16	0.20	170	250	1.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.10	2.0	0.08	0.16	0.20	170	250	1.0	0.15
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.10	2.0	0.06	0.18	0.38	170	250	1.0	0.18
		GG 25						0.36		230		
		GG 30						0.36		210		
Nodular Cast Iron	10	GGG 40	210	0.10	2.0	0.06	0.16	0.29	120	230	1.0	0.15
		GGG 50	260					0.24		190		
		GGG 70	310					0.24		150		
		G-X260NiCr42	450	0.10	1.0	0.06	0.10	0.08	30	70	0.6	0.07
Nickel Based Alloys	11	Inconel 625	--------	0.10	1.5	0.08	0.14	0.14	25	35	1.0	0.12
		Inconel 718						0.14	28	40		
		Hastelloy C						0.17	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.10	1.5	0.08	0.14	0.17	35	60	1.0	0.14
		T40					0.13	0.14	28	40	1.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CCMT 060204 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

LAMINA TECHNOLOGIES

CCMT 09T304 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CCMT 09T304 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

CCMT 09T308 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CCMT 09T308 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

CCMT 09T308 WM

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CCMT 09T304 WM	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

CCMT 120404 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CCMT 120404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

CCMT 120408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/rev]		A max [mm²]	V_C [m/min]		Optimal cutting conditions	
				min	max	min	max		min	max	d.o.c	feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CCMT 120408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

CCMT 120412 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/rev]		A max [mm²]	V_C [m/min]		Optimal cutting conditions	
				min	max	min	max		min	max	d.o.c	feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

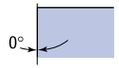
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CCMT 120412 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



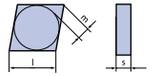
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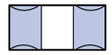
Shape
80° Diamond



Clearance Angle
0° No rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Cylindrical hole,
No Chip breaker.

Insert designation	Grade	l	s	r	Catalog Nr.	Page
CNMA 120416 NN	LT 10	12	4,76	1,6	T0000612	21

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMA 120416 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

80° Diamond shape flat insert. Strong edge preparation mainly for Gray Cast Iron machining. For general purpose Turning, Facing and Boring operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent

Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

CNMA

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150 / 180 / 210	CNMA inserts are not recommended for Low Carbon Steel								
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180 / 230 / 280 / 320	CNMA inserts are not recommended for Alloy Steel								
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220 / 280 / 320 / 350 / 400 / 480 / 550	CNMA inserts are not recommended for High Alloy Steel								
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	CNMA inserts are not recommended for Austenitic Stainless Steel								
	5	X2 CrNiMo 17 2 2 316	230 to 270									
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------									
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	CNMA inserts are not recommended for Ferritic Stainless Steel								
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed / Treated	CNMA inserts are not recommended for Martensitic Stainless Steel								
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.20	0.90	3.0	170	250	4.0	0.60
		GG 25						2.7		230		
		GG 30						2.7		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.20	0.70	2.3	120	230	4.0	0.50
		GGG 50	260					2.0		190		
		GGG 70	310					1.8		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.25	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	CNMA inserts are not recommended for Exotic materials								
		Inconel 718										
		Hastelloy C										
Titanium Based Alloys	12	TiAl 6 V4	--------	CNMA inserts are not recommended for Exotic materials								
		T40										

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMA 120416 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

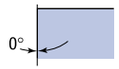
LAMINA TECHNOLOGIES



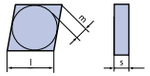
C N M G



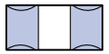
Shape
80° Diamond



Clearance Angle
0° No rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
CNMG 120404 NN	LT 10	12	4,76	0,4	T0000491	23
CNMG 120408 NN	LT 10	12	4,76	0,8	T0000059	24
CNMG 120408 NR	LT 10	12	4,76	0,8	T0001436	25
CNMG 120408 NP	LT 10	12	4,76	0,8	T0001966	26
CNMG 120408 WM	LT 10	12	4,76	0,8	T0000060	27
CNMG 120412 NN	LT 10	12	4,76	1,2	T0000061	28

NN All Purpose Chipbreaker WM Wiper Medium chip breaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMG 120404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
CNMG 120408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
CNMG 120408 NR	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
CNMG 120408 NP	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
CNMG 120408 WM	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
CNMG 120412 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

The most popular general purpose Turning inserts. Use for Turning, Facing and Boring operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent





Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

CNMG

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_c [m/min] min	V_c [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMG 120404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

LAMINA TECHNOLOGIES

CNMG 120408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMG 120408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

CNMG 120408 NR

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.27	0.68	2.3	180	330	4.0	0.50
			180		5.0		0.68	2.3		280		
			210		5.0		0.60	2.0		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.27	0.60	2.0	120	280	4.0	0.45
			230		5.0		0.60	1.5		250		
			280		5.0	0.23	0.53	1.5		210		
			320		4.0		0.53	1.3		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.23	0.60	1.5	70	190	4.0	0.40
			280		5.0		0.60	1.5		150		
			320		4.0		0.53	1.2		130		
			350		4.0		0.53	1.2		100		
			400	0.50	3.5	0.14	0.45	0.9	50	90	3.4	0.36
			480		3.0		0.35	0.7	40	80	2.9	0.30
			550		2.5		0.28	0.5	30	70	2.5	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.26	0.52	1.3	170	270	4.0	0.40
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.46	1.1	160	210	4.0	0.36
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.23	0.46	0.8	70	150	4.0	0.32
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.29	0.46	1.1	170	250	4.0	0.35
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.29	0.46	1.1	170	250	4.0	0.35
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.20	0.90	2.3	170	250	4.0	0.60
		GG 25						2.0		230		
		GG 30						2.0		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.20	0.70	1.7	120	230	4.0	0.50
		GGG 50	260					1.5		190		
		GGG 70	310					1.4		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.2	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.26	0.46	1.1	25	35	3.0	0.38
		Inconel 718						1.1	28	40		
		Hastelloy C						1.2	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.23	0.46	1.2	35	60	3.0	0.38
		T40					0.39	0.9	28	40	3.0	0.32

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMG 120408 NR	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

CNMG 120408 NP

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.27	0.68	2.3	180	330	4.0	0.50
			180		5.0		0.68	2.3		280		
			210		5.0		0.60	2.0		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.27	0.60	2.0	120	280	4.0	0.45
			230		5.0		0.60	1.5		250		
			280		5.0	0.23	0.53	1.5		210		
			320		4.0		0.53	1.3		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.23	0.60	1.5	70	190	4.0	0.40
			280		5.0		0.60	1.5		150		
			320		4.0		0.53	1.2		130		
			350		4.0		0.53	1.2		100		
			400	0.50	3.5	0.14	0.45	0.9	50	90	3.4	0.36
			480		3.0		0.35	0.7	40	80	2.9	0.30
			550		2.5		0.28	0.5	30	70	2.5	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.26	0.52	1.3	170	270	4.0	0.40
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.46	1.1	160	210	4.0	0.36
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.23	0.46	0.8	70	150	4.0	0.32
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.29	0.46	1.1	170	250	4.0	0.35
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.29	0.46	1.1	170	250	4.0	0.35
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.20	0.90	2.3	170	250	4.0	0.60
		GG 25						2.0		230		
		GG 30						2.0		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.20	0.70	1.7	120	230	4.0	0.50
		GGG 50	260					1.5		190		
		GGG 70	310					1.4		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.2	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.26	0.46	1.1	25	35	3.0	0.38
		Inconel 718						1.1	28	40		
		Hastelloy C						1.2	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.23	0.46	1.2	35	60	3.0	0.38
		T40					0.39	0.9	28	40	3.0	0.32

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMG 120408 NP	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

CNMG 120408 WM

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMG 120408 WM	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

CNMG 120412 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.27	0.68	3.1	180	330	4.0	0.50
			180		5.0		0.68	3.1		280		
			210		5.0		0.60	2.6		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.27	0.60	2.6	120	280	4.0	0.45
			230		5.0		0.60	2.0		250		
			280		5.0	0.23	0.53	2.0		210		
			320		4.0		0.53	1.7		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.23	0.60	2.0	70	190	4.0	0.40
			280		5.0		0.60	2.0		150		
			320		4.0		0.53	1.6		130		
			350		4.0		0.53	1.6		100		
			400	0.50	3.5	0.14	0.45	1.2	50	90	3.4	0.36
			480		3.0		0.35	0.9	40	80	2.9	0.30
			550		2.5		0.28	0.6	30	70	2.5	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.26	0.52	1.7	170	270	4.0	0.40
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.46	1.4	160	210	4.0	0.36
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.23	0.46	1.0	70	150	4.0	0.32
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.20	0.90	3.0	170	250	4.0	0.60
		GG 25						2.7		230		
		GG 30						2.7		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.20	0.70	2.3	120	230	4.0	0.50
		GGG 50	260					2.0		190		
		GGG 70	310					1.8		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.3	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.26	0.46	1.4	25	35	3.0	0.38
		Inconel 718						1.4	28	40		
		Hastelloy C						1.6	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.23	0.46	1.6	35	60	3.0	0.38
		T40						1.2	28	40	3.0	0.32

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMG 120412 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

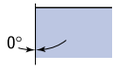


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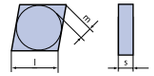
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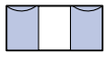
Shape
80° Diamond



Clearance Angle
0° No rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
CNMM 120408 NR	LT 10	12	4,76	0,8	T0000669	30
CNMM 120412 NR	LT 10	12	4,76	1,2	T0000671	31

NR Roughing chip breaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMM 120408 NR					
CNMM 120412 NR					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

80° Diamond shape, single sided inserts. Strong cutting edge for roughing operations which includes interrupted cut, high feeds and high depth of cut.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent





Machining Recommendation Guide - Please see Pg. 8

CNMM 120408 NR

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	1.20	7.0	0.30	0.60	3.0	180	330	5.0	0.45
			180		7.0		0.60	2.6		280		
			210		7.0		0.60	2.4		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	1.00	7.0	0.28	0.52	2.2	120	280	5.0	0.36
			230		7.0		0.40	2.0		250		
			280		7.0	0.25	0.38	1.6		210		
			320		7.0		0.32	1.4		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.80	7.0	0.25	0.42	1.8	70	190	5.0	0.35
			280		7.0		0.34	1.4		150		
			320		5.0		0.30	1.2		130		
			350		5.0		0.28	1.1		100		
			400	0.80	4.0	0.15	0.24	0.9	50	90	3.0	0.21
			480		3.5		0.20	0.8	40	80	2.5	0.18
			550		3.0		0.18	0.6	30	70	2.0	0.16
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	1.00	7.0	0.25	0.42	1.8	170	270	5.0	0.32
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.38	1.6	160	210	5.0	0.28
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.21	0.35	1.4	70	150	5.0	0.25
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	1.00	7.0	0.23	0.42	1.8	170	250	5.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	1.00	7.0	0.23	0.42	1.8	170	250	5.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	1.00	7.0	0.23	0.60	2.8	170	250	5.0	0.40
		GG 25						2.6		230		
		GG 30						2.4		210		
Nodular Cast Iron	10	GGG 40	210	0.80	7.0	0.21	0.50	2.6	120	230	5.0	0.38
		GGG 50	260					2.4		190		
		GGG 70	310					2.2		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.3	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.80	5.0	0.26	0.38	1.2	25	35	3.0	0.32
		Inconel 718						1.2	28	40		
		Hastelloy C						1.4	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.80	5.0	0.23	0.38	1.4	35	60	3.0	0.32
		T40					0.34	1.0	28	40	3.0	0.30

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMM 120408 NR	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

CNMM 120412 NR

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	1.50	7.0	0.35	0.80	3.5	180	330	5.0	0.60
			180		7.0		0.80	3.2		280		
			210		7.0		0.80	2.8		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	1.20	7.0	0.32	0.70	3.0	120	280	5.0	0.42
			230		7.0		0.65	2.6		250		
			280		7.0	0.30	0.55	2.3		210		
			320		7.0		0.50	2.1		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	1.00	7.0	0.28	0.60	2.6	70	190	4.0	0.35
			280		7.0		0.50	2.3		150		
			320		5.0		0.40	2.0		130		
			350		5.0		0.35	1.8		100		
			400	1.00	4.0	0.17	0.32	1.5	50	90	3.5	0.29
			480		3.5		0.30	1.2	40	80	3.0	0.27
			550		3.0		0.25	1.0	30	70	2.5	0.23
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	1.50	7.0	0.28	0.58	2.8	170	270	4.0	0.32
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.25	0.52	2.2	160	210	4.0	0.28
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.25	0.50	1.9	70	150	4.0	0.25
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	1.20	7.0	0.28	0.52	2.8	170	250	4.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	1.20	7.0	0.28	0.52	2.8	170	250	4.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	1.50	7.0	0.28	0.90	3.8	170	250	4.0	0.40
		GG 25						3.5		230		
		GG 30						3.2		210		
Nodular Cast Iron	10	GGG 40	210	1.20	7.0	0.22	0.75	3.5	120	230	4.0	0.38
		GGG 50	260					3.2		190		
		GGG 70	310					3.0		150		
		G-X260NiCr42	450	1.00	2.4	0.12	0.24	0.5	30	50	1.2	0.18
Nickel Based Alloys	11	Inconel 625	--------	1.20	5.0	0.28	0.45	1.4	25	35	3.0	0.32
		Inconel 718						1.6	28	40		
		Hastelloy C						1.6	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	1.20	5.0	0.25	0.45	1.2	35	60	3.0	0.32
		T40					0.40	1.0	28	40	3.0	0.30

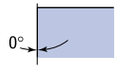
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMM 120412 NR	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



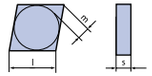
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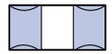
Shape
80° Diamond



Clearance Angle
0° No rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
CNMP 120408 NN	LT 10	12	4,76	0,8	T0000062	33
CNMP 120412 NN	LT 10	12	4,76	1,2	T0000063	34

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMP 120408 NN					
CNMP 120412 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

80° Diamond shape, double sided inserts with positive chip breaker geometry. Generates low cutting forces, suitable for High Temperature Alloys.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent









Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMP 120408 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

LAMINA TECHNOLOGIES

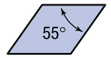
CNMP 120412 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.27	0.68	3.1	180	330	4.0	0.50
			180		5.0		0.68	3.1		280		
			210		5.0		0.60	2.6		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.27	0.60	2.6	120	280	4.0	0.45
			230		5.0		0.60	2.0		250		
			280		5.0	0.23	0.53	2.0		210		
			320		4.0		0.53	1.7		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.23	0.60	2.0	70	190	4.0	0.40
			280		5.0		0.60	2.0		150		
			320		4.0		0.53	1.6		130		
			350		4.0		0.53	1.6		100		
			400	0.50	3.5	0.14	0.45	1.2	50	90	3.4	0.36
			480		3.0		0.35	0.9	40	80	2.9	0.30
			550		2.5		0.28	0.6	30	70	2.5	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.26	0.52	1.7	170	270	4.0	0.40
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.46	1.4	160	210	4.0	0.36
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.23	0.46	1.0	70	150	4.0	0.32
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.20	0.90	3.0	170	250	4.0	0.60
		GG 25						2.7		230		
		GG 30						2.7		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.20	0.70	2.3	120	230	4.0	0.50
		GGG 50	260					2.0		190		
		GGG 70	310					1.8		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.3	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.26	0.46	1.4	25	35	3.0	0.38
		Inconel 718						1.4	28	40		
		Hastelloy C						1.6	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.23	0.46	1.6	35	60	3.0	0.38
		T40					0.39	1.2	28	40	3.0	0.32

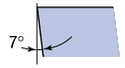
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNMP 120412 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



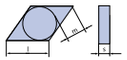
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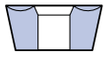
Shape
55° Diamond



Clearance Angle
7° Positive rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Screw down clamping
Single sided

DCMT

Insert designation	Grade	l	s	r	Catalog Nr.	Page
DCMT 070204 NN	LT 10	7	2,38	0,4	T0000064	36
DCMT 11T304 NN	LT 10	11	3,97	0,4	T0000065	37
DCMT 11T308 NN	LT 10	11	3,97	0,8	T0000721	38

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DCMT 070204 NN					
DCMT 11T304 NN					
DCMT 11T308 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

55° Diamond shape inserts, suitable for Internal turning due to a unique chip removal geometry. Generates low cutting forces, most suitable for small work-pieces.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent





Machining Recommendation Guide - Please see Pg. 8

DCMT 070204 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.10	2.0	0.08	0.20	0.36	180	350	1.0	0.18
			180		2.0		0.18	0.29		280		
			210		2.0		0.16	0.29		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.10	2.0	0.08	0.18	0.29	120	280	1.0	0.15
			230		2.0		0.18	0.24		250		
			280		1.5	0.09	0.16	0.24		210		
			320		1.5		0.14	0.19		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.10	2.0	0.08	0.16	0.24	70	190	1.0	0.12
			280		1.5		0.14	0.24		150		
			320		1.5		0.13	0.17		130		
			350		1.5		0.13	0.14		100		
			400	0.10	1.3	0.05	0.11	0.12	50	90	0.9	0.10
			480		1.2		0.09	0.10	40	80	0.7	0.08
			550		1.0		0.08	0.08	30	70	0.6	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.10	2.0	0.08	0.16	0.22	170	270	1.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		1.8	0.08	0.14	0.17	160	210	1.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		1.5	0.08	0.13	0.14	70	150	1.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.10	2.0	0.08	0.16	0.20	170	250	1.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.10	2.0	0.08	0.16	0.20	170	250	1.0	0.15
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.10	2.0	0.06	0.18	0.38	170	250	1.0	0.18
		GG 25						0.36		230		
		GG 30						0.36		210		
Nodular Cast Iron	10	GGG 40	210	0.10	2.0	0.06	0.16	0.29	120	230	1.0	0.15
		GGG 50	260					0.24		190		
		GGG 70	310					0.24		150		
		G-X260NiCr42	450	0.10	1.0	0.06	0.10	0.08	30	70	0.6	0.07
Nickel Based Alloys	11	Inconel 625	--------	0.10	1.5	0.08	0.14	0.14	25	35	1.0	0.12
		Inconel 718						0.14	28	40		
		Hastelloy C						0.17	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.10	1.5	0.08	0.14	0.17	35	60	1.0	0.14
		T40					0.13	0.14	28	40	1.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DCMT 070204 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

DCMT 11T304 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DCMT 11T304 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

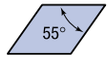
DCMT 11T308 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_c [m/min] min	V_c [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

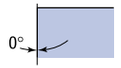
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DCMT 11T308 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



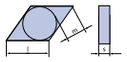
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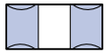
Shape
55° Diamond



Clearance Angle
0° No rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
DNMG 110404 NN	LT 10	11	4,76	0,4	T0000066	40
DNMG 110408 NN	LT 10	11	4,76	0,8	T0000675	41
DNMG 150404 NN	LT 10	15	4,76	0,4	T0000476	42
DNMG 150408 NN	LT 10	15	4,76	0,8	T0000475	43
DNMG 150412 NN	LT 10	15	4,76	1,2	T0001021	44
DNMG 150604 NN	LT 10	15	6,35	0,4	T0000583	45
DNMG 150608 NN	LT 10	15	6,35	0,8	T0000067	46
DNMG 150612 NN	LT 10	15	6,35	1,2	T0000672	47

DNMG

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNMG 110404 NN					
DNMG 110408 NN					
DNMG 150404 NN					
DNMG 150408 NN					
DNMG 150412 NN					
DNMG 150604 NN					
DNMG 150608 NN					
DNMG 150612 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent





NN All Purpose Chipbreaker

Machining Recommendation Guide - Please see Pg. 8

55° Diamond shape inserts. Suitable for roughing complex shapes operations such as Profiling, Copying and Finishing turning operations.

DNMG 110404 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNMG 110404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

DNMG 110408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNMG 110408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

DNMG 150404 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNMG 150404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

DNMG 150408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNMG 150408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

DNMG 150412 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.27	0.68	3.1	180	330	4.0	0.50
			180		5.0		0.68	3.1		280		
			210		5.0		0.60	2.6		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.27	0.60	2.6	120	280	4.0	0.45
			230		5.0		0.60	2.0		250		
			280		5.0	0.23	0.53	2.0		210		
			320		4.0		0.53	1.7		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.23	0.60	2.0	70	190	4.0	0.40
			280		5.0		0.60	2.0		150		
			320		4.0		0.53	1.6		130		
			350		4.0		0.53	1.6		100		
			400	0.50	3.5	0.14	0.45	1.2	50	90	3.4	0.36
			480		3.0		0.35	0.9	40	80	2.9	0.30
			550		2.5		0.28	0.6	30	70	2.5	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.26	0.52	1.7	170	270	4.0	0.40
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.46	1.4	160	210	4.0	0.36
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.23	0.46	1.0	70	150	4.0	0.32
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.20	0.90	3.0	170	250	4.0	0.60
		GG 25						2.7		230		
		GG 30						2.7		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.20	0.70	2.3	120	230	4.0	0.50
		GGG 50	260					2.0		190		
		GGG 70	310					1.8		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.3	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.26	0.46	1.4	25	35	3.0	0.38
		Inconel 718						1.4	28	40		
		Hastelloy C						1.6	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.23	0.46	1.6	35	60	3.0	0.38
		T40					0.39	1.2	28	40	3.0	0.32

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNMG 150412 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

DNMG 150604 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNMG 150604 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

DNMG 1500608 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNMG 150608 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

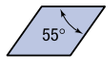
DNMG 150612 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.27	0.68	3.1	180	330	4.0	0.50
			180		5.0		0.68	3.1		280		
			210		5.0		0.60	2.6		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.27	0.60	2.6	120	280	4.0	0.45
			230		5.0		0.60	2.0		250		
			280		5.0	0.23	0.53	2.0		210		
			320		4.0		0.53	1.7		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.23	0.60	2.0	70	190	4.0	0.40
			280		5.0		0.60	2.0		150		
			320		4.0		0.53	1.6		130		
			350		4.0		0.53	1.6		100		
			400	0.50	3.5	0.14	0.45	1.2	50	90	3.4	0.36
			480		3.0		0.35	0.9	40	80	2.9	0.30
			550		2.5		0.28	0.6	30	70	2.5	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.26	0.52	1.7	170	270	4.0	0.40
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.46	1.4	160	210	4.0	0.36
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.23	0.46	1.0	70	150	4.0	0.32
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.20	0.90	3.0	170	250	4.0	0.60
		GG 25						2.7		230		
		GG 30						2.7		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.20	0.70	2.3	120	230	4.0	0.50
		GGG 50	260					2.0		190		
		GGG 70	310					1.8		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.3	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.26	0.46	1.4	25	35	3.0	0.38
		Inconel 718						1.4	28	40		
		Hastelloy C						1.6	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.23	0.46	1.6	35	60	3.0	0.38
		T40					0.39	1.2	28	40	3.0	0.32

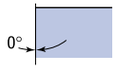
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNMG 150612 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



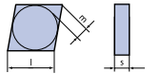
K N U X



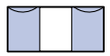
Shape
55° Rectangular



Clearance Angle
0° No rake



Tolerance
l ± 0.13 m ± 0.2
s ± 0.13



Insert Type
Pin / Top clamp
Single sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
KNUX 160405 R11	LT 10	16	4,76	0,5	T0000951	50

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
KNUX 160405 R11	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

A 55° nose angle insert with two cutting edges. Popular insert with excellent chip control and low cutting forces, suitable for conventional Turning operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent







Machining Recommendation Guide - Please see Pg. 8

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	5.0	0.12	0.30	0.80	180	330	3.0	0.16
			180		4.0		0.28	0.80		280		
			210		4.0		0.25	0.70		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	4.0	0.10	0.28	0.80	120	280	3.0	0.15
			230		4.0		0.25	0.70		250		
			280		3.0	0.08	0.22	0.60		210		
			320		3.0		0.20	0.50		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	3.0	0.08	0.23	0.50	70	190	2.0	0.12
			280		3.0		0.21	0.50		150		
			320		3.0		0.18	0.30		130		
			350		3.0		0.16	0.30		100		
			400	0.20	2.6	0.05	0.14	0.25	50	90	1.7	0.12
			480		2.3		0.11	0.20	40	80	1.4	0.10
			550		2.0		0.09	0.20	30	70	1.2	0.08
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	4.0	0.12	0.23	0.70	170	270	3.0	0.16
	5	X2 CrNiMo 17 2 2 316	230 to 270		3.0	0.10	0.21	0.50	160	210	2.0	0.14
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		3.0	0.08	0.18	0.40	70	150	2.0	0.20
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	3.0	0.10	0.22	0.50	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	3.0	0.10	0.22	0.50	170	250	2.0	0.15
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	5.0	0.12	0.30	0.80	170	250	3.0	0.16
		GG 25						0.70		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	4.0	0.10	0.25	0.70	120	230	2.5	0.13
		GGG 50	260					0.60		190		
		GGG 70	310					0.50		150		
		G-X260NiCr42	450	0.40	1.4	0.06	0.14	0.13	30	50	1.0	0.10
Nickel Based Alloys	11	Inconel 625	--------	0.20	3.0	0.08	0.22	0.40	25	35	1.5	0.12
		Inconel 718						0.40	28	40		
		Hastelloy C						0.50	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	3.0	0.08	0.23	0.50	35	60	1.5	0.12
		T40					0.21	0.40	28	40	1.5	0.12

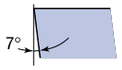
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
KNUX 160405 R11	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



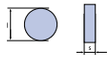
R C M T



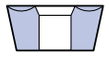
Shape
Round



Clearance Angle
7° Positive rake



Tolerance
l ± 0.05
s ± 0.13



Insert Type
Screw down clamping
Single sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
RCMT 0602 M0	LT 10	06	2,38	3	T0000090	51
RCMT 0803 M0	LT 10	08	3,18	4	T0000091	52
RCMT 10T3 M0	LT 10	10	3,97	5	T0000092	53
RCMT 1204 M0	LT 10	12	4,76	6	T0000093	54

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
RCMT 0602 M0					
RCMT 0803 M0					
RCMT 10T3 M0					
RCMT 1204 M0					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

Round inserts with positive rake angle and excellent edge resistance. Suitable for Profiling operations of Mill rolls and Aerospace parts.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent





Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	2.0	0.15	0.35	0.64	180	350	1.0	0.35
			180		2.0		0.35	0.64		280		
			210		1.5		0.35	0.56		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	2.0	0.15	0.30	0.56	120	280	1.0	0.30
			230		2.0		0.30	0.48		250		
			280		2.0	0.13	0.30	0.40		210		
			320		1.5		0.25	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	2.0	0.13	0.30	0.48	70	190	1.0	0.28
			280		2.0		0.30	0.40		150		
			320		1.5		0.30	0.32		130		
			350		1.5		0.25	0.24		100		
			400	0.50	1.2	0.08	0.22	0.17	50	90	0.9	0.20
			480		1.0		0.18	0.12	40	80	0.7	0.16
			550		0.8		0.14	0.10	30	70	0.6	0.12
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	2.0	0.14	0.25	0.32	170	270	1.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.13	0.18	0.24	120	210	1.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		1.5	0.13	0.18	0.24	70	120	1.0	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	2.0	0.15	0.20	0.32	170	250	1.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	2.0	0.15	0.20	0.32	170	250	1.0	0.32
			Treated						120	210		
Grey Cast Iron	9	GG 20	140 to 230	0.50	2.0	0.11	0.45	0.80	170	280	1.0	0.35
		GG 25						0.72		250		
		GG 30						0.72		230		
Nodular Cast Iron	10	GGG 40	210	0.50	2.0	0.11	0.35	0.60	120	230	1.0	0.30
		GGG 50	260					0.52		190		
		GGG 70	310					0.48		150		
		G-X260NiCr42	450	0.20	1.0	0.04	0.10	0.08	30	50	0.6	0.07
Nickel Based Alloys	11	Inconel 625	--------	0.50	1.5	0.13	0.18	0.20	25	35	1.0	0.28
		Inconel 718						0.20	28	40		
		Hastelloy C						0.24	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	1.5	0.13	0.18	0.24	35	60	1.0	0.30
		T40					0.15	0.24	28	40	1.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
RCMT 0602 M0					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

LAMINA TECHNOLOGIES

RCMT 0803 M0

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/rev]		A max [mm²]	V_C [m/min]		Optimal cutting conditions	
				min	max	min	max		min	max	d.o.c	feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	2.0	0.15	0.42	0.80	180	350	1.0	0.35
			180		2.0		0.42	0.80		280		
			210		1.5		0.42	0.70		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	2.0	0.15	0.36	0.70	120	280	1.0	0.30
			230		2.0		0.36	0.60		250		
			280		2.0	0.13	0.36	0.50		210		
			320		1.5		0.30	0.40		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	2.0	0.13	0.36	0.60	70	190	1.0	0.28
			280		2.0		0.36	0.50		150		
			320		1.5		0.36	0.40		130		
			350		1.5		0.30	0.30		100		
			400	0.50	1.3	0.08	0.26	0.21	50	90	0.9	0.23
			480		1.0		0.21	0.15	40	80	0.7	0.19
			550		0.9		0.17	0.10	30	70	0.6	0.15
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	2.0	0.14	0.30	0.40	170	270	1.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.13	0.21	0.30	120	210	1.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		1.5	0.13	0.21	0.30	70	120	1.0	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	2.0	0.15	0.24	0.40	170	250	1.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	2.0	0.15	0.24	0.40	170	250	1.0	0.32
			Treated						120	210		
Grey Cast Iron	9	GG 20	140 to 230	0.50	2.0	0.11	0.54	1.00	170	280	1.0	0.35
		GG 25						0.90		250		
		GG 30						0.90		230		
Nodular Cast Iron	10	GGG 40	210	0.50	2.0	0.11	0.42	0.75	120	230	1.0	0.30
		GGG 50	260					0.65		190		
		GGG 70	310					0.60		150		
		G-X260NiCr42	450	0.50	1.0	0.08	0.21	0.15	30	50	0.7	0.19
Nickel Based Alloys	11	Inconel 625	--------	0.50	1.5	0.13	0.21	0.25	25	35	1.0	0.28
		Inconel 718						0.25	28	40		
		Hastelloy C						0.30	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	1.5	0.13	0.21	0.30	35	60	1.0	0.30
		T40					0.18	0.30	28	40	1.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
RCMT 0803 M0	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

RCMT 10T3 M0

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/rev]		A max [mm²]	V_C [m/min]		Optimal cutting conditions	
				min	max	min	max		min	max	d.o.c	feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	3.0	0.20	0.50	1.1	180	350	1.0	0.35
			180		3.0		0.50	1.1		280		
			210		2.0		0.50	1.0		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	3.0	0.20	0.45	1.0	120	280	1.0	0.30
			230		2.0		0.42	0.8		250		
			280		2.0	0.16	0.42	0.7		210		
			320		2.0		0.35	0.6		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	2.0	0.16	0.45	0.8	70	190	1.0	0.28
			280		2.0		0.42	0.7		150		
			320		1.5		0.42	0.6		130		
			350		1.5		0.35	0.4		100		
			400	0.50	1.2	0.10	0.30	0.3	50	90	1.0	0.27
			480		1.0		0.25	0.2	40	80	0.8	0.22
			550		0.9		0.19	0.1	30	70	0.5	0.17
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	2.0	0.18	0.35	0.4	170	270	1.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.16	0.25	0.3	120	210	1.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		1.5	0.16	0.25	0.3	70	120	1.0	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	2.0	0.20	0.28	0.4	170	250	1.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	2.0	0.20	0.28	0.4	170	250	1.0	0.32
			Treated						120	210		
Grey Cast Iron	9	GG 20	140 to 230	0.50	2.0	0.14	0.63	1.4	170	280	1.0	0.35
		GG 25						1.3		250		
		GG 30						1.3		230		
Nodular Cast Iron	10	GGG 40	210	0.50	2.0	0.14	0.49	1.1	120	230	1.0	0.30
		GGG 50	260					0.9		190		
		GGG 70	310					0.8		150		
		G-X260NiCr42	450	0.50	1.0	0.10	0.25	0.2	30	50	0.8	0.22
Nickel Based Alloys	11	Inconel 625	--------	0.50	1.5	0.16	0.25	0.3	25	35	1.0	0.28
		Inconel 718						0.3	28	40		
		Hastelloy C						0.3	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	1.5	0.16	0.25	0.3	35	60	1.0	0.30
		T40					0.21	0.3	28	40	1.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
RCMT 10T3 M0	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

RCMT 1204 M0

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	4.0	0.22	0.70	1.6	180	350	2.0	0.45
			180		4.0		0.70	1.6		280		
			210		3.0		0.70	1.4		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	4.0	0.22	0.60	1.4	120	280	2.0	0.40
			230		3.0		0.60	1.2		250		
			280		3.0	0.18	0.60	1.0		210		
			320		2.5		0.50	0.8		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	3.0	0.18	0.60	1.2	70	190	2.0	0.38
			280		3.0		0.60	1.0		150		
			320		2.0		0.60	0.8		130		
			350		2.0		0.50	0.6		100		
			400	0.50	1.7	0.11	0.43	0.4	50	90	1.7	0.35
			480		1.4		0.35	0.3	40	80	1.4	0.32
			550		1.2		0.28	0.2	30	70	1.2	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	3.0	0.20	0.50	0.8	170	270	2.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		3.0	0.18	0.35	0.6	120	210	2.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.18	0.35	0.6	70	120	1.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	3.0	0.22	0.40	0.8	170	250	2.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	3.0	0.22	0.40	0.8	170	250	2.0	0.32
			Treated						120	210		
Grey Cast Iron	9	GG 20	140 to 230	0.50	3.0	0.15	0.90	1.8	170	280	2.0	0.35
		GG 25						1.6		250		
		GG 30						1.4		230		
Nodular Cast Iron	10	GGG 40	210	0.50	3.0	0.15	0.70	1.5	120	230	1.5	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.2	0.11	0.28	0.2	30	50	1.0	0.20
Nickel Based Alloys	11	Inconel 625	--------	0.50	2.0	0.18	0.35	0.5	25	35	1.5	0.28
		Inconel 718						0.5	28	40		
		Hastelloy C						0.6	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	2.0	0.18	0.35	0.6	35	60	1.5	0.30
		T40					0.30	0.6	28	40	1.5	0.28

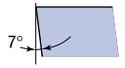
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
RCMT 1204 M0	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



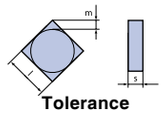
S C M T



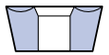
Shape
Square 90°



Clearance Angle
0° No rake



Tolerance
l ± 0.08 m ± 0.13
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
SCMT 09T304 NN	LT 10	9	3,97	0,4	T0001459	56
SCMT 09T308 NN	LT 10	9	3,97	0,8	T0001458	57
SCMT 120408 NN	LT 10	12	4,76	0,8	T0001777	58

SCMT

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NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
SCMT 09T304 NN					
SCMT 09T308 NN					
SCMT 120408 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

Square inserts with a positive rake angle with excellent cutting edge resistance. Suitable for Boring.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent

Machining Recommendation Guide - Please see Pg. 8

SCMT 09T304 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	330	2.0	0.20
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.18
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.14
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.16	50	90	1.7	0.11
			480		1.5		0.10	0.14	40	80	1.4	0.09
			550		1.4		0.08	0.10	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.16
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.14
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.16
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.16
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.16
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.14	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.14
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
SCMT 09T304 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

SCMT 09T308 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	6.0	0.21	0.47	1.7	180	330	2.0	0.34
			180		5.0		0.42	1.4		280		
			210		5.0		0.35	1.2		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.42	1.4	120	280	2.0	0.32
			230		5.0		0.42	1.2		250		
			280		4.0	0.18	0.37	1.0		210		
			320		4.0		0.34	0.8		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.18	0.37	1.2	70	190	2.0	0.30
			280		5.0		0.34	1.0		150		
			320		4.0		0.30	0.8		130		
			350		4.0		0.30	0.7		100		
			400	0.50	3.5	0.11	0.26	0.6	50	90	1.7	0.23
			480		3.0		0.21	0.5	40	80	1.4	0.19
			550		2.5		0.17	0.4	30	70	1.2	0.15
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.37	1.0	170	270	2.0	0.32
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.34	0.8	120	210	2.0	0.27
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.30	0.7	70	120	2.0	0.24
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.37	0.9	170	250	2.0	0.30
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.37	0.9	170	250	2.0	0.30
			Treated						120	200		
Grey Cast Iron	9	GG 20	140 to 230	0.50	6.0	0.15	0.42	1.7	170	250	3.0	0.34
		GG 25						1.5		230		
		GG 30						1.3		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.38	1.3	120	230	3.0	0.30
		GGG 50	260					1.2		190		
		GGG 70	310					1.1		150		
		G-X260NiCr42	450	0.50	2.0	0.11	0.17	0.4	30	50	1.2	0.15
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.5	0.20	0.34	0.7	25	35	2.0	0.27
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.5	0.18	0.34	0.8	35	60	2.0	0.27
		T40					0.30	0.7	28	40	2.0	0.24

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
SCMT 09T308 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

SCMT 120408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	6.0	0.21	0.47	1.7	180	330	2.0	0.34
			180		5.0		0.42	1.4		280		
			210		5.0		0.35	1.2		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.42	1.4	120	280	2.0	0.32
			230		5.0		0.42	1.2		250		
			280		4.0	0.18	0.37	1.0		210		
			320		4.0		0.34	0.8		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.18	0.37	1.2	70	190	2.0	0.30
			280		5.0		0.34	1.0		150		
			320		4.0		0.30	0.8		130		
			350		4.0		0.30	0.7		100		
			400	0.50	3.5	0.11	0.26	0.6	50	90	1.7	0.23
			480		3.0		0.21	0.5	40	80	1.4	0.19
			550		2.5		0.17	0.4	30	70	1.2	0.15
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.37	1.0	170	270	2.0	0.32
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.34	0.8	120	210	2.0	0.27
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.30	0.7	70	120	2.0	0.24
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.37	0.9	170	250	2.0	0.30
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.37	0.9	170	250	2.0	0.30
			Treated						120	200		
Grey Cast Iron	9	GG 20	140 to 230	0.50	6.0	0.15	0.42	1.7	170	250	3.0	0.34
		GG 25						1.5		230		
		GG 30						1.3		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.38	1.3	120	230	3.0	0.30
		GGG 50	260					1.2		190		
		GGG 70	310					1.1		150		
		G-X260NiCr42	450	0.50	2.0	0.11	0.17	0.4	30	50	1.2	0.15
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.5	0.20	0.34	0.7	25	35	2.0	0.27
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.5	0.18	0.34	0.8	35	60	2.0	0.27
		T40					0.30	0.7	28	40	2.0	0.24

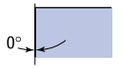
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
SCMT 120408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



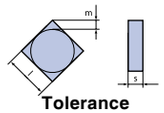
S N M G



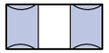
Shape
Square 90°



Clearance Angle
0° No rake



Tolerance
l ± 0.08 m ± 0.13
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
SNMG 120408 NN	LT 10	12	4,76	0,8	T0000322	60
SNMG 120412 NN	LT 10	12	4,76	1,2	T0000323	61

SNMG

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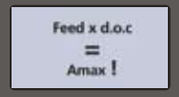
NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
SNMG 120408 NN					
SNMG 120412 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

Square inserts with strong cutting edge. Suitable for roughing operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent







Machining Recommendation Guide - Please see Pg. 8

SNMG 120408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.30	0.64	1.8	180	350	3.0	0.50
			180		5.0		0.64	1.8		300		
			210		4.0		0.57	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.30	0.57	1.2	120	280	2.5	0.43
			230		4.0		0.57	1.2		250		
			280		4.0	0.26	0.50	1.2		210		
			320		3.5		0.50	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.26	0.57	1.2	70	190	2.0	0.40
			280		4.0		0.57	1.2		150		
			320		3.0		0.50	0.8		130		
			350		3.0		0.50	0.8		100		
			400	0.50	2.5	0.15	0.43	0.6	50	90	1.5	0.36
			480		2.0		0.35	0.4	40	80	1.2	0.29
			550		1.7		0.29	0.3	30	70	0.7	0.26
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.29	0.57	1.0	170	270	2.1	0.50
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.26	0.50	0.8	160	210	2.1	0.46
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.26	0.50	0.6	70	150	1.8	0.40
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.31	0.50	0.9	170	250	2.1	0.46
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.31	0.50	0.9	170	250	2.1	0.46
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.21	0.86	2.0	170	250	2.1	0.50
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.21	0.71	1.5	120	230	2.1	0.43
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.16	0.36	0.4	30	50	0.7	0.26
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.29	0.50	0.7	25	35	1.4	0.40
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.26	0.50	0.8	35	60	1.4	0.43
		T40					0.43	0.6	28	40	1.4	0.40

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
SNMG 120408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

SNMG 120412 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.39	0.97	3.1	180	330	3.0	0.70
			180		5.0		0.97	3.1		280		
			210		5.0		0.86	2.6		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.39	0.86	2.6	120	280	2.5	0.64
			230		5.0		0.86	2.0		250		
			280		5.0	0.33	0.76	2.0		210		
			320		4.0		0.76	1.7		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.33	0.86	2.0	70	190	2.5	0.57
			280		5.0		0.86	2.0		150		
			320		4.0		0.76	1.6		130		
			350		4.0		0.76	1.6		100		
			400	0.50	3.5	0.20	0.64	1.2	50	90	2.0	0.51
			480		3.0		0.50	0.9	40	80	1.8	0.43
			550		2.5		0.40	0.6	30	70	1.7	0.36
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.37	0.74	1.7	170	270	2.8	0.57
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.33	0.66	1.4	160	210	2.8	0.51
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.33	0.66	1.0	70	150	2.8	0.46
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.41	0.66	1.5	170	250	2.8	0.50
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.41	0.66	1.5	170	250	2.8	0.50
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.29	1.29	3.0	170	250	2.8	0.86
		GG 25						2.7		230		
		GG 30						2.7		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.29	1.00	2.3	120	230	2.8	0.71
		GGG 50	260					2.0		190		
		GGG 70	310					1.8		150		
		G-X260NiCr42	450	0.50	1.8	0.09	0.21	0.3	30	50	1.0	0.17
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.37	0.66	1.4	25	35	2.1	0.54
		Inconel 718						1.4	28	40		
		Hastelloy C						1.6	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.33	0.66	1.6	35	60	2.1	0.54
		T40					0.56	1.2	28	40	2.1	0.46

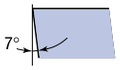
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
SNMG 120412 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



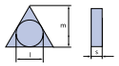
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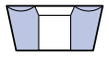
Shape
Triangle 60°



Clearance Angle
7° Positive rake



Tolerance
l ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Pin / Top clamp
Single sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
TCMT 110204 NN	LT 10	11	2,38	0,4	T0000477	63
TCMT 110208 NN	LT 10	11	2,38	0,8	T0000478	64
TCMT 16T304 NN	LT 10	16	3,97	0,4	T0000479	65
TCMT 16T308 NN	LT 10	16	3,97	0,8	T0000068	66
TCMT 16T312 NN	LT 10	16	3,97	0,8	T0001774	67

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TCMT 110204 NN					
TCMT 110208 NN					
TCMT 16T304 NN					
TCMT 16T308 NN					
TCMT 16T312 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

60° Triangle shape inserts, with positive rake angle. Suitable for regular and sever conditions Boring and Internal turning.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent





Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.10	2.0	0.08	0.20	0.36	180	350	1.0	0.18
			180		2.0		0.18	0.29		280		
			210		2.0		0.16	0.29		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.10	2.0	0.08	0.18	0.29	120	280	1.0	0.15
			230		2.0		0.18	0.24		250		
			280		1.5	0.09	0.16	0.24		210		
			320		1.5		0.14	0.19		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.10	2.0	0.08	0.16	0.24	70	190	1.0	0.12
			280		1.5		0.14	0.24		150		
			320		1.5		0.13	0.17		130		
			350		1.5		0.13	0.14		100		
			400	0.10	1.3	0.05	0.11	0.12	50	90	0.9	0.10
			480		1.2		0.09	0.10	40	80	0.7	0.08
			550		1.0		0.08	0.08	30	70	0.6	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.10	2.0	0.08	0.16	0.22	170	270	1.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		1.8	0.08	0.14	0.17	160	210	1.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		1.5	0.08	0.13	0.14	70	150	1.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.10	2.0	0.08	0.16	0.20	170	250	1.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.10	2.0	0.08	0.16	0.20	170	250	1.0	0.15
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.10	2.0	0.06	0.18	0.38	170	250	1.0	0.18
		GG 25						0.36		230		
		GG 30						0.36		210		
Nodular Cast Iron	10	GGG 40	210	0.10	2.0	0.06	0.16	0.29	120	230	1.0	0.15
		GGG 50	260					0.24		190		
		GGG 70	310					0.24		150		
		G-X260NiCr42	450	0.10	1.0	0.06	0.10	0.08	30	70	0.6	0.07
Nickel Based Alloys	11	Inconel 625	--------	0.10	1.5	0.08	0.14	0.14	25	35	1.0	0.12
		Inconel 718						0.14	28	40		
		Hastelloy C						0.17	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.10	1.5	0.08	0.14	0.17	35	60	1.0	0.14
		T40					0.13	0.14	28	40	1.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TCMT 110204 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

LAMINA TECHNOLOGIES

TCMT 110208 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	2.0	0.15	0.45	0.43	180	400	1.0	0.24
			180		2.0		0.40	0.35		350		
			210		2.0		0.40	0.35		200		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.0	0.12	0.40	0.35	120	300	1.0	0.22
			230		2.0		0.40	0.29		250		
			280		1.5	0.12	0.38	0.29		210		
			320		1.5		0.35	0.23		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.0	0.12	0.40	0.29	70	190	1.0	0.18
			280		1.5		0.38	0.29		150		
			320		1.5		0.35	0.20		130		
			350		1.5		0.32	0.17		100		
			400	0.20	1.2	0.07	0.27	0.12	50	90	1.0	0.16
			480		1.0		0.22	0.09	40	80	0.8	0.14
			550		0.8		0.18	0.06	30	70	0.5	0.12
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.0	0.15	0.38	0.31	170	270	1.0	0.24
	5	X2 CrNiMo 17 2 2 316	230 to 270		1.8	0.12	0.35	0.24	120	210	1.0	0.22
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		1.5	0.12	0.32	0.20	70	120	1.0	0.22
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.15	0.38	0.27	170	250	1.0	0.24
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.15	0.35	0.27	170	250	1.0	0.15
			Treated						120	210		
Grey Cast Iron	9	GG 20	140 to 230	0.20	2.0	0.15	0.40	0.46	170	280	1.0	0.24
		GG 25						0.43		250		
		GG 30						0.43		230		
Nodular Cast Iron	10	GGG 40	210	0.20	2.0	0.15	0.40	0.35	120	230	1.0	0.15
		GGG 50	260					0.29		190		
		GGG 70	310					0.29		150		
		G-X260NiCr42	450	0.20	0.8	0.07	0.18	0.09	30	50	0.9	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.20	1.5	0.15	0.32	0.17	25	35	0.7	0.22
		Inconel 718						0.17	28	40		
		Hastelloy C						0.20	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	1.5	0.12	0.35	0.20	35	60	0.7	0.22
		T40					0.35	0.17	28	40	0.7	0.22

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TCMT 110208 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

TCMT 16T304 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TCMT 16T304 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

TCMT 16T308 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TCMT 16T308 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

TCMT 16T312 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.22	0.47	1.3	180	350	2.0	0.33
			180		4.0		0.43	1.1		280		
			210		4.0		0.38	0.9		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	4.0	0.22	0.43	1.1	120	280	1.5	0.30
			230		4.0		0.43	0.9		250		
			280		3.0	0.20	0.38	0.7		210		
			320		3.0		0.35	0.6		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.20	0.38	0.9	70	190	1.5	0.28
			280		4.0		0.35	0.7		150		
			320		3.0		0.32	0.6		130		
			350		3.0		0.32	0.5		100		
			400	0.20	2.8	0.05	0.28	0.4	40	90	2.4	0.23
			480		2.2		0.24	0.3	40	80	2.0	0.20
			550		1.5		0.20	0.3	30	70	1.2	0.16
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	4.0	0.22	0.38	0.9	170	270	1.5	0.28
	5	X2 CrNiMo 17 2 2 316	230 to 270		3.0	0.20	0.35	0.7	120	210	1.5	0.25
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		3.0	0.20	0.32	0.6	70	120	1.5	0.23
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	3.0	0.23	0.38	0.8	170	250	1.5	0.28
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	3.0	0.23	0.38	0.8	170	250	1.5	0.28
			Treated						120	210		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.18	0.45	1.3	170	280	3.0	0.32
		GG 25						1.2		250		
		GG 30						1.1		230		
Nodular Cast Iron	10	GGG 40	210	0.50	4.0	0.18	0.38	1.1	120	230	2.5	0.28
		GGG 50	260					1.0		190		
		GGG 70	310					0.9		150		
		G-X260NiCr42	450	0.20	1.2	0.04	0.12	0.1	30	50	0.9	0.08
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.22	0.34	0.7	25	35	1.5	0.25
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.20	0.34	0.8	35	60	1.5	0.25
		T40					0.30	0.7	28	40	1.5	0.22

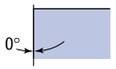
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TCMT 16T312 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



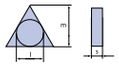
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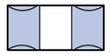
Shape
Triangle 60°



Clearance Angle
0° No rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
TNMG 160404 NN	LT 10	16	4,76	0,4	T0000457	69
TNMG 160408 NN	LT 10	16	4,76	0,8	T0000069	70
TNMG 160412 NN	LT 10	16	4,76	1,2	T0001734	71
TNMG 220404 NN	LT 10	22	4,76	0,4	T0001873	72
TNMG 220408 NN	LT 10	22	4,76	0,8	T0000113	73
TNMG 220412 NN	LT 10	22	4,76	1,2	T0001735	74

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNMG 160404 NN					
TNMG 160408 NN					
TNMG 160412 NN					
TNMG 220404 NN					
TNMG 220408 NN					
TNMG 220412 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

60° Triangle shape inserts. Suitable for General purpose Turning and Copying operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent





Machining Recommendation Guide - Please see Pg. 8

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNMG 160404 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

TNMG 160408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNMG 160408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

TNMG 160412 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.27	0.68	3.1	180	330	4.0	0.50
			180		5.0		0.68	3.1		280		
			210		5.0		0.60	2.6		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.27	0.60	2.6	120	280	4.0	0.45
			230		5.0		0.60	2.0		250		
			280		5.0	0.23	0.53	2.0		210		
			320		4.0		0.53	1.7		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.23	0.60	2.0	70	190	4.0	0.40
			280		5.0		0.60	2.0		150		
			320		4.0		0.53	1.6		130		
			350		4.0		0.53	1.6		100		
			400	0.50	3.5	0.14	0.45	1.2	50	90	3.4	0.36
			480		3.0		0.35	0.9	40	80	2.9	0.30
			550		2.5		0.28	0.6	30	70	2.5	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.26	0.52	1.7	170	270	4.0	0.40
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.46	1.4	160	210	4.0	0.36
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.23	0.46	1.0	70	150	4.0	0.32
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.20	0.90	3.0	170	250	4.0	0.60
		GG 25						2.7		230		
		GG 30						2.7		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.20	0.70	2.3	120	230	4.0	0.50
		GGG 50	260					2.0		190		
		GGG 70	310					1.8		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.3	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.26	0.46	1.4	25	35	3.0	0.38
		Inconel 718						1.4	28	40		
		Hastelloy C						1.6	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.23	0.46	1.6	35	60	3.0	0.38
		T40					0.39	1.2	28	40	3.0	0.32

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNMG 160412 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

TNMG 220404 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	4.0	0.15	0.40	1.3	180	330	3.0	0.25
			180		4.0		0.40	1.3		280		
			210		4.0		0.30	1.1		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	4.0	0.15	0.30	1.1	120	280	2.5	0.25
			230		4.0		0.30	1.1		250		
			280		4.0	0.15	0.28	1.0		210		
			320		4.0		0.28	1.2		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.13	0.30	1.1	70	190	2.0	0.20
			280		4.0		0.30	1.1		150		
			320		3.0		0.28	1.0		130		
			350		3.0		0.28	1.0		100		
			400	0.50	2.5	0.08	0.24	0.5	50	90	1.7	0.18
			480		2.0		0.20	0.3	40	80	1.4	0.16
			550		1.5		0.15	0.2	30	70	1.2	0.14
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	4.0	0.15	0.30	1.0	170	270	2.0	0.18
	5	X2 CrNiMo 17 2 2 316	230 to 270		3.0	0.15	0.25	1.0	160	210	2.0	0.15
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		3.0	0.15	0.25	1.0	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.16	0.25	1.0	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.16	0.25	0.9	170	250	2.0	0.15
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	4.0	0.12	0.40	1.7	170	250	3.0	0.18
		GG 25						1.5		230		
		GG 30						1.3		210		
Nodular Cast Iron	10	GGG 40	210	0.50	4.0	0.12	0.35	1.6	120	230	2.0	0.15
		GGG 50	260					1.3		190		
		GGG 70	310					1.1		150		
		G-X260NiCr42	450	0.50	1.5	0.08	0.15	0.3	30	50	0.6	0.07
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.12	0.25	0.5	25	35	1.0	0.13
		Inconel 718						0.5	28	40		
		Hastelloy C						0.3	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.11	0.25	0.3	35	60	1.0	0.15
		T40					0.23	0.3	28	40	1.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNMG 220404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

TNMG 220408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	7.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		7.0		0.45	1.8		300		
			210		5.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	7.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		7.0		0.40	1.2		250		
			280		5.0	0.18	0.35	1.2		210		
			320		4.0		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		5.0		0.40	1.2		150		
			320		4.0		0.35	0.8		130		
			350		4.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	7.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	7.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNMG 220408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

TNMG 220412 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	6.0	0.27	0.68	3.1	180	330	4.0	0.50
			180		5.0		0.68	3.1		280		
			210		5.0		0.60	2.6		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	6.0	0.27	0.60	2.6	120	280	4.0	0.45
			230		6.0		0.60	2.0		250		
			280		5.0	0.23	0.53	2.0		210		
			320		5.0		0.53	1.7		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	6.0	0.23	0.60	2.0	70	190	4.0	0.40
			280		5.0		0.60	2.0		150		
			320		5.0		0.53	1.6		130		
			350		4.0		0.53	1.6		100		
			400	0.50	3.5	0.14	0.45	1.2	50	90	3.4	0.36
			480		3.0		0.35	0.9	40	80	2.9	0.30
			550		2.5		0.28	0.6	30	70	2.5	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.26	0.52	1.7	170	270	4.0	0.40
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.46	1.4	160	210	4.0	0.36
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.23	0.46	1.0	70	150	4.0	0.32
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	6.0	0.20	0.90	3.0	170	250	4.0	0.60
		GG 25						2.7		230		
		GG 30						2.7		210		
Nodular Cast Iron	10	GGG 40	210	0.50	6.0	0.20	0.70	2.3	120	230	4.0	0.50
		GGG 50	260					2.0		190		
		GGG 70	310					1.8		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.3	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.26	0.46	1.4	25	35	3.0	0.38
		Inconel 718						1.4	28	40		
		Hastelloy C						1.6	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.23	0.46	1.6	35	60	3.0	0.38
		T40					0.39	1.2	28	40	3.0	0.32

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNMG 220412 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



T N M P

Shape
Triangle 60°

Clearance Angle
0° No rake

Tolerance
d ± 0.05 m ± 0.08
s ± 0.13

Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
TNMP 160408 NN	LT 10	16	4,76	0,8	T0000492	76

NN All Purpose Chipbreaker

TNMP

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNMP 160408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

60° Triangle shape inserts, with positive chip breaker geometry. Generates considerably low cutting forces. Suitable for General purpose, Copying, High Temperature Alloys and Stainless Steel turning operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent







Machining Recommendation Guide - Please see Pg. 8

TNMP 160408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNMP 160408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



T N U X

Shape
Triangle 60°

Clearance Angle
0° No rake

Tolerance
l ± 0.13 m ± 0.2
s ± 0.13

Insert Type
Pin / Top clamp
Double sided

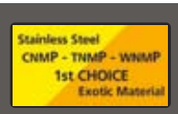
Insert designation	Grade	l	s	r	Catalog Nr.	Page
TNUX 160404 R	LT 10	16	4,76	0,4	T0001125	78
TNUX 160404 L	LT 10	16	4,76	0,4	T0001877	78
TNUX 160408 R	LT 10	16	4,76	0,8	T0001137	79
TNUX 160408 L	LT 10	16	4,76	0,8	T0001878	79

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNUX 160404 R					
TNUX 160404 L					
TNUX 160408 R					
TNUX 160408 L					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

TNUX

60° Triangle shape inserts. Suitable for General turning and longitudinal operations, where there is a concern for work piece vibrations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent







Machining Recommendation Guide - Please see Pg. 8

TNUX 160404 R & TNUX 160404 L

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	5.0	0.12	0.30	1.2	180	330	2.5	0.16
			180		4.0		0.28	0.8		280		
			210		4.0		0.25	0.8		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	4.0	0.10	0.28	0.8	120	280	2.0	0.15
			230		4.0		0.25	0.8		250		
			280		3.0	0.08	0.22	0.6		210		
			320		3.0		0.20	0.5		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	3.0	0.08	0.23	0.6	70	190	1.5	0.12
			280		3.0		0.21	0.5		150		
			320		3.0		0.18	0.5		130		
			350		3.0		0.16	0.4		100		
			400	0.20	2.0	0.05	0.12	0.2	50	90	1.5	0.11
			480		1.5		0.10	0.2	40	80	1.0	0.09
			550		1.0		0.08	0.1	30	70	0.5	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	4.0	0.12	0.23	0.7	170	270	3.0	0.16
	5	X2 CrNiMo 17 2 2 316	230 to 270		3.0	0.10	0.21	0.5	160	210	2.0	0.14
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		3.0	0.08	0.18	0.5	70	150	1.5	0.20
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	3.0	0.10	0.22	0.6	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	3.0	0.10	0.22	0.6	170	250	2.0	0.15
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	5.0	0.12	0.30	1.2	170	250	3.0	0.16
		GG 25						1.2		230		
		GG 30						1.2		210		
Nodular Cast Iron	10	GGG 40	210	0.20	4.0	0.10	0.25	0.8	120	230	2.0	0.13
		GGG 50	260					0.8		190		
		GGG 70	310					0.8		150		
		G-X260NiCr42	450	0.20	1.4	0.05	0.10	0.1	30	50	1.0	0.07
Nickel Based Alloys	11	Inconel 625	--------	0.20	3.0	0.08	0.22	0.6	25	35	1.5	0.12
		Inconel 718						0.6	28	40		
		Hastelloy C						0.6	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	3.0	0.08	0.23	0.6	35	60	1.5	0.12
		T40					0.21	0.5	28	40	1.5	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNUX 160404 R & L	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

TNUX 160408 R & TNUX 160408 L

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	5.0	0.18	0.45	1.8	180	350	3.0	0.35
			180		4.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	4.0	0.15	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		3.0	0.12	0.35	1.2		210		
			320		3.0		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	3.0	0.12	0.40	1.2	70	190	2.5	0.28
			280		3.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.5	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.5	0.22
			550		1.0		0.19	0.2	30	70	1.0	0.15
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	4.0	0.18	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		3.0	0.15	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		3.0	0.12	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	3.0	0.15	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	3.0	0.15	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	5.0	0.12	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.20	4.0	0.10	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.0	0.10	0.19	0.2	30	50	1.0	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	3.0	0.12	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	3.0	0.12	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

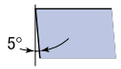
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNUX 160408 R & L	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



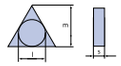
T P M R



Shape
Triangle 60°



Clearance Angle
5° Positive rake



Tolerance
d ± 0.05 m ± 0.16
s ± 0.13



Insert Type
Clamping
Single sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
TPMR 160304 NN	LT 10	16	3,76	0,4	T0001638	81
TPMR 160308 NN	LT 10	16	3,76	0,8	T0001535	82

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TPMR 160304 NN					
TPMR 160308 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

60° Triangle shape inserts, with positive rake angle. Suitable for Boring and Internal turning operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent





Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TPMR 160304 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

LAMINA TECHNOLOGIES

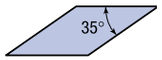
TPMR 160308 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

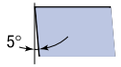
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TPMR 160304 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



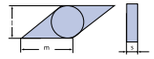
V B M T



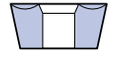
Shape
35° Diamond



Clearance Angle
5° Positive rake



Tolerance
l ± 0.05 m ± 0.16
s ± 0.13



Insert Type
Screw down clamping
Single sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
VBMT 110304 NN	LT 10	11	3,76	0,4	T0001460	84
VBMT 160404 NN	LT 10	16	4,76	0,4	T0000070	85
VBMT 160408 NN	LT 10	16	4,76	0,8	T0000071	86

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VBMT 110304 NN					
VBMT 160404 NN					
VBMT 160408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

VBMT

35° shape inserts, with positive rake angle. Suitable for internal and external Copying operations of complex geometries.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent





Machining Recommendation Guide - Please see Pg. 8

VBMT 110304 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/rev]		A max [mm²]	V_C [m/min]		Optimal cutting conditions	
				min	max	min	max		min	max	d.o.c	feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.10	2.0	0.08	0.20	0.36	180	350	1.0	0.18
			180		2.0		0.18	0.29		280		
			210		2.0		0.16	0.29		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.10	2.0	0.08	0.18	0.29	120	280	1.0	0.15
			230		2.0		0.18	0.24		250		
			280		1.5	0.09	0.16	0.24		210		
			320		1.5		0.14	0.19		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.10	2.0	0.08	0.16	0.24	70	190	1.0	0.12
			280		1.5		0.14	0.24		150		
			320		1.5		0.13	0.17		130		
			350		1.5		0.13	0.14		100		
			400	0.10	1.3	0.05	0.11	0.12	50	90	0.9	0.10
			480		1.2		0.09	0.10	40	80	0.7	0.08
			550		1.0		0.08	0.08	30	70	0.6	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.10	2.0	0.08	0.16	0.22	170	270	1.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		1.8	0.08	0.14	0.17	160	210	1.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		1.5	0.08	0.13	0.14	70	150	1.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.10	2.0	0.08	0.16	0.20	170	250	1.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.10	2.0	0.08	0.16	0.20	170	250	1.0	0.15
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.10	2.0	0.06	0.18	0.38	170	250	1.0	0.18
		GG 25						0.36		230		
		GG 30						0.36		210		
Nodular Cast Iron	10	GGG 40	210	0.10	2.0	0.06	0.16	0.29	120	230	1.0	0.15
		GGG 50	260					0.24		190		
		GGG 70	310					0.24		150		
		G-X260NiCr42	450	0.10	1.0	0.06	0.10	0.08	30	70	0.6	0.07
Nickel Based Alloys	11	Inconel 625	--------	0.10	1.5	0.08	0.14	0.14	25	35	1.0	0.12
		Inconel 718						0.14	28	40		
		Hastelloy C						0.17	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.10	1.5	0.08	0.14	0.17	35	60	1.0	0.14
		T40					0.13	0.14	28	40	1.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VBMT 110304 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

VBMT 160404 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/rev]		A max [mm²]	V_C [m/min]		Optimal cutting conditions	
				min	max	min	max		min	max	d.o.c	feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VBMT 160404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

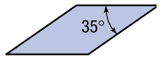
VBMT 160408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

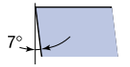
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VBMT 160404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



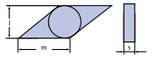
V C M T



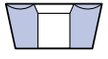
Shape
35° Diamond



Clearance Angle
7° Positive rake



Tolerance
l ± 0.05 m ± 0.16
s ± 0.13



Insert Type
Screw down clamping
Single sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
VCMT 160404 NN	LT 10	16	4,76	0,4	T0001102	88
VCMT 160408 NN	LT 10	16	4,76	0,8	T0001103	89

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VCMT 160404 NN					
VCMT 160408 NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

VCMT

35° shape inserts, with positive rake angle. Suitable for internal and external Copying operations of complex geometries.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent







Machining Recommendation Guide - Please see Pg. 8

VCMT 160404 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/rev]		A max [mm²]	V_C [m/min]		Optimal cutting conditions	
				min	max	min	max		min	max	d.o.c	feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VCMT 160404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

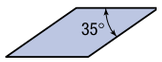
VCMT 160408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/rev]		A max [mm²]	V_C [m/min]		Optimal cutting conditions	
				min	max	min	max		min	max	d.o.c	feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

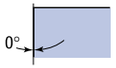
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VCMT 160408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



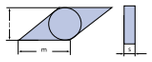
V N M G



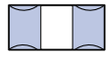
Shape
35° Diamond



Clearance Angle
0° No rake



Tolerance
l ± 0.05 m ± 0.16
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
VNMG 160404 NN	LT 10	16	4,76	0,4	T0000072	91
VNMG 160408 NN	LT 10	16	4,76	0,8	T0000073	92

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VNMG 160404 NN					
VNMG 160408 NN					

35° shape inserts. Suitable for Semi-roughing external Copying operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent







Machining Recommendation Guide - Please see Pg. 8

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VNMG 160404 NN					

VNMG 160408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

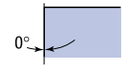
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VNMG 160408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



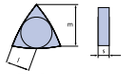
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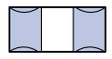
Shape
80° Diamond



Clearance Angle
0° No rake



Tolerance
l ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
WNMG 060404 NN	LT 10	6	4,76	0,4	T0000133	94
WNMG 060408 NN	LT 10	6	4,76	0,8	T0000137	95
WNMG 080404 NN	LT 10	8	4,76	0,4	T0000584	96
WNMG 080408 NN	LT 10	8	4,76	0,8	T0000075	97
WNMG 080408 NR	LT 10	8	4,76	0,8	T0001437	98
WNMG 080408 NP	LT 10	8	4,76	0,8	T0001967	99
WNMG 080408 WM	LT 10	8	4,76	0,8	T0000076	100
WNMG 080412 NN	LT 10	8	4,76	1,2	T0000077	101

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMG 060404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
WNMG 060408 NN					
WNMG 080404 NN					
WNMG 080408 NN					
WNMG 080408 NR					
WNMG 080408 NP					
WNMG 080408 WM					
WNMG 080412 NN					

WNMG

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent







NN All Purpose Chipbreaker WM Wiper Medium chip breaker

80° Trigon shape inserts, with 6 cutting edges. Suitable for all-purpose Turning, Facing and Boring operations.

WNMG 060404 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMG 060404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

WNMG 060408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	3.5	0.21	0.45	1.2	180	350	3.0	0.35
			180		3.5		0.45	1.2		300		
			210		3.5		0.40	1.0		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	3.5	0.21	0.40	1.0	120	280	3.0	0.30
			230		3.0		0.40	1.0		250		
			280		3.0	0.18	0.35	0.9		210		
			320		3.0		0.35	0.8		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	3.0	0.18	0.40	1.0	70	190	2.5	0.28
			280		3.0		0.40	1.0		150		
			320		2.5		0.35	0.7		130		
			350		2.5		0.35	0.7		100		
			400	0.50	2.0	0.11	0.30	0.5	50	90	1.5	0.25
			480		1.5		0.25	0.3	40	80	1.0	0.20
			550		1.0		0.20	0.2	30	70	0.5	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMG 060408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

WNMG 080404 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMG 080404 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

WNMG 080408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMG 080408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

WNMG 080408 NR

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.27	0.68	2.3	180	330	4.0	0.50
			180		5.0		0.68	2.3		280		
			210		5.0		0.60	2.0		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.27	0.60	2.0	120	280	4.0	0.45
			230		5.0		0.60	1.5		250		
			280		5.0	0.23	0.53	1.5		210		
			320		4.0		0.53	1.3		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.23	0.60	1.5	70	190	4.0	0.40
			280		5.0		0.60	1.5		150		
			320		4.0		0.53	1.2		130		
			350		4.0		0.53	1.2		100		
			400	0.50	3.5	0.14	0.45	0.9	50	90	3.4	0.36
			480		3.0		0.35	0.7	40	80	2.9	0.30
			550		2.5		0.28	0.5	30	70	2.5	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.26	0.52	1.3	170	270	4.0	0.40
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.46	1.1	160	210	4.0	0.36
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.23	0.46	0.8	70	150	4.0	0.32
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.29	0.46	1.1	170	250	4.0	0.35
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.29	0.46	1.1	170	250	4.0	0.35
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.20	0.90	2.3	170	250	4.0	0.60
		GG 25						2.0		230		
		GG 30						2.0		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.20	0.70	1.7	120	230	4.0	0.50
		GGG 50	260					1.5		190		
		GGG 70	310					1.4		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.2	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.26	0.46	1.1	25	35	3.0	0.38
		Inconel 718						1.1	28	40		
		Hastelloy C						1.2	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.23	0.46	1.2	35	60	3.0	0.38
		T40					0.39	0.9	28	40	3.0	0.32

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMG 080408 NR	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

WNMG 080408 NP

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.27	0.68	2.3	180	330	4.0	0.50
			180		5.0		0.68	2.3		280		
			210		5.0		0.60	2.0		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.27	0.60	2.0	120	280	4.0	0.45
			230		5.0		0.60	1.5		250		
			280		5.0	0.23	0.53	1.5		210		
			320		4.0		0.53	1.3		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.23	0.60	1.5	70	190	4.0	0.40
			280		5.0		0.60	1.5		150		
			320		4.0		0.53	1.2		130		
			350		4.0		0.53	1.2		100		
			400	0.50	3.5	0.14	0.45	0.9	50	90	3.4	0.36
			480		3.0		0.35	0.7	40	80	2.9	0.30
			550		2.5		0.28	0.5	30	70	2.5	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.26	0.52	1.3	170	270	4.0	0.40
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.46	1.1	160	210	4.0	0.36
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.23	0.46	0.8	70	150	4.0	0.32
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.29	0.46	1.1	170	250	4.0	0.35
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.29	0.46	1.1	170	250	4.0	0.35
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.20	0.90	2.3	170	250	4.0	0.60
		GG 25						2.0		230		
		GG 30						2.0		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.20	0.70	1.7	120	230	4.0	0.50
		GGG 50	260					1.5		190		
		GGG 70	310					1.4		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.2	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.26	0.46	1.1	25	35	3.0	0.38
		Inconel 718						1.1	28	40		
		Hastelloy C						1.2	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.23	0.46	1.2	35	60	3.0	0.38
		T40					0.39	0.9	28	40	3.0	0.32

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMG 080408 NP	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

WNMG 080408 WM

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMG 080408 WM	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

WNMG 080412 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.27	0.68	3.1	180	330	4.0	0.50
			180		5.0		0.68	3.1		280		
			210		5.0		0.60	2.6		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.27	0.60	2.6	120	280	4.0	0.45
			230		5.0		0.60	2.0		250		
			280		5.0	0.23	0.53	2.0		210		
			320		4.0		0.53	1.7		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	5.0	0.23	0.60	2.0	70	190	4.0	0.40
			280		5.0		0.60	2.0		150		
			320		4.0		0.53	1.6		130		
			350		4.0		0.53	1.6		100		
			400	0.50	3.5	0.14	0.45	1.2	50	90	3.4	0.36
			480		3.0		0.35	0.9	40	80	2.9	0.30
			550		2.5		0.28	0.6	30	70	2.5	0.25
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.26	0.52	1.7	170	270	4.0	0.40
	5	X2 CrNiMo 17 2 2 316	230 to 270		5.0	0.23	0.46	1.4	160	210	4.0	0.36
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		5.0	0.23	0.46	1.0	70	150	4.0	0.32
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	5.0	0.29	0.46	1.5	170	250	4.0	0.35
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.20	0.90	3.0	170	250	4.0	0.60
		GG 25						2.7		230		
		GG 30						2.7		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.20	0.70	2.3	120	230	4.0	0.50
		GGG 50	260					2.0		190		
		GGG 70	310					1.8		150		
		G-X260NiCr42	450	0.50	1.8	0.06	0.15	0.3	30	50	1.2	0.12
Nickel Based Alloys	11	Inconel 625	--------	0.50	5.0	0.26	0.46	1.4	25	35	3.0	0.38
		Inconel 718						1.4	28	40		
		Hastelloy C						1.6	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	5.0	0.23	0.46	1.6	35	60	3.0	0.38
		T40					0.39	1.2	28	40	3.0	0.32

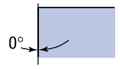
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMG 080412 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



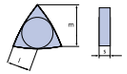
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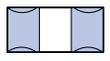
Shape
80° Diamond



Clearance Angle
0° No rake



Tolerance
l ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
WNMP 060404 NN	LT 10	6	4,76	0,4	T0000306	103
WNMP 060408 NN	LT 10	6	4,76	0,8	T0000307	104
WNMP 080408 NN	LT 10	8	4,76	0,8	T0000308	105

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMP 060404 NN					
WNMP 060408 NN					
WNMP 080408 NN					

1 2 3 4

80° Trigon shape inserts, with positive chip breaker geometry. Generates lower cutting forces, suitable for High Temperature Alloys and Stainless Steel operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent







Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMP 060404 NN					

1 2 3 4

LAMINA TECHNOLOGIES

WNMP 060408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/rev]		A max [mm²]	V_C [m/min]		Optimal cutting conditions	
				min	max	min	max		min	max	d.o.c	feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	3.5	0.21	0.45	1.2	180	350	3.0	0.35
			180		3.5		0.45	1.2		300		
			210		3.5		0.40	1.0		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	3.5	0.21	0.40	1.0	120	280	3.0	0.30
			230		3.0		0.40	1.0		250		
			280		3.0	0.18	0.35	0.9		210		
			320		3.0		0.35	0.8		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	3.0	0.18	0.40	1.0	70	190	2.5	0.28
			280		3.0		0.40	1.0		150		
			320		2.5		0.35	0.7		130		
			350		2.5		0.35	0.7		100		
			400	0.50	2.0	0.11	0.30	0.5	50	90	1.5	0.25
			480		1.5		0.25	0.3	40	80	1.0	0.20
			550		1.0		0.20	0.2	30	70	0.5	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMP 060408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

LAMINA TECHNOLOGIES

WNMP 080408 NN

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/rev]		A max [mm²]	V_C [m/min]		Optimal cutting conditions	
				min	max	min	max		min	max	d.o.c	feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	5.0	0.21	0.45	1.8	180	350	3.0	0.35
			180		5.0		0.45	1.8		300		
			210		4.0		0.40	1.5		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	5.0	0.21	0.40	1.2	120	280	3.0	0.30
			230		4.0		0.40	1.2		250		
			280		4.0	0.18	0.35	1.2		210		
			320		3.5		0.35	1.0		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	4.0	0.18	0.40	1.2	70	190	2.5	0.28
			280		4.0		0.40	1.2		150		
			320		3.0		0.35	0.8		130		
			350		3.0		0.35	0.8		100		
			400	0.50	2.5	0.11	0.30	0.6	50	90	2.0	0.25
			480		2.0		0.25	0.4	40	80	1.7	0.20
			550		1.7		0.20	0.3	30	70	1.0	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

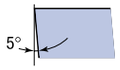
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
WNMP 080408 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

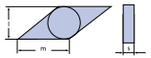
LAMINA TECHNOLOGIES

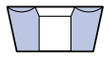
STAR V D T C B M T

V 35° D 55° T 60° C 80°









Shape
35° / 55° / 60° / 80°
Diamond

Clearance Angle
5° Positive rake

Tolerance
l ± 0.05 m ± 0.16
s ± 0.13

Insert Type
Screw down clamping
Single sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
ST-CBMT 060408L NN	LT 10	6	4,76	0,8	T0001005	108
ST-DBMT 060404L NN	LT 10	6	4,76	0,4	T0000965	109
ST-TBMT 060404L NN	LT 10	6	4,76	0,4	T0000996	110
ST-VBMT 060404L NN	LT 10	6	4,76	0,4	T0000995	111

NN All Purpose Chipbreaker

STAR Tool holders on the next page

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
ST-CBMT 060408L NN					
ST-DBMT 060404L NN					
ST-TBMT 060404L NN					
ST-VBMT 060404L NN					
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

Exclusive and unique design inserts with positive chip breaker geometry. Suitable for roughing, semi fininshig and finishing operations due to the ability to use the same tool holder and for 35° - 80° angle operations. Limited in Plunging angle.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent





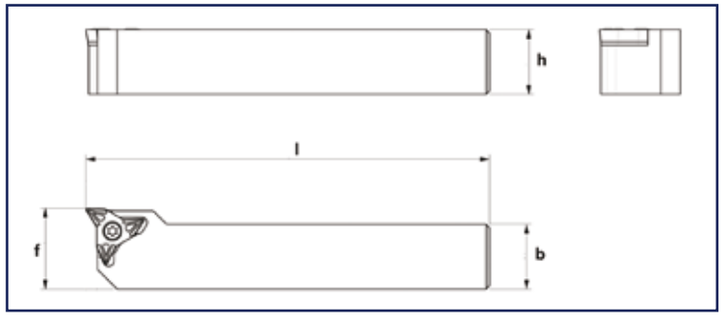


Machining Recommendation Guide - Please see Pg. 8

ST-C/D/T/VBMT

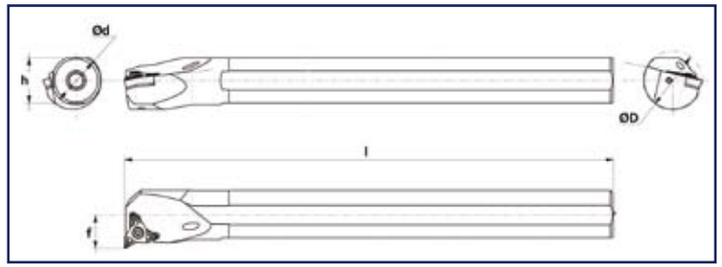
External

Catalog Nr.	Description	h	b	l	f
T2001028	ST-SXJBL 2020 K06	20	20	125	25
T2001029	ST-SXJBL 2525 K06	25	25	150	32



Internal

Catalog Nr.	Description	ød	l	h	f	øDmin
T2001031	ST-A25S-SXJBR 06	25	250	23	17	30



STAR

ST-CBMT 060408L

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.50	3.5	0.21	0.45	1.2	180	350	3.0	0.35
			180		3.5		0.45	1.2		300		
			210		3.5		0.40	1.0		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.50	3.5	0.21	0.40	1.0	120	280	3.0	0.30
			230		3.0		0.40	1.0		250		
			280		3.0	0.18	0.35	0.9		210		
			320		3.0		0.35	0.8		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.50	3.0	0.18	0.40	1.0	70	190	2.5	0.28
			280		3.0		0.40	1.0		150		
			320		2.5		0.35	0.7		130		
			350		2.5		0.35	0.7		100		
			400	0.50	2.0	0.11	0.30	0.5	50	90	1.5	0.25
			480		1.5		0.25	0.3	40	80	1.0	0.20
			550		1.0		0.20	0.2	30	70	0.5	0.18
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.50	5.0	0.20	0.40	1.0	170	270	3.0	0.35
	5	X2 CrNiMo 17 2 2 316	230 to 270		4.0	0.18	0.35	0.8	160	210	3.0	0.32
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		4.0	0.18	0.35	0.6	70	150	2.5	0.28
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.50	4.0	0.22	0.35	0.9	170	250	3.0	0.32
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.50	5.0	0.15	0.60	2.0	170	250	3.0	0.35
		GG 25						1.8		230		
		GG 30						1.8		210		
Nodular Cast Iron	10	GGG 40	210	0.50	5.0	0.15	0.50	1.5	120	230	3.0	0.30
		GGG 50	260					1.3		190		
		GGG 70	310					1.2		150		
		G-X260NiCr42	450	0.50	1.7	0.11	0.25	0.4	30	50	1.0	0.18
Nickel Based Alloys	11	Inconel 625	--------	0.50	3.0	0.20	0.35	0.7	25	35	2.0	0.28
		Inconel 718						0.7	28	40		
		Hastelloy C						0.8	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.50	3.0	0.18	0.35	0.8	35	60	2.0	0.30
		T40					0.30	0.6	28	40	2.0	0.28

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
ST-CBMT 060408L NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

ST-DBMT 060404L

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	Vc [m/min] min	Vc [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
ST-DBMT 060404L NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

ST-TBMT 060404L

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
ST-TBMT 060404L NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

LAMINA TECHNOLOGIES

ST-VBMT 060404L

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_C [m/min] min	V_C [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.20	3.0	0.11	0.23	0.60	180	350	2.0	0.18
			180		2.5		0.20	0.48		280		
			210		2.5		0.18	0.48		250		
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.20	2.5	0.11	0.20	0.48	120	280	2.0	0.15
			230		2.5		0.20	0.40		250		
			280		2.0	0.09	0.18	0.40		210		
			320		2.0		0.16	0.32		180		
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.20	2.5	0.09	0.18	0.40	70	190	2.0	0.12
			280		2.5		0.16	0.40		150		
			320		2.0		0.14	0.28		130		
			350		2.0		0.14	0.24		100		
			400	0.20	1.8	0.05	0.12	0.20	50	90	1.7	0.11
			480		1.5		0.10	0.17	40	80	1.4	0.09
			550		1.4		0.08	0.13	30	70	1.2	0.07
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.20	2.5	0.10	0.18	0.32	170	270	2.0	0.15
	5	X2 CrNiMo 17 2 2 316	230 to 270		2.0	0.09	0.16	0.24	160	210	2.0	0.12
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	-------		2.0	0.09	0.14	0.20	70	150	2.0	0.12
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.15
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.20	2.0	0.11	0.18	0.28	170	250	2.0	0.12
			Treated						120	190		
Grey Cast Iron	9	GG 20	140 to 230	0.20	3.0	0.08	0.20	0.64	170	250	2.0	0.18
		GG 25						0.60		230		
		GG 30						0.60		210		
Nodular Cast Iron	10	GGG 40	210	0.20	2.5	0.08	0.18	0.48	120	230	2.0	0.15
		GGG 50	260					0.40		190		
		GGG 70	310					0.40		150		
		G-X260NiCr42	450	0.20	1.5	0.05	0.10	0.17	30	70	1.4	0.09
Nickel Based Alloys	11	Inconel 625	--------	0.20	2.0	0.10	0.16	0.24	25	35	2.0	0.12
		Inconel 718						0.24	28	40		
		Hastelloy C						0.28	40	65		
Titanium Based Alloys	12	TiAl 6 V4	--------	0.20	2.0	0.09	0.16	0.28	35	60	2.0	0.14
		T40					0.14	0.24	28	40	2.0	0.12

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
ST-VBMT 060404L NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

LAMINA TECHNOLOGIES

STAR

ONLY ONE GRADE

The Lamina Multi-Mat LT-10 Grade for Turning and Parting can Machine most materials with

Only one grade
LT-10

Steel	Stainless Steel	Cast Iron	Super Alloys
Example **35 NC 6**	Example **316L**	Example **FC400-12**	Example **Inconel 718**

ALU-Turning LT - 05 Aluminium

ALUMINIUM-TURNING INSERTS

Lamina's unique line of Turning inserts for Aluminium and soft material machining. Based on optimized chip breaker geometry and our unique coated grade, LT-05.



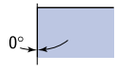
True Multi-Mat inserst for real productivity



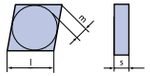
C N G G



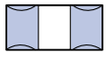
Shape
80° Diamond



Clearance Angle
0° No rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
CNGG 120404 ALU	LT 05	12	4,76	0,4	T0001025	115
CNGG 120408 ALU	LT 05	12	4,76	0,8	T0001019	115

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNGG 120404 ALU					
CNGG 120408 ALU					

ISO standard inserts with extreme and unique positive chip breaker geometry, for Aluminum turning operations. Suitable mostly for external operations but good also for internal operations, Roughing - Finishing operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent

Machining Recommendation Guide - Please see Pg. 8

CNGG 120404-ALU

Aluminium	Group No	Material Examples*	Brinell hardness HB	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_c [m/min] min	V_c [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Si < 4%	13	AlMgSi 1	----	0.25	5.0	0.12	0.35	1.5	400	1200	0.5 to 3	0.23
4% < Si < 8%	13	AlSi 6 Cu 4	----			0.10	0.30	1.2	250	600		
Si > 8%	14	AlSi 12	----	Recommended to use CNMG 120404 NN - LT-10								

For high Si Aluminuim, it is recommended to use CNMG 120404 NN.
See cutting conditions bellow.

Si > 8%	14	AlSi 12	----	0.50	5.0	0.10	0.30	0.80	200	400	0.5 to 1.2	0.15

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNGG 120404 ALU					

CNGG 120408-ALU

Aluminium	Group No	Material Examples*	Brinell hardness HB	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_c [m/min] min	V_c [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Si < 4%	13	AlMgSi 1	----	0.25	5.0	0.12	0.60	2.0	400	1200	0.5 to 3	0.23
4% < Si < 8%	13	AlSi 6 Cu 4	----			0.10	0.50	1.8	250	600		
Si > 8%	14	AlSi 12	----	Recommended to use CNMP 120408 NN - LT-10								

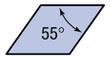
For high Si Aluminuim, it is recommended to use CNMP 120408 NN.
See cutting conditions bellow.

Si > 8%	14	AlSi 12	----	0.50	5.0	0.15	0.50	1.50	200	400	1.0 to 3.0	0.25

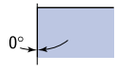
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
CNGG 120408 ALU					



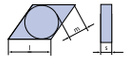
D N G G



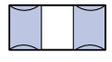
Shape
55° Diamond



Clearance Angle
0° No rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
DNGG 110404 ALU	LT 05	11	4,76	0,4	T0001026	117
DNGG 110408 ALU	LT 05	11	4,76	0,8	T0001010	117

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNGG 110404 ALU					
DNGG 110408 ALU					

ISO standard inserts with extreme and unique positive chip breaker geometry, for Aluminum turning operations. Suitable mostly for external operations but good also for internal operations, Roughing - Finishing operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent

Machining Recommendation Guide - Please see Pg. 8

DNGG 110404-ALU

Aluminium	Group No	Material Examples*	Brinell hardness HB	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_c [m/min] min	V_c [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Si < 4%	13	AlMgSi 1	----	0.25	5.0	0.12	0.30	1.5	400	1200	0.5 to 3	0.23
4% < Si < 8%	13	AlSi 6 Cu 4	----			0.10	0.25	1.2	250	600		
Si > 8%	14	AlSi 12	----	Recommended to use LT-10								

For high Si Aluminuim, it is recommended to use DNMG 110404 NN.
See cutting conditions bellow.

Si > 8%	14	AlSi 12	----	0.50	5.0	0.10	0.30	0.80	200	400	0.5 to 1.2	0.15

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNGG 110404 ALU					

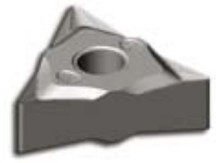
DNGG 110408-ALU

Aluminium	Group No	Material Examples*	Brinell hardness HB	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_c [m/min] min	V_c [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Si < 4%	13	AlMgSi 1	----	0.25	5.0	0.12	0.60	2.0	400	1200	0.5 to 3	0.32
4% < Si < 8%	13	AlSi 6 Cu 4	----			0.10	0.45	1.6	250	600		
Si > 8%	14	AlSi 12	----	Recommended to use LT-10								

For high Si Aluminuim, it is recommended to use DNMG 110408 NN.
See cutting conditions bellow.

Si > 8%	14	AlSi 12	----	0.50	5.0	0.10	0.30	0.80	200	400	0.5 to 1.2	0.15

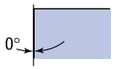
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNGG 110408 ALU					



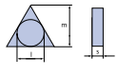
T N G G



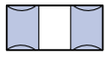
Shape
Triangle 60°



Clearance Angle
0° No rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
TNGG 160404 ALU	LT 05	16	4,76	0,4	T0001105	119

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
TNGG 160404 ALU	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

ISO standard inserts with extreme and unique positive chip breaker geometry, for Aluminum turning operations. Suitable mostly for external operations but good also for internal operations, Roughing - Finishing operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent

Machining Recommendation Guide - Please see Pg. 8

Aluminium	Group No	Material Examples*	Brinell hardness HB	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_c [m/min] min	V_c [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Si < 4%	13	AlMgSi 1	----	0.25	5.0	0.12	0.30	1.5	400	1200	0.5 to 3	0.23
4% < Si < 8%	13	AlSi 6 Cu 4	----			0.10	0.25	1.2	250	600		
Si > 8%	14	AlSi 12	----	Recommended to use TNMG 160404 NN - LT-10								

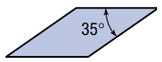
For high Si Aluminuim, it is recommended to use TNMG 160404 NN.
See cutting conditions bellow.

Si > 8%	14	AlSi 12	----	0.20	4.0	0.10	0.30	0.80	200	400	0.5 to 1.2	0.15

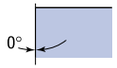
Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
DNGG 110404 ALU	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4



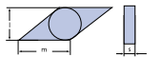
V N G G



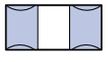
Shape
35° Diamond



Clearance Angle
0° No rake



Tolerance
l ± 0.05 m ± 0.16
s ± 0.13



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	r	Catalog Nr.	Page
VNGG 160404 ALU	LT 05	16	4,76	0,4	T0001006	121
VNGG 160408 ALU	LT 05	16	4,76	0,8	T0001032	121

NN All Purpose Chipbreaker

Application Guide	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VNMG 160404 NN					
VNMG 160408 NN					

ISO standard inserts with extreme and unique positive chip breaker geometry, for Aluminum turning operations. Suitable mostly for external operations but good also for internal operations, Roughing - Finishing operations.

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent

Machining Recommendation Guide - Please see Pg. 8

VNGG 160404-ALU

Aluminium	Group No	Material Examples*	Brinell hardness HB	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_c [m/min] min	V_c [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Si < 4%	13	AlMgSi 1	----	0.25	6.0	0.12	0.30	1.5	400	1'200	0.5 to 3	0.23
4% < Si < 8%	13	AlSi 6 Cu 4	----			0.10	0.25	1.2	250	600		
Si > 8%	14	AlSi 12	----	Recommended to use VNMG 160404 NN - LT-10								

For high Si Aluminuim, it is recommended to use VNMG 160404 NN.
See cutting conditions bellow.

Si > 8%	14	AlSi 12	----	0.50	5.0	0.10	0.30	0.80	200	400	0.5 to 1.2	0.15

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VNGG 160404 ALU					

VNGG 160408-ALU

Aluminium	Group No	Material Examples*	Brinell hardness HB	d.o.c [mm] min	d.o.c [mm] max	feed [mm/rev] min	feed [mm/rev] max	A max [mm²]	V_c [m/min] min	V_c [m/min] max	Optimal cutting conditions d.o.c	Optimal cutting conditions feed
Si < 4%	13	AlMgSi 1	----	0.25	6.0	0.12	0.60	2.0	400	1'200	0.5 to 3	0.32
4% < Si < 8%	13	AlSi 6 Cu 4	----			0.10	0.45	1.6	250	600		
Si > 8%	14	AlSi 12	----	Recommended to use VNMG 160408 NN - LT-10								

For high Si Aluminuim, it is recommended to use VNMG 160408 NN.
See cutting conditions bellow.

Si > 8%	14	AlSi 12	----	0.50	5.0	0.18	0.45	1.50	200	400	1.0 to 3.0	0.25

Insert designation	Super Finishing	Finishing	Semi Finishing	Roughing	Interrrupted Cut
VNGG 160404 ALU					

Aluminium machining like never before...

LAMINA **4** CUTTING EDGES





instead of

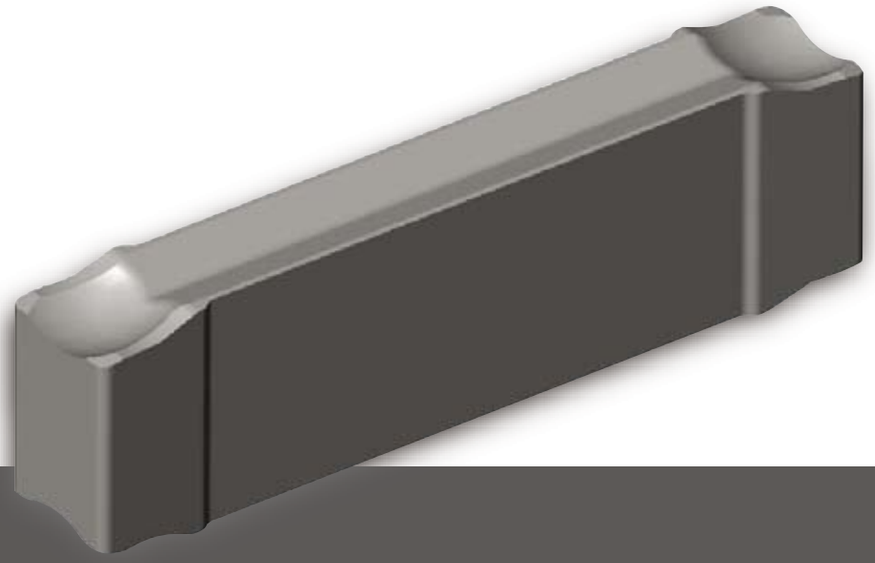
ISO **2** CUTTING EDGES





- Excellent chip control and surface finishing- even in low Silicon Aluminium.
- Excellent toughness & wear resistance characteristics.
- Double the cutting edges, per insert.
- Can handle with ease depth of cut of up to 6 mm.
- True ability to run un-manned in CNC operation.
- Can be mounted on a standard tool-holder.

MULTI-MAT® PARTING INSERTS





G N T X
G C T X

G — **Shape**: "Doge bone"

C — **Clearance Angle**: N = 0° No rake; C = 7° rake angle

T — **Tolerance**: l ± 0.05 m ± 0.16; s ± 0.13

X — **Insert Type**: Special

Insert designation	Grade	W	R	Catalog Nr.	Page
GNTX 2002 NN	LT 10	2.0mm	0.18mm	T0001468	126
GNTX 3003 NN	LT 10	3.0mm	0.18mm	T0001470	127
GCTX 2002 NN	LT 10	3.0mm	0.25mm	T0001469	128
GCTX 3003 NN	LT 10	3.0mm	0.25mm	T0001471	129
GCTX 2002 PP	LT 10	3.0mm	0.25mm	T0001880	130
GCTX 3003 PP	LT 10	3.0mm	0.25mm	T0001879	131

NN All Purpose Chipbreaker

Application Guide	Parting	Grooving	Side Turning	Chamfering
GNTX 2002 NN				
GNTX 3003 NN				
GCTX 2002 NN				
GCTX 3003 NN				
GCTX 2002 PP				
GCTX 3003 PP				
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

1 Not Recommended 2 Acceptable 3 Recommended 4 Excellent

GNTX : 4 CUTTING EDGE - ForSteel and cast Iron.
GCTX : 2 CUTTING EDGE - ForStainless Steel.

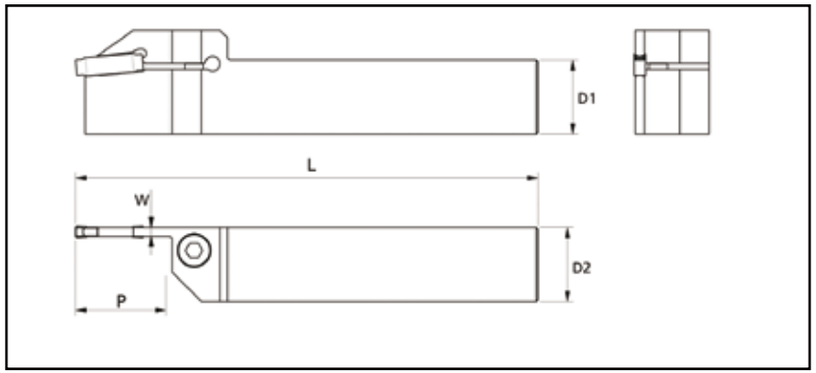
Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

GNTX / GCTX

Catalog Nr.	Description	D1	D2	L	W	Pmax	Hand
T2001164	LT PNG-L 12-2.0	12	12	120	1.6	20	left
T2001165	LT PNG-R 12-2.0	12	12	120	1.6	20	right
T2001166	LT PNG-L 16-2.0	16	16	120	1.6	20	left
T2001167	LT PNG-R 16-2.0	16	16	120	1.6	20	right
T2001484	LT PNG-L 20-2.0	20	20	120	1.6	20	left
T2001485	LT PNG-R 20-2.0	20	20	120	1.6	20	right
T2001482	LT PNG-L 25-2.0	25	25	120	1.6	20	left
T2001483	LT PNG-R 25-2.0	25	25	120	1.6	20	right

Catalog Nr.	Description	D1	D2	L	W	Pmax	Hand
T2001168	LT PNG-L 16-3.0	16	16	120	2.4	20	left
T2001169	LT PNG-R 16-3.0	16	16	120	2.4	20	right
T2001170	LT PNG-L 20-3.0	20	20	125	2.4	25	left
T2001171	LT PNG-R 20-3.0	20	20	125	2.4	25	right
T2001197	LT PNG-L 25-3.0	25	25	125	2.4	25	left
T2001198	LT PNG-R 25-3.0	25	25	125	2.4	25	right



LAMINA TECHNOLOGIES

GNTX 2002 NN

Material Group	Group No	Material Examples*	Brinell hardness	feed [mm/rev] min	feed [mm/rev] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150 180 210	0.04	0.17	130	220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180 230	0.04	0.15	90	200
			280 320	0.03	0.15	90	180
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220 280	0.03	0.14	60	150
			320 350	0.03	0.14	60	110
			400 480 550	0.03	0.07	50	80
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	For Stainless Steel please use GCTX insert.			
	5	X2 CrNiMo 17 2 2 316	230 to 270				
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------				
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed				
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed Treated				
Grey Cast Iron	9	GG 20 GG 25 GG 30	140 to 230	0.06	0.16	130	190
Nodular Cast Iron	10	GGG 40 GGG 50 GGG 70	210 260 310	0.05	0.14	90	150
		G-X260NiCr42	450	0.05	0.14	90	150
Nickel Based Alloys	11	Inconel 625 Inconel 718 Hastelloy C	--------	For Exotic material please use GCTX insert.			
Titanium Based Alloys	12	TiAl 6 V4 T40	--------				

Insert designation	Parting	Grooving	Side Turning	Chamfering
GNTX 2002 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

GNTX 3003 NN

Material Group	Group No	Material Examples*	Brinell hardness	feed [mm/rev] min	feed [mm/rev] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150 180 210	0.06	0.20	130	220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180 230	0.05	0.18	90	200
			280 320	0.05	0.18	90	180
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220 280	0.05	0.17	60	150
			320 350	0.05	0.17	60	110
			400 480 550	0.03	0.07	50	80
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	For Stainless Steel please use GCTX insert.			
	5	X2 CrNiMo 17 2 2 316	230 to 270				
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------				
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed				
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed Treated				
Grey Cast Iron	9	GG 20 GG 25 GG 30	140 to 230	0.08	0.18	130	190
Nodular Cast Iron	10	GGG 40 GGG 50 GGG 70	210 260 310	0.08	0.15	90	150
		G-X260NiCr42	450	0.06	0.08	30	70
Nickel Based Alloys	11	Inconel 625 Inconel 718 Hastelloy C	--------	For Exotic material please use GCTX insert.			
Titanium Based Alloys	12	TiAl 6 V4 T40	--------				

Insert designation	Parting	Grooving	Side Turning	Chamfering
GNTX 3003 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

GCTX 2002 NN

Material Group	Group No	Material Examples*	Brinell hardness	feed [mm/rev] min	feed [mm/rev] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.04	0.17	130	230
			180				
			210				
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.03	0.15	90	200
			230				
			280	0.03	0.15	90	180
			320				
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.03	0.14	60	150
			280				
			320	0.03	0.14	70	130
			350				
			400	0.03	0.07	50	80
			480				
			550				
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.03	0.10	170	230
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.03	0.08	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.03	0.08	90	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.03	0.10	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.03	0.10	60	210
			Treated	0.03	0.10	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.06	0.16	130	190
		GG 25					
		GG 30					
Nodular Cast Iron	10	GGG 40	210	0.05	0.14	90	150
		GGG 50	260				
		GGG 70	310				
		G-X260NiCr42	450	0.03	0.06	30	70
Nickel Based Alloys	11	Inconel 625	--------	0.03	0.06	25	65
		Inconel 718					
		Hastelloy C					
Titanium Based Alloys	12	TiAl 6 V4	--------	0.03	0.06	28	60
		T40			0.06	28	40

Insert designation	Parting	Grooving	Side Turning	Chamfering
GCTX 3003 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

Material Group	Group No	Material Examples*	Brinell hardness	feed [mm/rev] min	feed [mm/rev] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.06	0.20	130	230
			180				
			210				
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.05	0.18	90	200
			230				
			280	0.05	0.18	90	180
			320				
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.05	0.17	60	150
			280				
			320	0.05	0.22	70	130
			350				
			400	0.03	0.07	50	80
			480				
			550				
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.04	0.12	170	230
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.04	0.10	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.04	0.08	90	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.04	0.12	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.04	0.12	60	210
			Treated	0.04	0.12	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.08	0.18	130	190
		GG 25					
		GG 30					
Nodular Cast Iron	10	GGG 40	210	0.08	0.15	90	150
		GGG 50	260				
		GGG 70	310				
		G-X260NiCr42	450	0.06	0.08	30	70
Nickel Based Alloys	11	Inconel 625	--------	0.04	0.18	25	65
		Inconel 718					
		Hastelloy C					
Titanium Based Alloys	12	TiAl 6 V4	--------	0.04	0.08	28	60
		T40			0.08	28	40

Insert designation	Parting	Grooving	Side Turning	Chamfering
GCTX 3003 NN	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

GCTX 2002 PP

Material Group	Group No	Material Examples*	Brinell hardness	feed [mm/rev] min	feed [mm/rev] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150 180 210	0.04	0.17	130	230
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180 230	0.03	0.15	90	200
			280 320	0.03	0.15	90	180
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220 280	0.03	0.14	60	150
			320 350	0.03	0.14	70	130
			400 480 550	0.03	0.07	50	80
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.03	0.10	170	230
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.03	0.08	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.03	0.08	90	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.03	0.10	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.03	0.10	60	210
			Treated	0.03	0.10	90	150
Grey Cast Iron	9	GG 20 GG 25 GG 30	140 to 230	0.06	0.16	130	190
Nodular Cast Iron	10	GGG 40 GGG 50 GGG 70	210 260 310	0.05	0.14	90	150
		G-X260NiCr42	450	0.03	0.06	30	70
Nickel Based Alloys	11	Inconel 625 Inconel 718 Hastelloy C	--------	0.03	0.06	25	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.03	0.06	28	60
		T40			0.06	28	40

Insert designation	Parting	Grooving	Side Turning	Chamfering
GCTX 2002 PP	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

Material Group	Group No	Material Examples*	Brinell hardness	feed [mm/rev] min	feed [mm/rev] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150 180 210	0.06	0.20	130	230
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180 230	0.05	0.18	90	200
			280 320	0.05	0.18	90	180
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220 280	0.05	0.17	60	150
			320 350	0.05	0.22	70	130
			400 480 550	0.03	0.07	50	80
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.04	0.12	170	230
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.04	0.10	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.04	0.08	90	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.04	0.12	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.04	0.12	60	210
			Treated	0.04	0.12	90	150
Grey Cast Iron	9	GG 20 GG 25 GG 30	140 to 230	0.08	0.18	130	190
Nodular Cast Iron	10	GGG 40 GGG 50 GGG 70	210 260 310	0.08	0.15	90	150
		G-X260NiCr42	450	0.06	0.08	30	70
Nickel Based Alloys	11	Inconel 625 Inconel 718 Hastelloy C	--------	0.04	0.18	25	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.04	0.08	28	60
		T40			0.08	28	40

Insert designation	Parting	Grooving	Side Turning	Chamfering
GCTX 3003 PP	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

ONLY ONE GRADE

MULTI-MAT® MILLING INSERTS

The Lamina Multi-Mat LT-30 Grade for Milling and Drilling can machine most materials with

Only one grade
LT-30

Steel	Stainless Steel	Cast Iron	Super Alloys
Example **35 NC 6**	Example **316L**	Example **FC400-12**	Example **Inconel 718**



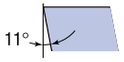
True Multi-Mat inserts for real productivity



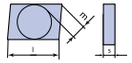
A D K T



Shape
80° Diamond



Clearance Angle
15°



Tolerance
l ± 0.05 m ± 0.013
s ± 0.025

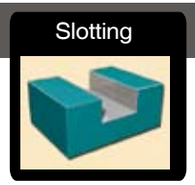


Insert Type
Screw Down Clamping
no chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
ADKT 1505 PDTR	LT 30	15	5,56	90º	15º	Right	M0001573	136

Surfacing Insert Lead angle 90°

Application Guide







Multi purpose 90° milling insert. Suitable for Roughing to Finishing - Slotting, Shoulder and Face milling operations.



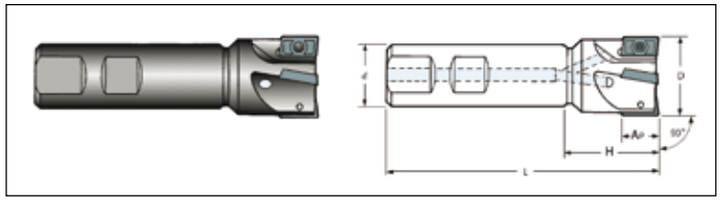




Machining Recommendation Guide - Please see Pg. 8

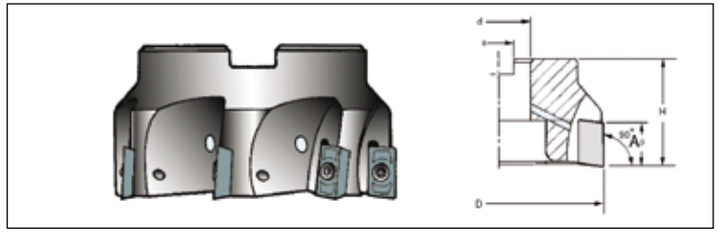
Catalog Nr.	Description	D	d	L	H	Ap	z
M2001613	LT 790 W-W-D25	25	25	100	44	15	2
M2001503	LT 790 W-W-D32	32	32	110	50	15	3
M2001614	LT 790 W-W-D40	40	32	115	45	15	4

Screw set: VT 40 **Key set:** CT 15



Catalog Nr.	Description	D	d	H	Ap	z
M2001615	LT 790 M-W-D40	40	16	40	15	4
M2001504	LT 790 M-W-D50	50	22	40	15	5
M2001616	LT 790 M-W-D63	63	22	40	15	6
M2001617	LT 790 M-W-D80	80	27	50	15	7
M2001618	LT 790 M-W-D100	100	32	50	15	8
M2001619	LT 790 M-W-D125	125	40	63	15	9

W = With coolant **Screw set:** VT 50 **Key set:** CT 15



ADKT 1505 PDTR

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	14.0	0.18	0.32	180	300
			180		14.0		0.32		260
			210		14.0		0.32		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	14.0	0.15	0.25	130	200
			230		14.0		0.25		180
			280	0.5	14.0	0.15	0.22	100	160
			320		14.0		0.22		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	10.0	0.12	0.22	90	130
			280		10.0		0.22		110
			320	0.5	10.0	0.12	0.18	60	100
			350		10.0		0.18		90
			400	0.5	5.0	0.10	0.18	40	80
			480		3.0		0.16		70
			550		1.5		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	14.0	0.15	0.25	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	14.0	0.12	0.22	120	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	10.0	0.12	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	14.0	0.15	0.25	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	14.0	0.15	0.25	130	210
			Treated	0.5	14.0	0.15	0.20	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	14.0	0.18	0.32	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	14.0	0.15	0.28	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	10.0	0.12	0.18	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	10.0	0.12	0.20	35	60
		T40					0.18	28	40



A O M T

AOMT

Shape
80° Diamond

Clearance Angle
15°

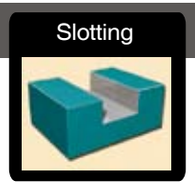
Tolerance
l ± 0.05 m ± 0.013
s ± 0.025

Insert Type
Screw Down Clamping
no chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
AOMT 123608 PETR	LT 30	15	5,56	90º	15º	Right	M0001640	139

Surfacing Insert Lead angle 90°

Application Guide







Multi purpose 90° milling insert. Suitable for Roughing to Finishing - Slotting, Shoulder, Face and Ramping down milling operations.

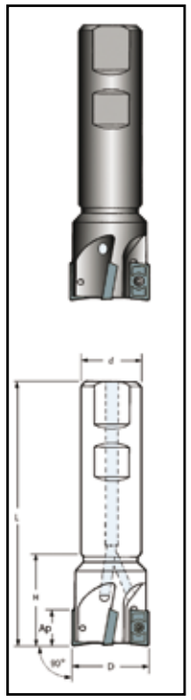


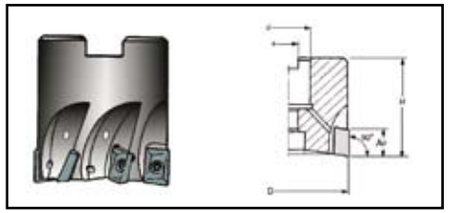




Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	d	L	H	Ap	z
M2001817	LT720 W-W-D16/1	16	16	85	25	10	1
M2001781	LT720 W-W-D16/2	16	16	85	25	10	2
M2001818	LT720 W-W-D20/2	20	20	100	30	10	2
M2001782	LT720 W-W-D20/3	20	20	100	30	10	3
M2001783	LT720 W-W-D25/3	25	25	115	35	10	3
M2001819	LT720 W-W-D25/4	25	25	115	35	10	4
M2001820	LT720 W-W-D32/4	32	32	125	45	10	4
M2001784	LT720 W-W-D32/5	32	32	125	45	10	5





Catalog Nr.	Description	D	d	H	Ap	z
M2001785	LT 720 M-W-D40/6	40	22	40	10	6
M2001821	LT 720 M-W-D50/7	50	22	40	10	7

W = With coolant **Screw set:** VT 25 **Key set:** BT 08



AOMT

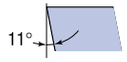
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	11.0	0.10	0.38	180	300
			180		11.0		0.25		260
			210		11.0		0.23		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	11.0	0.08	0.22	130	200
			230		11.0		0.22		180
			280	0.5	11.0	0.08	0.18	100	160
			320		11.0		0.18		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.08	0.18	90	130
			280		7.0		0.18		110
			320	0.5	7.0	0.08	0.16	60	100
			350		7.0		0.16		90
			400	0.5	4.0	0.10	0.16	40	80
			480		2.0		0.15		70
			550		1.0		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	7.0	0.10	0.22	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	7.0	0.10	0.20	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	7.0	0.08	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	7.0	0.08	0.20	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	7.0	0.08	0.20	130	210
			Treated	0.5	7.0	0.08	0.20	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	9.0	0.10	0.25	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	9.0	0.10	0.22	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.08	0.15	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.08	0.18	35	60
		T40					0.15	28	40



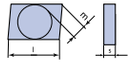
A P K T



Shape
80° Diamond



Clearance Angle
15°



Tolerance
l ± 0.05 m ± 0.013
s ± 0.025

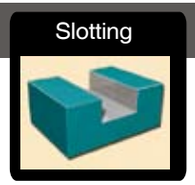


Insert Type
Screw Down Clamping
no chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
APKT 1604 PDTR	LT 30	16	4,76	90º	15º	Right	M0000021	143
APKT 160424 ER	LT 30	16	4,76	2,4	15º	Right	M0000300	143
APKT 1705 PETR	LT 30	17	5,56	2,4	15º	Right	M0001810	144

Surfacing Insert Lead angle 90°

Application Guide







Multi purpose 90° milling inserts. Suitable for Roughing to Finishing - Slotting, Shoulder and Face milling operations.



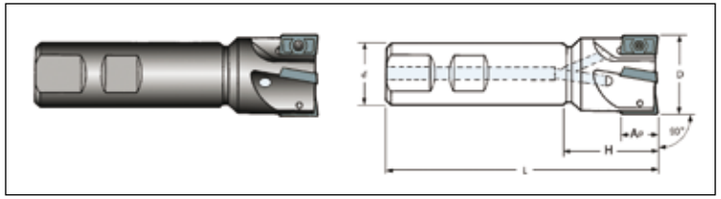




Machining Recommendation Guide - Please see Pg. 8

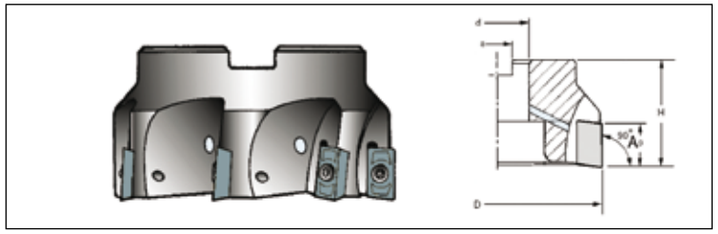
Catalog Nr.	Description	D	d	L	H	Ap	z
M2000536	LT 730 W-W-D25	25	25	100	44	15	2
M2001478	LT 730 W-WL-D25	25	20	150	44	15	2
M2000537	LT 730 W-W-D32	32	32	110	50	15	3
M2001479	LT 730 W-WL-D32	32	25	150	50	15	3
M2000538	LT 730 W-W-D40	40	32	115	45	15	4
M2001480	LT 730 W-WL-D40	40	32	150	45	15	4

Screw set: VT 40 **Key set:** CT 15



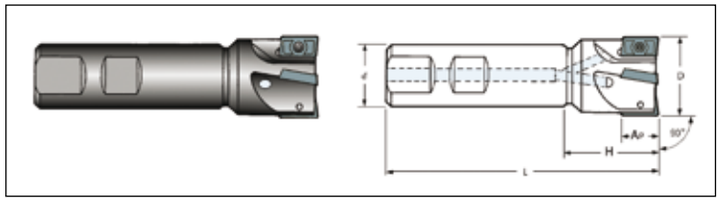
Catalog Nr.	Description	D	d	H	Ap	z
M2000539	LT 730 M-W-D40	40	16	40	15	4
M2000540	LT 730 M-W-D50	50	22	40	15	5
M2000541	LT 730 M-W-D63	63	22	40	15	6
M2000542	LT 730 M-W-D80	80	27	50	15	7
M2000543	LT 730 M-W-D100	100	32	50	15	8
M2000544	LT 730 M-W-D125	125	40	63	15	9
M2000545	LT 730 M-W-D160	160	40	63	15	10

W = With coolant **Screw set:** VT 40 **Key set:** CT 15



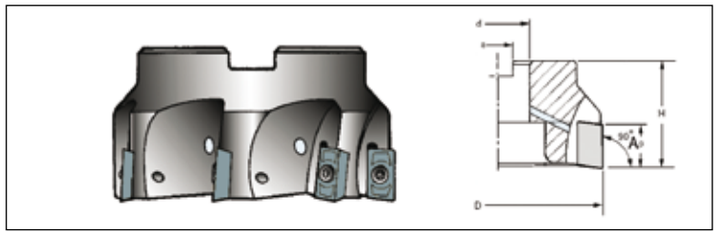
Catalog Nr.	Description	D	d	L	H	Ap	z
M2001833	LT737 W-W-D25/2	25	20	100	32	14	2
M2001834	LT737 W-W-D32/3	32	32	110	40	14	3
M2001835	LT737 W-W-D40/4	40	32	115	45	14	4
M2001836	LT737 W-WL-D25/2	25	25	210	40	14	2
M2001837	LT737 W-WL-D32/3	32	32	200	65	14	3

Screw set: VT 40 Key set: CT 15



Catalog Nr.	Description	D	d	H	Ap	z
M2001838	LT737 M-W-D40/4	40	16	40	14	4
M2001839	LT737 M-W-D50/5	50	22	40	14	5
M2001841	LT737 M-W-D63/6	63	22	40	14	6
M2001842	LT737 M-W-D80/7	80	27	50	14	7
M2001843	LT737 M-W-D100/7	100	32	50	14	7
M2001844	LT737 M-W-D125/9	125	40	63	14	9
M2001845	LT737 M-W-D160/10	160	40	63	14	10

W = With coolant Screw set: VT 40 Key set: CT 15



Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	15.0	0.18	0.32	180	300
			180		15.0		0.32		260
			210		15.0		0.32		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	15.0	0.15	0.25	130	200
			230		15.0		0.25		180
			280	0.5	15.0	0.15	0.22	100	160
			320		15.0		0.22		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	12.0	0.12	0.22	90	130
			280		12.0		0.22		110
			320	0.5	12.0	0.12	0.18	60	100
			350		12.0		0.18		90
			400	0.5	5.0	0.10	0.18	40	80
			480		3.0		0.16		70
			550		1.5		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	15.0	0.15	0.25	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	15.0	0.12	0.22	120	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	12.0	0.12	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	15.0	0.15	0.25	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	15.0	0.15	0.25	130	210
			Treated	0.5	15.0	0.15	0.20	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	15.0	0.18	0.32	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	15.0	0.15	0.28	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	12.0	0.12	0.18	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	12.0	0.12	0.20	35	60
		T40					0.18	28	40

APKT 1705 PETR

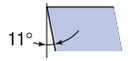
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	15.0	0.18	0.40	180	300
			180		15.0		0.35		260
			210		15.0		0.32		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	15.0	0.18	0.35	130	200
			230		15.0		0.32		180
			280	0.5	15.0	0.18	0.30	100	160
			320		15.0		0.28		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	15.0	0.18	0.32	90	130
			280		15.0		0.30		110
			320	0.5	7.0	0.15	0.28	60	100
			350		7.0		0.26		90
			400	0.5	4.0	0.10	0.24	40	80
			480		2.0		0.22		70
			550		1.0		0.20		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	9.0	0.15	0.22	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	9.0	0.15	0.20	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	9.0	0.15	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	9.0	0.10	0.20	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	9.0	0.10	0.20	130	210
			Treated	0.5	9.0	0.10	0.20	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	9.0	0.20	0.45	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	9.0	0.20	0.45	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.22	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.08	0.15	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.08	0.18	35	60
		T40					0.15	28	40



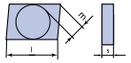
A P L X



Shape
80° Diamond



Clearance Angle
15°



Tolerance
l ± 0.05 m ± 0.013
s ± 0.025



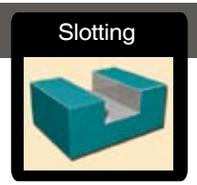
Insert Type
Screw Down Clamping
no chip breaker

APLX

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
APLX 1003 PDTR	LT 30	10	3,18	90º	15º	Right	M0000454	148
APLX 100308 PDTR	LT 30	10	3,18	0,8	15º	Right	M0001151	148
APLX 100332 PDTR	LT 30	10	3,18	3,2	15º	Right	M0001566	149
APLX 100340 PDTR	LT 30	10	3,18	4,0	15º	Right	M0001567	149

Surfacing Insert Lead angle 90°

Application Guide







Multi purpose 90° milling inserts. Suitable for Roughing to Finishing - Slotting, Shoulder and Face milling operations.

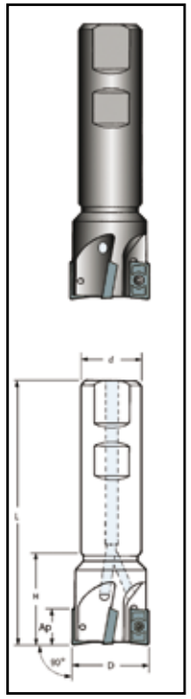


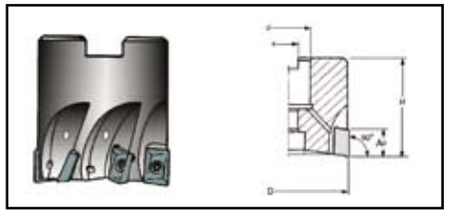




Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	d	L	H	Ap	z
M2000518	LT 740 W-W-D10/1	10	16	80	24	9	1
M2000530	LT 740 W-WL-D10	10	16	150	24	9	1
M2000519	LT 740 W-W-D12/1	12	16	80	24	9	1
M2000531	LT 740 W-WL-D12	12	16	150	24	9	1
M2000520	LT 740 W-W-D14/1	14	16	80	24	9	1
M2000521	LT 740 W-W-D16/2	16	16	85	25	9	2
M2000532	LT 740 W-WL-D16	16	16	150	24	9	2
M2000522	LT 740 W-W-D18/2	18	20	85	25	9	2
M2000523	LT 740 W-W-D20	20	20	90	25	9	3
M2000533	LT 740 W-WL-D20	20	20	150	25	9	3
M2000524	LT 740 W-W-D22	22	25	95	25	9	3
M2000525	LT 740 W-W-D25/3	25	25	95	25	9	3
M2000526	LT 740 W-W-D25	25	25	95	25	9	4
M2000534	LT 740 W-WL-D25	25	20	150	25	9	4
M2000527	LT 740 W-W-D28	28	25	95	25	9	4
M2000528	LT 740 W-W-D30	30	25	95	25	9	4
M2000529	LT 740 W-W-D32	32	25	95	26	9	5
M2000535	LT 740 W-WL-D32	32	25	150	26	9	5

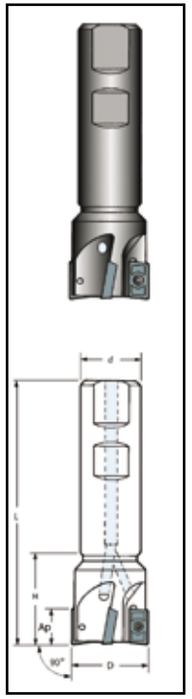


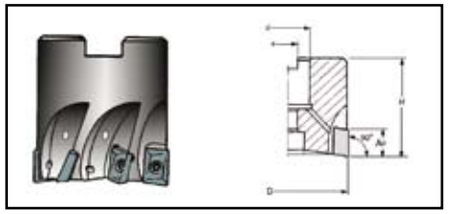


Catalog Nr.	Description	D	d	H	Ap	z
M2000514	LT 740 M-W-D40/6	40	22	40	9	6
M2000515	LT 740 M-W-D50/7	50	22	40	9	7
M2000516	LT 740 M-W-D63/8	63	22	40	9	8
M2000517	LT 740 M-W-D80/11	80	27	50	9	11

W = With coolant **Screw set:** VT 25 **Key set:** BT 08

Catalog Nr.	Description	D	d	L	H	Ap	z
* M2001584	LT 745 W-W-D10/1	10	16	80	24	9	1
* M2001596	LT 745 W-WL-D10	10	16	150	24	9	1
* M2001585	LT 745 W-W-D12/1	12	16	80	24	9	1
* M2001597	LT 745 W-WL-D12	12	16	150	24	9	1
* M2001586	LT 745 W-W-D14/1	14	16	80	24	9	1
* M2001587	LT 745 W-W-D16/2	16	16	85	25	9	2
* M2001598	LT 745 W-WL-D16	16	16	150	24	9	2
* M2001588	LT 745 W-W-D18/2	18	20	85	25	9	2
* M2001589	LT 745 W-W-D20	20	20	90	25	9	3
* M2001599	LT 745 W-WL-D20	20	20	150	25	9	3
* M2001590	LT 745 W-W-D22	22	25	95	25	9	3
* M2001591	LT 745 W-W-D25/3	25	25	95	25	9	3
* M2001592	LT 745 W-W-D25	25	25	95	25	9	4
* M2001600	LT 745 W-WL-D25	25	20	150	25	9	4
* M2001593	LT 745 W-W-D28	28	25	95	25	9	4
* M2001594	LT 745 W-W-D30	30	25	95	25	9	4
* M2001595	LT 745 W-W-D32	32	25	95	26	9	5
* M2001601	LT 745 W-WL-D32	32	25	150	26	9	5





Catalog Nr.	Description	D	d	H	Ap	z
* M2001580	LT 745 M-W-D40/6	40	22	40	9	6
* M2001581	LT 745 M-W-D50/7	50	22	40	9	7
* M2001582	LT 745 M-W-D63/8	63	22	40	9	8
* M2001583	LT 745 M-W-D80/11	80	27	50	9	11

W = With coolant **Screw set:** VT 25 **Key set:** BT 08

*** Non stock item - On special request.**

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	9.0	0.10	0.38	180	300
			180		9.0		0.25		260
			210		9.0		0.23		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	9.0	0.08	0.22	130	200
			230		9.0		0.22		180
			280	0.5	9.0	0.08	0.18	100	160
			320		9.0		0.18		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.08	0.18	90	130
			280		7.0		0.18		110
			320	0.5	7.0	0.08	0.16	60	100
			350		7.0		0.16		90
			400	0.5	4.0	0.10	0.16	40	80
			480		2.0		0.15		70
			550		1.0		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	9.0	0.10	0.22	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	9.0	0.10	0.20	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	9.0	0.08	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	9.0	0.08	0.20	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	9.0	0.08	0.20	130	210
			Treated	0.5	9.0	0.08	0.20	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	9.0	0.10	0.25	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	9.0	0.10	0.22	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.08	0.15	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.08	0.18	35	60
		T40					0.15	28	40

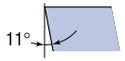
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	9.0	0.10	0.38	180	300
			180		9.0		0.25		260
			210		9.0		0.23		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	9.0	0.08	0.22	130	200
			230		9.0		0.22		180
			280	0.5	9.0	0.08	0.18	100	160
			320		9.0		0.18		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.08	0.18	90	130
			280		7.0		0.18		110
			320	0.5	7.0	0.08	0.16	60	100
			350		7.0		0.16		90
			400	0.5	4.0	0.10	0.16	40	80
			480		2.0		0.15		70
			550		1.0		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	9.0	0.10	0.22	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	9.0	0.10	0.20	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	9.0	0.08	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	9.0	0.08	0.20	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	9.0	0.08	0.20	130	210
			Treated	0.5	9.0	0.08	0.20	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	9.0	0.10	0.25	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	9.0	0.10	0.22	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.08	0.15	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.08	0.18	35	60
		T40					0.15	28	40



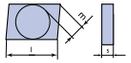
A P M T



Shape
80° Diamond



Clearance Angle
15°



Tolerance
l ± 0.05 m ± 0.013
s ± 0.025

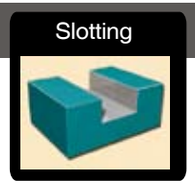


Insert Type
Screw Down Clamping
no chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
APMT 0903 PDTR	LT 30	9	3,18	90º	15º	Right	M0000663	154
APMT 1135 PDTR	LT 30	11	3,52	90º	15º	Right	M0001133	155
APMT 1604 PDTR	LT 30	16	4,76	90º	15º	Right	M0001134	156

Surfacing Insert Lead angle 90°

Application Guide







Multi purpose 90° milling inserts. Suitable for Roughing to Finishing - Slotting, Shoulder and Face milling operations.





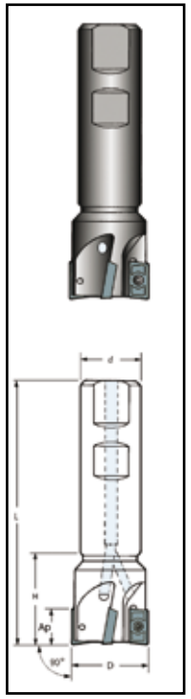


Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

APMT 1135 PDTR

Catalog Nr.	Description	D	d	L	H	Ap	z
M2001652	LT 755 W-W-D10/1	10	16	100	25	9	1
M2001653	LT 755 W-W-D12/1	12	16	100	30	9	1
M2001654	LT 755 W-W-D16/2	16	16	120	30	9	2
M2001658	LT 755 W-WL-D16/2	16	16	160	30	9	2
M2001655	LT 755 W-W-D20/2	20	20	120	35	9	2
M2001659	LT 755 W-WL-D20/2	20	20	150	35	9	2
M2001656	LT 755 W-W-D25/4	25	25	150	40	9	4
M2001660	LT 755 W-WL-D25/4	25	25	200	40	9	4
M2001657	LT 755 W-W-D32/4	32	25	150	40	9	4
M2001661	LT 755 W-WL-D32/4	32	25	200	40	9	4

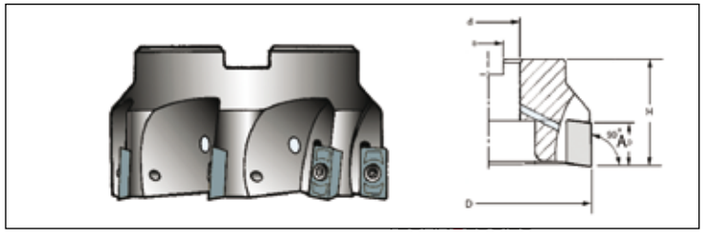


APMT 1604 PDTR

Catalog Nr.	Description	D	d	H	Ap	z
M2001662	LT 760 W-W-D25/2	25	25	150	50	15	2
M2001665	LT 760 W-WL-D25/2	25	25	200	70	15	2
M2001663	LT 760 W-W-D32/2	32	32	200	100	15	3
M2001666	LT 760 W-WL-D32/3	32	32	250	100	15	3
M2001664	LT 760 W-W-D40/4	35	32	200	100	15	3
M2001667	LT 760 W-WL-D40/4	35	32	250	100	15	3

Catalog Nr.	Description	D	d	H	Ap	z
M2001668	LT 760 M-W-D50/5	50	22	40	15	5
M2001669	LT 760 M-W-D63/6	63	22	40	15	6
M2001670	LT 760 M-W-D80/7	80	27	50	15	7
M2001671	LT 760 M-W-D100/8	100	32	50	15	8
M2001672	LT 760 M-W-D125/9	125	40	63	15	9

W = With coolant **Screw set:** VT 40 **Key set:** CT 15



APMT 0903 PDTR

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	8.5	0.10	0.25	180	300
			180		8.5		0.25		260
			210		8.5		0.25		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	8.5	0.08	0.22	130	200
			230		8.5		0.22		180
			280	0.5	8.5	0.08	0.18	100	160
			320		8.5		0.18		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.08	0.18	90	130
			280		7.0		0.18		110
			320	0.5	7.0	0.08	0.16	60	100
			350		7.0		0.16		90
			400	0.5	4.0	0.10	0.16	40	80
			480		2.0		0.15		70
			550		1.0		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	8.5	0.10	0.22	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	8.5	0.10	0.20	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	7.0	0.08	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	8.5	0.08	0.22	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	8.5	0.08	0.18	130	210
			Treated	0.5	8.5	0.08	0.18	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	8.5	0.10	0.28	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	8.5	0.10	0.25	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.08	0.15	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.08	0.18	35	60
		T40					0.15	28	40

APMT 1135 PDTR

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	10.0	0.10	0.38	180	300
			180		10.0		0.25		260
			210		10.0		0.23		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	10.0	0.08	0.22	130	200
			230		10.0		0.22		180
			280	0.5	10.0	0.08	0.18	100	160
			320		10.0		0.18		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.08	0.18	90	130
			280		7.0		0.18		110
			320	0.5	7.0	0.08	0.16	60	100
			350		7.0		0.16		90
			400	0.5	4.0	0.10	0.16	40	80
			480		2.0		0.15		70
			550		1.0		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	10.0	0.10	0.22	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	10.0	0.10	0.20	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	7.0	0.08	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	10.0	0.08	0.20	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	7.0	0.08	0.20	130	210
			Treated	0.5	7.0	0.08	0.20	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	10.0	0.10	0.25	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	10.0	0.10	0.22	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.08	0.15	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.08	0.18	35	60
		T40					0.15	28	40

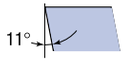
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	15.0	0.18	0.32	180	300
			180		15.0		0.32		260
			210		15.0		0.32		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	15.0	0.15	0.25	130	200
			230		15.0		0.25		180
			280	0.5	15.0	0.15	0.22	100	160
			320		15.0		0.22		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	12.0	0.12	0.22	90	130
			280		12.0		0.22		110
			320	0.5	12.0	0.12	0.18	60	100
			350		12.0		0.18		90
			400	0.5	5.0	0.10	0.18	40	80
			480		3.0		0.16		70
			550		1.5		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	15.0	0.15	0.25	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	15.0	0.12	0.22	120	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	12.0	0.12	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	15.0	0.15	0.25	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	15.0	0.15	0.25	130	210
			Treated	0.5	15.0	0.15	0.20	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	15.0	0.18	0.32	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	15.0	0.15	0.28	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	12.0	0.12	0.18	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	12.0	0.12	0.20	35	60
		T40					0.18	28	40



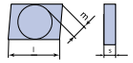
L D M T



Shape
80° Diamond



Clearance Angle
15°



Tolerance
l ± 0.05 m ± 0.013
s ± 0.025



Insert Type
Screw Down Clamping
no chip breaker

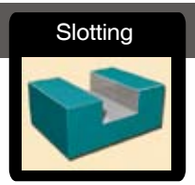
LDMT

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
LDMT 1504 PDTR	LT 30	15	4,76	90º	15º	Right	M0001772	157

Surfacing Insert Lead angle 90°

*Availability is subject to special agreement

Application Guide







Multi purpose 90° milling insert. Suitable for Roughing to Finishing - Slotting, Shoulder and Face milling operations.



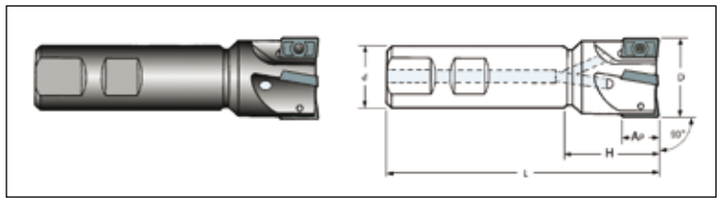




Machining Recommendation Guide - Please see Pg. 8

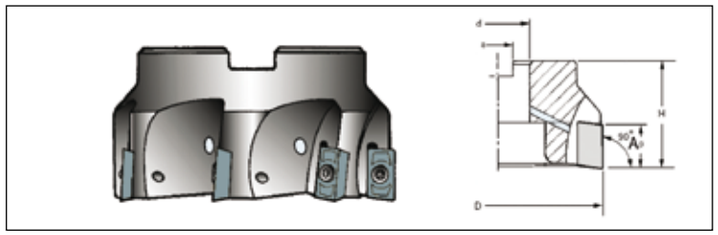
Catalog Nr.	Description	D	d	L	H	Ap	z
M2001822	LT 770 W-W-D25/2	25	25	100	44	15	2
M2001823	LT 770 W-W-D32/3	32	32	110	50	15	3
M2001824	LT 770 W-W-D40/4	40	32	115	45	15	4
M2001825	LT 770 W-WL-D25/2	25	25	150	44	15	2
M2001826	LT 770 W-WL-D32/3	32	32	150	50	15	3

Screw set: VT 40 Key set: CT 15



Catalog Nr.	Description	D	d	H	Ap	z
M2001827	LT 770 M-W-D40	40	16	40	15	4
M2001828	LT 770 M-W-D50	50	22	40	15	5
M2001829	LT 770 M-W-D63	63	22	40	15	6
M2001846	LT 770 M-W-D80	80	27	50	15	7
M2001830	LT 770 M-W-D100	100	32	50	15	8
M2001831	LT 770 M-W-D125	125	40	63	15	9
M2001832	LT 770 M-W-D160	160	50	63	15	9

W = With coolant Screw set: VT 50 Key set: CT 15



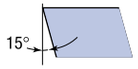
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	14.0	0.10	0.38	180	300
			180		14.0		0.25		260
			210		14.0		0.23		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	14.0	0.08	0.22	130	200
			230		14.0		0.22		180
			280	0.5	14.0	0.08	0.18	100	160
			320		14.0		0.18		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.08	0.18	90	130
			280		7.0		0.18		110
			320	0.5	7.0	0.08	0.16	60	100
			350		7.0		0.16		90
			400	0.5	4.0	0.10	0.16	40	80
			480		2.0		0.15		70
			550		1.0		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	14.0	0.10	0.22	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	14.0	0.10	0.20	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	7.0	0.08	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	7.0	0.08	0.20	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	7.0	0.08	0.20	130	210
			Treated	0.5	7.0	0.08	0.20	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	14.0	0.10	0.25	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	14.0	0.10	0.22	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.08	0.15	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.08	0.18	35	60
		T40					0.15	28	40



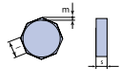
O D M T



Shape
Octagonal



Clearance Angle
15°



Tolerance
l ± 0.05 m ± 0.013
s ± 0.025



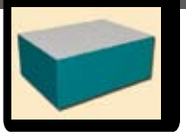
Insert Type
Screw down clamping
Chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
ODMT 0504 ZZTR	LT 30	5	4,76	0,8		Right	M0000664	160
ODMT 060508 TN	LT 30	6	5,56	0,8		Right	M0001104	161

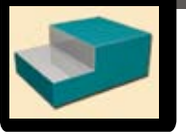
Surfacing Insert Lead angle 45°

Application Guide

Surfacing



Chamfering



Multi purpose 45° milling inserts, with 8 cutting edges. Suitable for Roughing to Finishing - Face milling, Plunging and Ramping down operations.



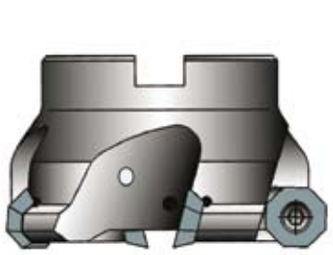


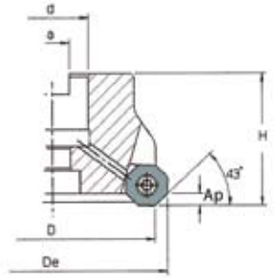


Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	De	L	Ap	H	z
M2000711	LT 820 M-D80	80	90	27	4	50	5
M2000712	LT 820 M-D100	100	110	32	4	50	6
M2000713	LT 820 M-D125	125	135	40	4	63	7
M2000714	LT 820 M-D160	160	170	40	4	63	9

Screw set: C O6710 **Key set:** CT 15





ODMT 0504 TR

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	3.5	0.23	0.48	190	350
			180		3.5		0.48		300
			210		3.5		0.48		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	3.5	0.28	0.42	150	240
			230		3.5		0.42		210
			280	0.5	3.5	0.28	0.35	130	190
			320		3.5		0.35		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	3.5	0.15	0.32	90	150
			280		3.5		0.32		130
			320	0.5	3.5	0.15	0.28	60	110
			350		3.5		0.28		90
			400	0.5	3.0	0.14	0.25	40	80
			480		2.0		0.22		70
			550		1.0		0.20		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	3.5	0.22	0.35	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	3.5	0.18	0.32	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	3.5	0.15	0.28	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	3.5	0.18	0.35	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	3.5	0.18	0.35	150	230
			Treated	0.5	3.5	0.18	0.28	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	3.5	0.20	0.50	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	3.5	0.18	0.48	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3.0	0.14	0.25	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	3.5	0.15	0.30	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	3.5	0.15	0.35	35	60
		T40					0.28	28	40

ODMT 060508 TN

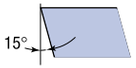
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	4.0	0.23	0.52	190	350
			180		4.0		0.52		300
			210		4.0		0.52		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	4.0	0.20	0.48	150	240
			230		4.0		0.48		210
			280	0.5	4.0	0.20	0.45	130	190
			320		4.0		0.45		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	4.0	0.15	0.42	90	150
			280		4.0		0.42		130
			320	0.5	4.0	0.15	0.38	60	110
			350		4.0		0.38		90
			400	0.5	3.0	0.14	0.25	40	80
			480		2.0		0.22		70
			550		1.0		0.20		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	4.0	0.18	0.35	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	4.0	0.18	0.32	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	4.0	0.15	0.28	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	4.0	0.21	0.38	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	4.0	0.21	0.38	150	230
			Treated	0.5	4.0	0.21	0.32	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	4.0	0.22	0.50	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	4.0	0.18	0.45	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3.0	0.14	0.25	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	4.0	0.16	0.32	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	4.0	0.18	0.32	35	60
		T40					0.28	28	40



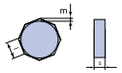
O D M W



Shape
Octagonal



Clearance Angle
15°



Tolerance
l ± 0.05 m ± 0.013
s ± 0.025



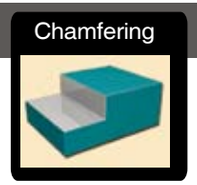
Insert Type
Screw down clamping
Chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
ODMW 060508 TN	LT 30	6	5,56	0,8		Right	M0000451	164

Surfacing Insert Lead angle 45°

Application Guide





Multi purpose 45° milling insert, with 8 cutting edges and flat rake surface. Designed for materials that generate short chips. Suitable for Roughing to Finishing - Face milling, Plunging and Ramping down operations.



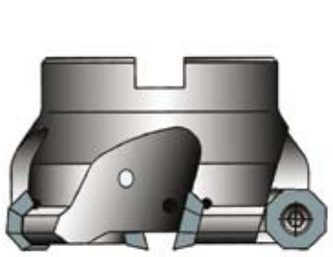


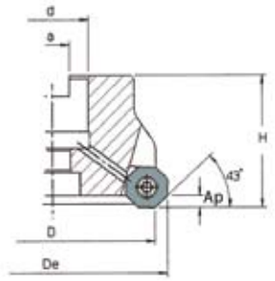


Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	De	L	Ap	H	z
M2000711	LT 820 M-D80	80	90	27	4	50	5
M2000712	LT 820 M-D100	100	110	32	4	50	6
M2000713	LT 820 M-D125	125	135	40	4	63	7
M2000714	LT 820 M-D160	160	170	40	4	63	9

Screw set: C O6710 **Key set:** CT 15





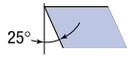
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	4	0.28	0.52	190	350
			180		4		0.52		300
			210		4		0.52		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	4	0.25	0.48	150	240
			230		4		0.48		210
			280	0.5	4	0.25	0.42	130	190
			320		4		0.42		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	4	0.23	0.38	90	150
			280		4		0.38		130
			320	0.5	4	0.23	0.32	60	110
			350		4		0.32		90
			400	0.5	3	0.14	0.25	40	80
			480		2		0.22		70
			550		1		0.2		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	ODMW inserts are not recommended for Stainless Steel					
	5	X2 CrNiMo 17 2 2 316	230 to 270						
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------						
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed						
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed						
			Treated						
Grey Cast Iron	9	GG 20	140 to 230	0.5	4	0.25	0.6	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	4	0.23	0.5	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3	0.14	0.25	30	60
Nickel Based Alloys	11	Inconel 625	--------	ODMW inserts are not recommended for Exotic materials					
		Inconel 718							
		Hastelloy C							
Titanium Based Alloys	12	TiAl 6 V4	--------						
		T40							



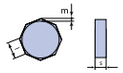
O F E R



Shape
Octagonal



Clearance Angle
25°



Tolerance
l ± 0.025 m ± 0.025
s ± 0.025



Insert Type
Screw down clamping
with chip breaker

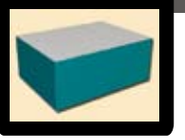
Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
OFER 070405 TN	LT 30	7	4,76	0,8		Right	M0000033	167

Surfacing Insert Lead angle 43°

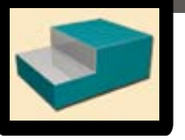
OFER

Application Guide

Surfacing



Chamfering



Multi purpose 45° milling insert, with 8 cutting edges and flat rake surface. Suitable for Roughing to Finishing - Face milling, Plunging and Ramping down operations.



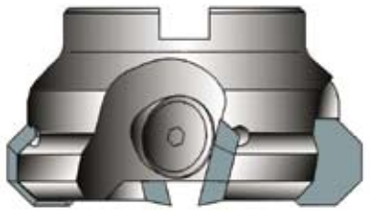


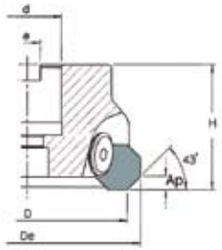


Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	De	d	H	Ap	z
M2000508	LT 880 M-W-D63	63	73	22	40	5	4
M2000510	LT 880 M-W-D80	80	90	27	50	5	5
M2000511	LT 880 M-W-D100	100	110	32	50	5	6
M2000512	LT 880 M-W-D125	125	135	40	63	5	8
M2000513	LT 880 M-W-D160	160	170	40	63	5	10

W = With coolant Screw set: CVB 88 Key set: ET 4





Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	4.0	0.18	0.32	190	350
			180		4.0		0.32		300
			210		4.0		0.32		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	4.0	0.15	0.30	150	240
			230		4.0		0.30		210
			280	0.5	4.0	0.15	0.30	130	190
			320		4.0		0.30		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	4.0	0.12	0.25	90	150
			280		4.0		0.25		130
			320	0.5	4.0	0.12	0.25	60	110
			350		4.0		0.25		90
			400	0.5	3.0	0.14	0.25	40	80
			480		2.0		0.22		70
			550		1.0		0.20		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	5.0	0.18	0.32	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	5.0	0.15	0.28	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	3.5	0.12	0.25	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	5.0	0.12	0.32	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	5.0	0.12	0.32	150	230
			Treated	0.5	5.0	0.12	0.25	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	5.0	0.15	0.40	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	5.0	0.12	0.32	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3.0	0.14	0.25	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	3.5	0.12	0.28	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	3.5	0.12	0.28	35	60
		T40						28	40

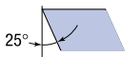
OFER



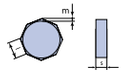
O F M T



Shape
Octagonal



Clearance Angle
15°



Tolerance
l ± 0.05 m ± 0.013
s ± 0.025



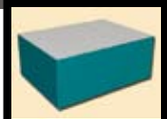
Insert Type
Screw down clamping
Chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
OFMT 05T305 TN	LT 30	5	3,97	0,8		Right	M0000591	170
OFMT 050405 TR	LT 30	5	4,76	0,8		Right	M0000034	170
OFMT 070405 TN	LT 30	7	4,76	0,8		Right	M0000592	171

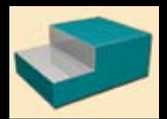
Surfacing Insert Lead angle 43°

Application Guide

Surfacing



Chamfering



Multi purpose 45° milling inserts, with 8 cutting edges and flat rake surface. Suitable for Roughing to Finishing - Face milling, Plunging and Ramping down operations.







Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

OFMT 05T305 TN

Catalog Nr.	Description	D	De	d	H	Ap	z
M2000501	LT 800 M-W-D32	32	39	16	40	3,5	3
M2000502	LT 800 M-W-D40	40	47	16	40	3,5	3
M2000503	LT 800 M-W-D50	50	57	22	40	3,5	4
M2000504	LT 800 M-W-D63	63	70	22	40	3,5	5
M2000505	LT 800 M-W-D80	80	87	27	50	3,5	6
M2000506	LT 800 M-W-D100	100	107	32	50	3,5	7
M2000507	LT 800 M-W-D125	125	132	40	63	3,5	8

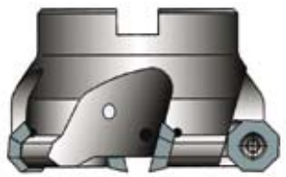
OFMT 050405 TR

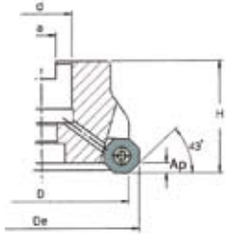
Catalog Nr.	Description	D	De	d	H	Ap	z
M2001602	LT 805 M-W-D32	32	39	16	40	3,5	3
M2001603	LT 805 M-W-D40	40	47	16	40	3,5	3
M2001604	LT 805 M-W-D50	50	57	22	40	3,5	4
M2001605	LT 805 M-W-D63	63	70	22	40	3,5	5
M2001607	LT 805 M-W-D80	80	87	27	50	3,5	6
M2001608	LT 805 M-W-D100	100	107	32	50	3,5	7
M2001609	LT 805 M-W-D125	125	132	40	63	3,5	8

OFMT 070405 TN

Catalog Nr.	Description	D	De	d	H	Ap	z
M2000707	LT 810 M-D80	80	92	27	50	5	6
M2000708	LT 810 M-D100	100	112	32	50	5	7
M2000709	LT 810 M-D125	125	137	40	63	5	8

W = With coolant **Screw set:** C O6710 **Key set:** CT 15





OFMT 05T305 TN & OFMT 050405 TR

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	3.5	0.23	0.48	190	350
			180		3.5		0.48		300
			210		3.5		0.48		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	3.5	0.28	0.42	150	240
			230		3.5		0.42		210
			280	0.5	3.5	0.28	0.35	130	190
			320		3.5		0.35		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	3.5	0.15	0.32	90	150
			280		3.5		0.32		130
			320	0.5	3.5	0.15	0.28	60	110
			350		3.5		0.28		90
			400	0.5	3.0	0.14	0.25	40	80
			480		2.0		0.22		70
			550		1.0		0.20		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	3.5	0.22	0.35	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	3.5	0.18	0.32	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	3.5	0.15	0.28	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	3.5	0.18	0.35	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	3.5	0.18	0.35	150	230
			Treated	0.5	3.5	0.18	0.28	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	3.5	0.20	0.50	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	3.5	0.18	0.48	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3.0	0.14	0.25	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	3.5	0.15	0.30	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	3.5	0.15	0.35	35	60
		T40					0.28	28	40

OFMT 070405 TN

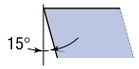
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	4.5	0.23	0.48	190	350
			180		4.5		0.48		300
			210		4.5		0.48		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	4.5	0.28	0.42	150	240
			230		4.5		0.42		210
			280	0.5	4.5	0.28	0.35	130	190
			320		4.5		0.35		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	4.0	0.15	0.32	90	150
			280		4.0		0.32		130
			320	0.5	4.0	0.15	0.28	60	110
			350		4.0		0.28		90
			400	0.5	3.0	0.14	0.25	40	80
			480		2.0		0.22		70
			550		1.0		0.20		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	4.5	0.22	0.35	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	4.5	0.18	0.32	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	4.5	0.15	0.28	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	4.5	0.18	0.35	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	4.5	0.18	0.35	150	230
			Treated	0.5	4.5	0.18	0.28	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	4.5	0.20	0.50	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	4.0	0.18	0.48	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3.0	0.14	0.25	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	4.0	0.15	0.30	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	4.0	0.15	0.35	35	60
		T40					0.28	28	40



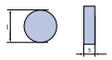
R D M T



Shape
Round



Clearance Angle
15º



Tolerance
ll ± 0.05
s ± 0.13



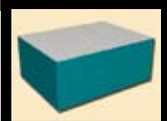
Insert Type
Screw down clamping
chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
RDMT 0602 MO	LT 30	6	2,38	3		Neutral	M0000035	175
RDMT 0803 MO	LT 30	8	3,18	4		Neutral	M0000037	176
RDMT 1003 MO	LT 30	10	3,18	5		Neutral	M0001875	177
RDMT 10T3 MO	LT 30	10	3,97	5		Neutral	M0000038	177
RDMT 1204 MO	LT 30	12	4,76	6		Neutral	M0000039	178
RDMT 12T3 MO	LT 30	12	3,97	6		Neutral	M0001876	178

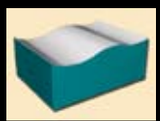
Surfacing Insert Lead angle 90°

Application Guide

Surfacing



Copying



Mould-Milling



Multi purpose Round inserts. Suitable for Roughing to Semi-finishing Copying of 3D surfaces and Face milling operations.







Machining Recommendation Guide - Please see Pg. 8

LAMINA TECHNOLOGIES

RDMT 0602 MO

Catalog Nr.	Description	D	H	L	Ap	z
M2000676	LT 060 W-W-D16	16	25	150	3	2
M2000677	LT 060 W-W-D20	20	60	180	3	3
M2000678	LT 060 W-W-D25	25	80	180	3	3

RDMT 0803 MO

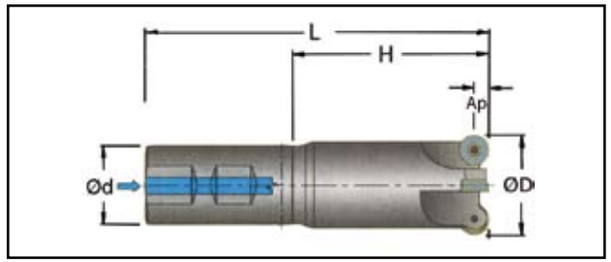
Catalog Nr.	Description	D	H	L	Ap	z
M2000679	LT 080 W-W-D20	20	42	180	4	2
M2000680	LT 080 W-W-D25	25	60	180	4	3
M2000681	LT 080 W-W-D32	32	80	180	4	3

RDMT 1003 MO

Catalog Nr.	Description	D	H	L	Ap	z
M2002085	LT 105 W-W-D20	20	42	180	4	2
M2002086	LT 105 W-W-D25	25	60	180	4	3
M2002087	LT 105 W-W-D32	32	80	180	4	3

RDMT 10T3 MO

Catalog Nr.	Description	D	H	L	Ap	z
M2000683	LT 100 W-W-D20	20	80	180	5	2
M2000684	LT 100 W-W-D25	25	80	180	5	3
M2000685	LT 100 W-W-D32	32	105	212	5	3



RDMT 1204 M0

Catalog Nr.	Description	D	H	L	Ap	z
M2000687	LT 120 W-W-D40	40	110	170	6	4

Catalog Nr.	Description	D1	D2	d	H	Ap	z
M2000691	LT 120 M-W-D40	40	28	16	40	6	4
M2000689	LT 120 M-W-D63	63	51	27	40	6	5
M2000690	LT 120 M-W-D80	80	68	32	50	6	6
M2000688	LT 120 M-W-D100	100	88	40	50	6	7

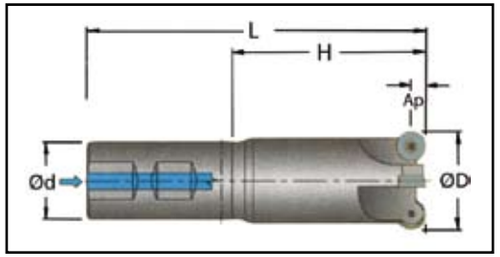
W = With coolant

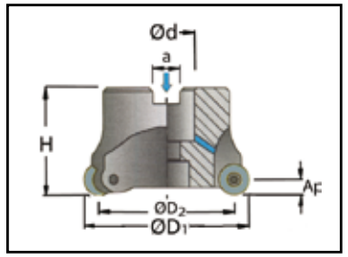
RDMT 12T3 M0

Catalog Nr.	Description	D	H	L	Ap	z
M2002088	LT 125 W-W-D40	40	110	170	6	4

Catalog Nr.	Description	D1	D2	d	H	Ap	z
M2002089	LT 125 M-W-D40	40	28	16	40	6	4
M2002090	LT 125 M-W-D63	63	51	27	40	6	5
M2002091	LT 125 M-W-D80	80	68	32	50	6	6
M2002093	LT 125 M-W-D100	100	88	40	50	6	7

W = With coolant





Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	2.0	0.18	0.40	190	350
			180		2.0		0.35		300
			210		1.5		0.32		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	2.0	0.15	0.40	150	240
			230		2.0		0.32		210
			280	0.5	2.0	0.13	0.30	130	190
			320		1.5		0.25		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	2.0	0.13	0.32	90	150
			280		2.0		0.30		130
			320	0.5	1.5	0.13	0.27	60	110
			350		1.5		0.25		90
			400	0.2	0.8	0.12	0.22	40	80
			480		0.5		0.20		70
			550		0.5		0.18		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	2.0	0.14	0.28	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	2.0	0.13	0.25	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	1.5	0.13	0.22	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	2.0	0.15	0.25	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	2.0	0.15	0.25	150	230
			Treated	0.5	2.0	0.15	0.25	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	2.0	0.11	0.45	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	2.0	0.11	0.35	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.2	0.5	0.11	0.20	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	1.5	0.13	0.23	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	1.5	0.13	0.25	35	60
		T40					0.18	28	40

RDMT 0803 M0

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	3.0	0.20	0.50	190	350
			180		2.5		0.47		300
			210		1.5		0.43		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	3.0	0.18	0.45	150	240
			230		2.5		0.40		210
			280	0.5	2.0	0.15	0.37	130	190
			320		1.5		0.35		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	2.0	0.13	0.40	90	150
			280		2.0		0.37		130
			320	0.5	1.5	0.13	0.35	60	110
			350		1.5		0.32		90
			400	0.2	1.0	0.12	0.28	40	80
			480		0.5		0.25		70
			550		0.5		0.22		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	3.0	0.14	0.35	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	2.5	0.13	0.32	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	2.0	0.13	0.30	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	2.5	0.15	0.30	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	2.5	0.15	0.30	150	230
			Treated	0.5	2.5	0.15	0.30	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	3.0	0.11	0.50	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	2.5	0.11	0.45	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.2	0.5	0.12	0.25	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	2.0	0.13	0.27	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	2.0	0.13	0.32	35	60
		T40					0.25	28	40

Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	3.0	0.23	0.58	190	350
			180		2.5		0.52		300
			210		1.5		0.45		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	3.0	0.21	0.52	150	240
			230		2.5		0.47		210
			280	0.5	2.0	0.20	0.43	130	190
			320		1.5		0.40		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	2.0	0.17	0.47	90	150
			280		2.0		0.43		130
			320	0.5	1.5	0.17	0.40	60	110
			350		1.5		0.38		90
			400	0.2	1.0	0.12	0.32	40	80
			480		0.5		0.28		70
			550		0.5		0.25		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	3.0	0.17	0.38	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	2.5	0.15	0.35	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	2.0	0.13	0.32	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	2.5	0.15	0.35	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	2.5	0.15	0.35	150	230
			Treated	0.5	2.5	0.15	0.35	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	3.0	0.18	0.60	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	2.5	0.18	0.50	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.2	0.5	0.12	0.32	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	2.0	0.15	0.32	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	2.0	0.17	0.35	35	60
		T40					0.27	28	40

RDMT 1204 M0 & RDMT 12T3 M0

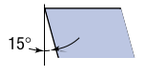
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	3.0	0.27	0.70	190	350
			180		2.5		0.65		300
			210		1.5		0.50		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	3.0	0.25	0.65	150	240
			230		2.5		0.57		210
			280	0.5	2.0	0.23	0.52	130	190
			320		1.5		0.50		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	2.0	0.20	0.57	90	150
			280		2.0		0.52		130
			320	0.5	1.5	0.20	0.50	60	110
			350		1.5		0.47		90
			400	0.5	1.5	0.18	0.38	40	80
			480		1.0		0.34		70
			550		0.5		0.30		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	3.0	0.20	0.45	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	2.5	0.17	0.40	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	2.0	0.15	0.37	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	2.5	0.17	0.40	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	2.5	0.17	0.40	150	230
			Treated	0.5	2.5	0.17	0.40	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	3.0	0.20	0.80	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	2.5	0.20	0.60	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.3	1.0	0.16	0.30	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	2.0	0.17	0.35	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	2.0	0.20	0.38	35	60
		T40					0.30	28	40



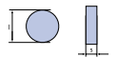
R D M W



Shape
Round



Clearance Angle
15º



Tolerance
ll ± 0.05
s ± 0.13



Insert Type
Screw down clamping
chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
RDMW 10T3 MO	LT 30	10	3,97	5		Neutral	M0001550	181

Surfacing Insert Lead angle 90°

RDMW

Application Guide







Multi purpose Round insert, with flat rake surface, designed for hard materials. Suitable for Roughing to Semi-finishing Copying of 3D surfaces and Face milling operations.

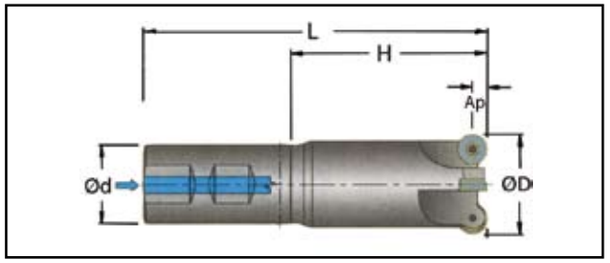






Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	H	L	Ap	z
M2000683	LT 100 W-W-D20	20	80	180	5	2
M2000684	LT 100 W-W-D25	25	80	180	5	3
M2000685	LT 100 W-W-D32	32	105	212	5	3



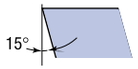
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	3	0.23	0.58	190	350
			180		2.5		0.52		300
			210		1.5		0.45		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	3	0.21	0.52	150	240
			230		2.5		0.47		210
			280	0.5	2	0.2	0.43	130	190
			320		1.5		0.4		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	2	0.2	0.47	90	150
			280		2		0.43		130
			320	0.5	1.5	0.2	0.4	60	110
			350		1.5		0.38		90
			400	0.3	1	0.2	0.36	40	80
			480		0.5		0.35		70
			550		0.5		0.3		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	RDMW inserts are not recommended for Stainless Steel					
	5	X2 CrNiMo 17 2 2 316	230 to 270						
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------						
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed						
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed						
			Treated						
Grey Cast Iron	9	GG 20	140 to 230	0.5	3	0.18	0.6	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	2.5	0.18	0.5	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.2	0.5	0.12	0.32	30	60
Nickel Based Alloys	11	Inconel 625	--------	RDMW inserts are not recommended for Exotic materials					
		Inconel 718							
		Hastelloy C							
Titanium Based Alloys	12	TiAl 6 V4	--------						
		T40							



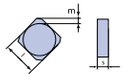
S D K T



Shape
Square 90°



Clearance Angle
15º



Tolerance
l ± 0.08 m ± 0.013
s ± 0.025



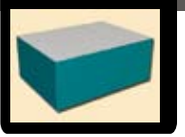
Insert Type
Screw down clamping chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
SDKT 1204 AETN	LT 30	12	4,76	45º	20º	Neutral	M0000171	184

Surfacing Insert Lead angle 45°

Application Guide

Surfacing



Chamfering



Multi purpose 45° milling insert, designed for high depths of cut. Suitable for Roughing to Finishing - Face, Plunging and Ramping down milling operations.





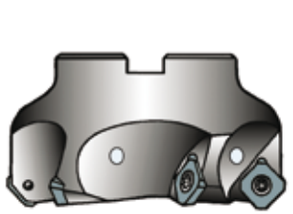


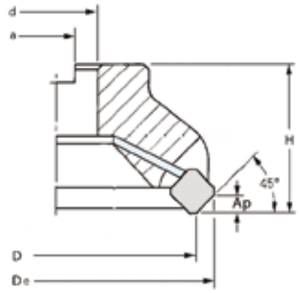
Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	de	d	H	Ap	z
M2000553	LT 670 M-W-D50	50	63	22	48	6	4
M2000555	LT 670 M-W-D63	63	76	22	48	6	5
M2000556	LT 670 M-W-D80	80	93	27	50	6	6
M2000557	LT 670 M-W-D100	100	113	32	55	6	6
M2000558	LT 670 M-W-D125	125	138	40	63	6	7
M2000559	LT 670 M-W-D160	160	173	40	63	6	8

W = With coolant

Screw set: VT 45 P **Key set:** CT 20





SDKT 1204 AFTN

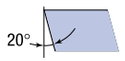
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	7.0	0.20	0.48	190	350
			180		7.0		0.48		300
			210		7.0		0.48		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	7.0	0.18	0.45	150	240
			230		7.0		0.45		210
			280	0.5	7.0	0.18	0.40	130	190
			320		7.0		0.40		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.16	0.42	90	150
			280		7.0		0.42		130
			320	0.5	7.0	0.16	0.38	60	110
			350		7.0		0.38		90
			400	0.3	5.0	0.14	0.35	40	80
			480		3.0		0.32		70
			550		1.5		0.28		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	7.0	0.18	0.35	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	5.0	0.15	0.32	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	5.0	0.12	0.28	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	7.0	0.18	0.35	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	7.0	0.15	0.35	150	230
			Treated	0.5	3.0	0.15	0.28	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	7.0	0.18	0.48	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	7.0	0.15	0.42	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.3	3.0	0.14	0.32	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.15	0.28	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.18	0.32	35	60
		T40						28	40



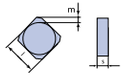
S E K N



Shape
Square 90°



Clearance Angle
20°



Tolerance
l ± 0.08 m ± 0.013
s ± 0.025



Insert Type
Clamping
No chip breaker

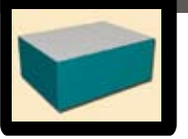
Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
SEKN 1203 AFTN	LT 30	12	3,18	45°	25°	Neutral	M0000041	187
SEKN 1204 AFTN	LT 30	12	4,76	45°	25°	Neutral	M0000042	187
SEKN 1504 AFTN	LT 30	15	4,76	45°	25°	Neutral	M0000450	188

Surfacing Insert Lead angle 45°

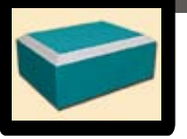
SEKN

Application Guide

Surfacing



Chamfering



Multi purpose 45° milling inserts, designed for high depths of cut. Suitable for Roughing to Finishing - Face, Plunging and Ramping down milling operations.



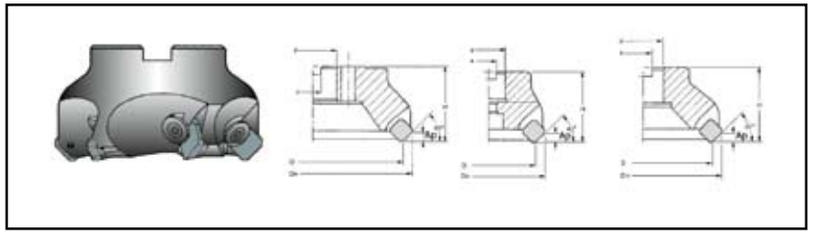




Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	De	d	H	Ap	z
M2000563	LT 550 M-D50	50	63	22	48	6	4
M2000564	LT 550 M-D63	63	76	22	48	6	5
M2000565	LT 550 M-D80	80	93	27	50	6	6
M2000566	LT 550 M-D100	100	113	32	50	6	6
M2000567	LT 550 M-D125	125	138	40	63	6	7
M2000568	LT 550 M-D160	160	173	40	63	6	7
M2000569	LT 550 M-D200	200	213	60	63	6	10
M2000570	LT 550 M-D250	250	263	60	63	6	13

Screw set: CVB 55 **Key set:** ET 4



Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	7.0	0.20	0.32	190	350
			180		7.0		0.32		300
			210		7.0		0.32		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	7.0	0.20	0.30	150	240
			230		7.0		0.30		210
			280	0.5	7.0	0.20	0.30	130	190
			320		7.0		0.30		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.15	0.25	90	150
			280		7.0		0.25		130
			320	0.5	7.0	0.15	0.25	60	110
			350		7.0		0.25		90
			400	0.5	5.0	0.12	0.24	40	80
			480		3.0		0.22		70
			550		1.5		0.20		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	7.0	0.18	0.32	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	5.0	0.15	0.28	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	5.0	0.12	0.25	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	7.0	0.12	0.32	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	7.0	0.12	0.32	150	230
			Treated	0.5	5.0	0.12	0.28	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	7.0	0.15	0.40	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	7.0	0.12	0.32	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3.0	0.12	0.22	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.12	0.28	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.12	0.32	35	60
		T40					0.28	28	40

SEKN

SEKN 1504 AFTN

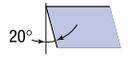
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	9.0	0.20	0.52	190	350
			180		9.0		0.52		300
			210		9.0		0.52		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	9.0	0.20	0.48	150	240
			230		9.0		0.48		210
			280	0.5	9.0	0.20	0.45	130	190
			320		9.0		0.45		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	9.0	0.15	0.42	90	150
			280		9.0		0.42		130
			320	0.5	9.0	0.15	0.38	60	110
			350		9.0		0.38		90
			400	0.5	5.0	0.12	0.32	40	80
			480		3.0		0.28		70
			550		1.5		0.26		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	7.0	0.25	0.35	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	7.0	0.23	0.32	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	7.0	0.18	0.28	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	9.0	0.23	0.38	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	9.0	0.18	0.38	150	230
			Treated	0.5	9.0	0.18	0.32	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	9.0	0.25	0.60	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	9.0	0.18	0.50	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3.0	0.12	0.28	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	7.0	0.18	0.32	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	7.0	0.18	0.32	35	60
		T40					0.28	28	40



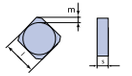
S E K R



Shape
Square 90°



Clearance Angle
20°



Tolerance
l ± 0.08 m ± 0.013
s ± 0.025



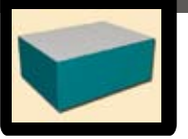
Insert Type
Clamping
chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
SEKR 1203 AFTN	LT 30	12	3,18	45°	25°	Neutral	M0000043	191
SEKR 1204 AFTN	LT 30	12	4,76	45°	25°	Neutral	M0000044	191

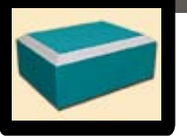
Surfacing Insert Lead angle 45°

Application Guide

Surfacing



Chamfering



SEKR

Multi purpose 45° milling inserts, designed for high depths of cut and materials that generate long chips. Suitable for Roughing to Finishing - Face, Plunging and Ramping down milling operations.



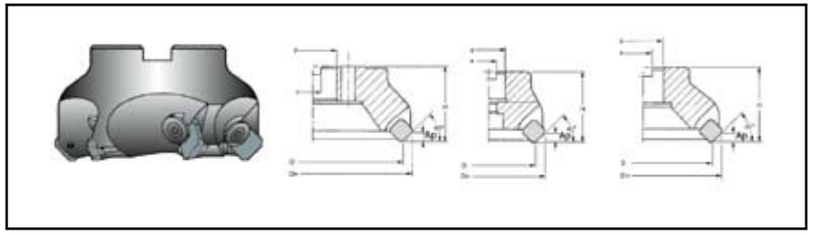




Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	De	d	H	Ap	z
M2000563	LT 550 M-D50	50	63	22	48	6	4
M2000564	LT 550 M-D63	63	76	22	48	6	5
M2000565	LT 550 M-D80	80	93	27	50	6	6
M2000566	LT 550 M-D100	100	113	32	50	6	6
M2000567	LT 550 M-D125	125	138	40	63	6	7
M2000568	LT 550 M-D160	160	173	40	63	6	7
M2000569	LT 550 M-D200	200	213	60	63	6	10
M2000570	LT 550 M-D250	250	263	60	63	6	13

Screw set: CVB 55 **Key set:** ET 4



Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	7.0	0.24	0.32	190	350
			180		7.0		0.32		300
			210		7.0		0.32		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	7.0	0.20	0.30	150	240
			230		7.0		0.30		210
			280	0.5	7.0	0.20	0.30	130	190
			320		7.0		0.30		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	5.0	0.15	0.25	90	150
			280		5.0		0.25		130
			320	0.5	5.0	0.15	0.25	60	110
			350		5.0		0.25		90
			400	0.5	5.0	0.12	0.24	40	80
			480		3.0		0.22		70
			550		1.5		0.20		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	7.0	0.18	0.32	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	5.0	0.15	0.28	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	5.0	0.12	0.25	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	7.0	0.18	0.32	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	7.0	0.12	0.32	150	230
			Treated	0.5	7.0	0.12	0.23	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	7.0	0.15	0.32	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	5.0	0.12	0.28	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3.0	0.12	0.22	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.12	0.23	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.12	0.28	35	60
		T40					0.28	28	40

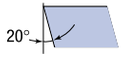
SEKR



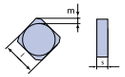
S E K T



Shape
Square 90°



Clearance Angle
20º



Tolerance
l ± 0.08 m ± 0.013
s ± 0.025



Insert Type
Screw down clamping chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
SEKT 12T3 AGSN	LT 30	12	3,97	45º	30º	Neutral	M0000455	194
SEKT 1204 AFTN	LT 30	12	4,76	45º	25º	Neutral	M0000045	194

Surfacing Insert Lead angle 45°

Application Guide

Surfacing



Chamfering



Multi purpose 45° milling inserts, designed for high depths of cut. Suitable for Roughing to Finishing - Face, Plunging and Ramping down milling operations.







Machining Recommendation Guide - Please see Pg. 8

SEKT 1204 AFTN

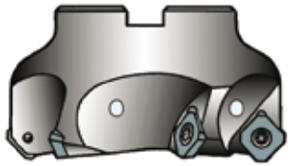
Catalog Nr.	Description	D	De	d	H	Ap	z
M2000546	LT 600 M-W-D40	40	53	16	40	6	3
M2000547	LT 600 M-W-D50	50	63	22	48	6	4
M2000548	LT 600 M-W-D63	63	76	22	48	6	5
M2000549	LT 600 M-W-D80	80	93	27	50	6	6
M2000550	LT 600 M-W-D100	100	113	32	50	6	6
M2000551	LT 600 M-W-D125	125	138	40	63	6	7
M2000552	LT 600 M-W-D160	160	173	40	63	6	8

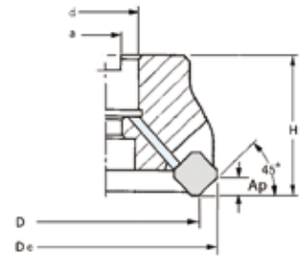
SEKT 12T3 AFTN

Catalog Nr.	Description	D	De	d	H	Ap	z
M2001431	LT 610 M-W-D40	40	53	16	40	6	3
M2001382	LT 610 M-W-D50	50	63	22	48	6	4
M2001383	LT 610 M-W-D63	63	76	22	48	6	5
M2001384	LT 610 M-W-D80	80	93	27	50	6	6
M2001432	LT 610 M-W-D100	100	113	32	50	6	6
M2001433	LT 610 M-W-D125	125	138	40	63	6	7
M2001434	LT 610 M-W-D160	160	173	40	63	6	8

W = With coolant **Screw set:** VT 50 **Key set:** CT 20







SEKT 12T3 AGSN & SEKT 1204 AFTN

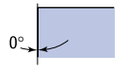
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	7.0	0.20	0.48	190	350
			180		7.0		0.48		300
			210		7.0		0.48		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	7.0	0.18	0.45	150	240
			230		7.0		0.45		210
			280	0.5	7.0	0.18	0.40	130	190
			320		7.0		0.40		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.16	0.42	90	150
			280		7.0		0.42		130
			320	0.5	7.0	0.16	0.38	60	110
			350		7.0		0.38		90
			400	0.3	5.0	0.14	0.35	40	80
			480		3.0		0.32		70
			550		1.5		0.28		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	7.0	0.18	0.35	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	5.0	0.15	0.32	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	5.0	0.12	0.28	70	150
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	7.0	0.18	0.35	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	7.0	0.15	0.35	150	230
			Treated	0.5	3.0	0.15	0.28	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	7.0	0.18	0.48	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	7.0	0.15	0.42	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.3	3.0	0.14	0.32	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.15	0.28	25	35
		Inconel 718						28	40
		Hastelloy C						40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.18	0.32	35	60
		T40					0.28	28	40



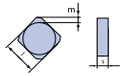
S N K X



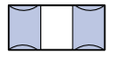
Shape
Square 90°



Clearance Angle
0° No rake



Tolerance
l ± 0.08 m ± 0.013
s ± 0.025



Insert Type
Pin / Top clamp
Double sided

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
SNKX 09T3-90°	LT 30	09	3,18	90°	25°	Neutral	M0001986	**197**
SNKX 09T3-45°	LT 30	09	3,18	45°	25°	Neutral	M0001984	**198**

Application Guide







SNKX

Exclusive and unique design insert with 8 cutting edges for 45° and true 90°. Suitable for general purpose milling including Slotting, Square shoulder, Facing and Ramping down operations.





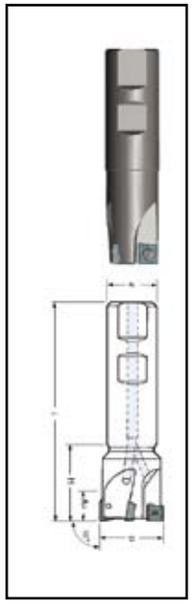


Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	d	L	H	Ap	z
M2001987	LT 990 W-D25/3	25	25	100	46	5	3
M2002070	LT 990 W-D32/4	32	32	110	50	5	4

Catalog Nr.	Description	D	d	H	Ap	z
M2002072	LT 990 M-W-D40/5	40	16	40	5	5
M2002073	LT 990 M-W-D50/6	50	22	40	5	6
M2002074	LT 990 M-W-D63/8	63	22	40	5	8

W = With coolant **Screw set:** VT 25 **Key set:** BT 08

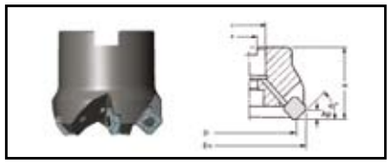


SNKX 09T3-45°

Catalog Nr.	Description	D	d	L	H	Ap	z
M2002075	LT 945 W-D25/3	25	25	100	46	5	3
M2002076	LT 945 W-D32/4	32	32	110	50	5	4

Catalog Nr.	Description	D	d	H	Ap	z
M2001988	LT 945 M-W-D40/5	40	16	40	5	5
M2002077	LT 945 M-W-D50/6	50	22	40	5	6
M2002078	LT 945 M-W-D63/8	63	22	40	5	8

W = With coolant **Screw set:** VT 25 **Key set:** BT 08



Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	1.5	0.10	0.25	180	300
			180		1.5		0.25		260
			210		1.5		0.25		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	1.5	0.08	0.22	130	200
			230		3.0		0.22		180
			280	0.5	3.0	0.08	0.18	100	160
			320		3.0		0.18		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	3.0	0.08	0.18	90	130
			280		3.0		0.18		110
			320	0.5	3.0	0.08	0.16	60	100
			350		3.0		0.16		90
			400	0.5	2.0	0.10	0.16	40	80
			480		1.5		0.15		70
			550		1.0		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	1.5	0.10	0.22	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	1.5	0.10	0.20	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	1.5	0.08	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	1.5	0.08	0.22	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	1.5	0.08	0.18	130	210
			Treated	0.5	1.5	0.08	0.18	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	3.0	0.10	0.28	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	3.0	0.10	0.25	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	1.5	0.08	0.15	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	1.5	0.08	0.18	35	60
		T40					0.15	28	40

SNKX 09T3-45°

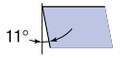
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	3.0	0.14	0.30	180	300
			180		3.0		0.30		260
			210		3.0		0.30		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	3.0	0.10	0.28	130	200
			230		3.0		0.28		180
			280	0.5	3.0	0.10	0.26	100	160
			320		3.0		0.26		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	3.0	0.10	0.26	90	130
			280		3.0		0.26		110
			320	0.5	3.0	0.10	0.23	60	100
			350		3.0		0.23		90
			400	0.5	2.0	0.14	0.23	40	80
			480		1.5		0.21		70
			550		1.0		0.20		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	3.0	0.14	0.30	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	3.0	0.14	0.28	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	3.0	0.10	0.26	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	3.0	0.10	0.30	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	3.0	0.10	0.26	130	210
			Treated	0.5	3.0	0.10	0.26	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	3.0	0.14	0.32	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	3.0	0.14	0.30	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.14	0.20	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	3.0	0.10	0.21	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	3.0	0.10	0.26	35	60
		T40						28	40



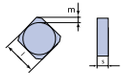
S P K N



Shape
Square 90°



Clearance Angle
20º



Tolerance
l ± 0.08 m ± 0.013
s ± 0.025



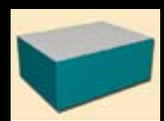
Insert Type
Clamping
chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
SPKN 1203 EDTR	LT 30	12	3,18	75º	15º	Right	M0000046	201
SPKN 1204 EDTR	LT 30	12	4,76	75º	15º	Right	M0000047	201
SPKN 1504 EDTR	LT 30	15	4,76	75º	15º	Right	M0001673	202

Surfacing Insert Lead angle 75°

Application Guide

Surfacing



SPKN

Square inserts with 75° lead angle, designed for high depths of cut. Suitable for Roughing to Finishing Face milling operations.

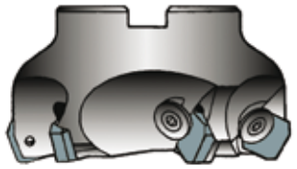


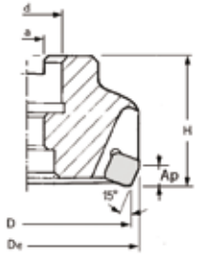


Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	De	d	H	Ap	z
M2000571	LT 750 M-D63	63	69	22	40	9	4
M2000572	LT 750 M-D80	80	86	27	50	9	5
M2000574	LT 750 M-D100	100	106	32	50	9	7
M2000575	LT 750 M-D125	125	131	40	63	9	8
M2000576	LT 750 M-D160	160	166	40	63	9	10
M2000577	LT 750 M-D200	200	206	60	63	9	12
M2000578	LT 750 M-D250	250	256	60	63	9	14

Screw set: CVB 55 **Key set:** ET 4





Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	7	0.18	0.38	190	350
			180		7		0.38		300
			210		7		0.38		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	7	0.15	0.35	150	240
			230		7		0.35		210
			280	0.5	7	0.15	0.32	130	190
			320		7		0.32		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7	0.12	0.32	90	150
			280		7		0.32		130
			320	0.5	7	0.12	0.28	60	110
			350		7		0.28		90
			400	0.5	5	0.1	0.22	40	80
			480		3		0.2		70
			550		1.5		0.28		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	SPKN inserts are not recommended for Stainless Steel					
	5	X2 CrNiMo 17 2 2 316	230 to 270						
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------						
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed						
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed						
			Treated						
Grey Cast Iron	9	GG 20	140 to 230	0.5	7	0.15	0.38	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	7	0.12	0.3	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3	0.1	0.2	30	60
Nickel Based Alloys	11	Inconel 625	--------	SPKN inserts are not recommended for Exotic materials					
		Inconel 718							
		Hastelloy C							
Titanium Based Alloys	12	TiAl 6 V4	--------						
		T40							

SPKN 1504 EDTR

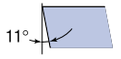
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	9	0.18	0.38	190	350
			180		9		0.38		300
			210		9		0.38		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	9	0.15	0.35	150	240
			230		9		0.35		210
			280	0.5	9	0.15	0.32	130	190
			320		9		0.32		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	9	0.12	0.32	90	150
			280		9		0.32		130
			320	0.5	9	0.12	0.28	60	110
			350		9		0.28		90
			400	0.5	6	0.1	0.22	40	80
			480		3		0.2		70
			550		1.5		0.28		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	SPKN inserts are not recommended for Stainless Steel					
	5	X2 CrNiMo 17 2 2 316	230 to 270						
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------						
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed						
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed						
			Treated						
Grey Cast Iron	9	GG 20	140 to 230	0.5	9	0.15	0.38	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	9	0.12	0.3	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3	0.1	0.2	30	60
Nickel Based Alloys	11	Inconel 625	--------	SPKN inserts are not recommended for Exotic materials					
		Inconel 718							
		Hastelloy C							
Titanium Based Alloys	12	TiAl 6 V4	--------						
		T40							



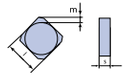
S P K R



Shape
Square 90°



Clearance Angle
20º



Tolerance
l ± 0.08 m ± 0.013
s ± 0.025



Insert Type
Clamping
chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
SPKR 1203 EDTR	LT 30	12	3,18	75º	15º	Right	M0000048	205
SPKR 1204 EDTR	LT 30	12	4,76	75º	15º	Right	M0000049	205

Surfacing Insert Lead angle 75°

Application Guide

Surfacing



Square inserts, with 75° lead angle designed for high depths of cut and materials that generate long chips. Suitable for Roughing to Finishing Face milling operations.

SPKR

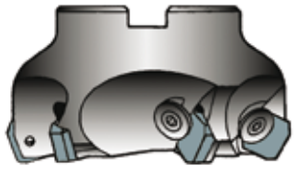


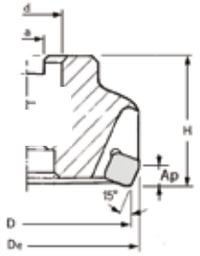


Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	De	d	H	Ap	z
M2000571	LT 750 M-D63	63	69	22	40	9	4
M2000572	LT 750 M-D80	80	86	27	50	9	5
M2000574	LT 750 M-D100	100	106	32	50	9	7
M2000575	LT 750 M-D125	125	131	40	63	9	8
M2000576	LT 750 M-D160	160	166	40	63	9	10
M2000577	LT 750 M-D200	200	206	60	63	9	12
M2000578	LT 750 M-D250	250	256	60	63	9	14

Screw set: CVB 55 **Key set:** ET 4





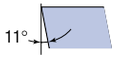
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	7.0	0.18	0.32	190	350
			180		7.0		0.32		300
			210		7.0		0.32		260
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	7.0	0.15	0.30	150	240
			230		7.0		0.30		210
			280	0.5	7.0	0.15	0.28	130	190
			320		7.0		0.28		170
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.12	0.28	90	150
			280		7.0		0.28		130
			320	0.5	7.0	0.12	0.25	60	110
			350		7.0		0.25		90
			400	0.5	5.0	0.10	0.22	40	80
			480		3.0		0.20		70
			550		1.5		0.28		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	0.5	0.18	0.25	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	0.5	0.15	0.20	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	10.0	0.12	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	5.0	0.12	0.25	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	5.0	0.12	0.25	150	230
			Treated	0.5	5.0	0.12	0.23	90	170
Grey Cast Iron	9	GG 20	140 to 230	0.5	7.0	0.15	0.32	170	300
		GG 25							250
		GG 30							210
Nodular Cast Iron	10	GGG 40	210	0.5	7.0	0.12	0.27	120	210
		GGG 50	260						170
		GGG 70	310						150
		G-X260NiCr42	450	0.5	3.0	0.10	0.20	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	10.0	0.12	0.18	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	10.0	0.12	0.20	35	60
		T40					0.18	28	40



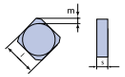
S P M T



Shape
Square 90°



Clearance Angle
11º



Tolerance
l ± 0.08 m ± 0.013
s ± 0.025

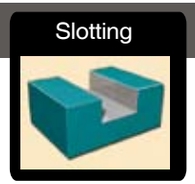


Insert Type
Clamping
No chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
SPMT 12T308	LT 30	12	3,18	75º		Nutral	M0001226	207

Surfacing Insert Lead angle 45°

Application Guide







Multi purpose 90° milling insert with 4 cutting edges. Suitable for Roughing to Finishing - Slotting, Shoulder and Face milling operations.





Machining Recommendation Guide - Please see Pg. 8

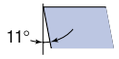
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	9.0	0.10	0.38	180	300
			180		9.0		0.25		260
			210		9.0		0.23		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	9.0	0.08	0.22	130	200
			230		9.0		0.22		180
			280	0.5	9.0	0.08	0.18	100	160
			320		9.0		0.18		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.08	0.18	90	130
			280		7.0		0.18		110
			320	0.5	7.0	0.08	0.16	60	100
			350		7.0		0.16		90
			400	0.5	4.0	0.10	0.16	40	80
			480		2.0		0.15		70
			550		1.0		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	9.0	0.10	0.22	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	9.0	0.10	0.20	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	9.0	0.08	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	9.0	0.08	0.20	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	9.0	0.08	0.20	130	210
			Treated	0.5	9.0	0.08	0.20	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	9.0	0.10	0.25	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	9.0	0.10	0.22	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	5.0	0.08	0.15	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	5.0	0.08	0.18	35	60
		T40					0.15	28	40



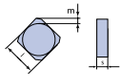
S P U N



Shape
Square 90°



Clearance Angle
11º



Tolerance
l ± 0.13 m ± 0.2
s ± 0.13



Insert Type
Clamping
No chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
SPUN 120308	LT 30	12	3,18	0,8		Neutral	M0000050	210

Application Guide





Multi purpose Square insert with corner radius and a flat rake surface. Use for face milling. Roughing to finishing.

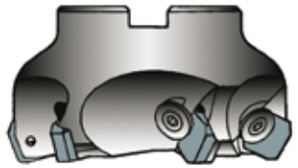


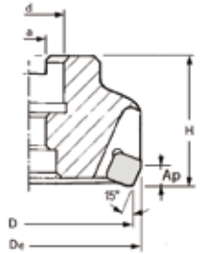


Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	De	d	H	Ap	z
M2000571	LT 750 M-D63	63	69	22	40	9	4
M2000572	LT 750 M-D80	80	86	27	50	9	5
M2000574	LT 750 M-D100	100	106	32	50	9	7
M2000575	LT 750 M-D125	125	131	40	63	9	8
M2000576	LT 750 M-D160	160	166	40	63	9	10
M2000577	LT 750 M-D200	200	206	60	63	9	12
M2000578	LT 750 M-D250	250	256	60	63	9	14

Screw set: CVB 55 **Key set:** ET 4





SPUN 120308

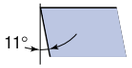
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	7	0.18	0.32	180	300
			180		7		0.32		260
			210		7		0.32		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	7	0.15	0.28	130	200
			230		7		0.28		180
			280	0.5	7	0.15	0.25	100	160
			320		7		0.25		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7	0.12	0.27	90	130
			280		7		0.27		110
			320	0.5	7	0.12	0.23	60	95
			350		7		0.23		80
			400	0.5	5	0.1	0.18	40	80
			480		3		0.16		70
			550		1.5		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	SPUN inserts are not recommended for Stainless Steel					
	5	X2 CrNiMo 17 2 2 316	230 to 270						
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------						
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed						
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed						
			Treated						
Grey Cast Iron	9	GG 20	140 to 230	0.5	7	0.15	0.35	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	7	0.12	0.28	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3	0.1	0.14	30	60
Nickel Based Alloys	11	Inconel 625	--------	SPUN inserts are not recommended for Exotic materials					
		Inconel 718							
		Hastelloy C							
Titanium Based Alloys	12	TiAl 6 V4	--------						
		T40							



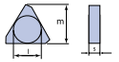
T P K N



Shape
Triangle 60°



Clearance Angle
11°



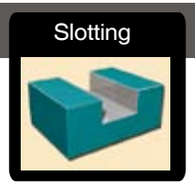
Tolerance
l ± 0.05 m ± 0.013
s ± 0.025



Insert Type
Clamping
no chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
TPKN 1603 PDTR	LT 30	16	3,18	90º	15º	Right	M0000051	213
TPKN 2204 PDTR	LT 30	22	4,76	90º	15º	Right	M0000052	214

Application Guide







Multi purpose 90° milling insert with 3 cutting edges. Use for slotting, shoulder milling and face milling. Roughing to finishing.





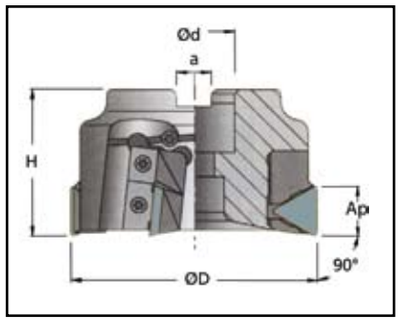
TPKN

Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	d	H	Ap	z
M2000699	LT 310 M-D63	63	22	50	14	6
M2000700	LT 310 M-D80	80	27	50	14	6
M2000701	LT 310 M-D100	100	32	50	14	7
M2000702	LT 310 M-D125	125	40	63	14	8

TPKN 2204 PDTR

Catalog Nr.	Description	D	d	H	Ap	z
M2000703	LT 320 M-D80	80	27	50	20	5
M2000704	LT 320 M-D100	100	32	50	20	6
M2000705	LT 320 M-D125	125	40	63	20	7
M2000706	LT 320 M-D160	160	40	63	20	9



Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	12	0.15	0.25	180	300
			180		12		0.25		260
			210		12		0.25		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	7	0.12	0.23	130	200
			230		7		0.23		180
			280	0.5	7	0.12	0.22	100	160
			320		7		0.22		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7	0.12	0.18	90	130
			280		7		0.18		120
			320	0.5	7	0.12	0.18	90	110
			350		7		0.18		100
			400	0.5	5	0.1	0.18	40	80
			480		3		0.16		70
			550		1.5		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	TPKN inserts are not recommended for Stainless Steel					
	5	X2 CrNiMo 17 2 2 316	230 to 270						
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------						
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed						
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed						
			Treated						
Grey Cast Iron	9	GG 20	140 to 230	0.5	12	0.15	0.25	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	12	0.12	0.21	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3	0.1	0.16	30	60
Nickel Based Alloys	11	Inconel 625	--------	TPKN inserts are not recommended for Exotic materials					
		Inconel 718							
		Hastelloy C							
Titanium Based Alloys	12	TiAl 6 V4	--------						
		T40							

TPKN 2204 PDTR

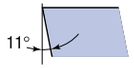
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	18	0.18	0.28	180	300
			180		18		0.28		260
			210		18		0.28		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	18	0.15	0.23	130	200
			230		18		0.23		180
			280	0.5	14	0.15	0.23	100	160
			320		14		0.23		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	12	0.12	0.18	90	130
			280		12		0.18		110
			320	0.5	12	0.12	0.18	60	95
			350		12		0.18		80
			400	0.5	5	0.1	0.18	40	80
			480		3		0.16		70
			550		1.5		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	TPKN inserts are not recommended for Stainless Steel					
	5	X2 CrNiMo 17 2 2 316	230 to 270						
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------						
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed						
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed						
			Treated						
Grey Cast Iron	9	GG 20	140 to 230	0.5	18	0.18	0.28	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	14	0.15	0.23	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3	0.1	0.18	30	60
Nickel Based Alloys	11	Inconel 625	--------	TPKN inserts are not recommended for Exotic materials					
		Inconel 718							
		Hastelloy C							
Titanium Based Alloys	12	TiAl 6 V4	--------						
		T40							



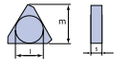
T P K R



Shape
Triangle 60°



Clearance Angle
11°



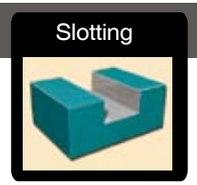
Tolerance
l ± 0.05 m ± 0.013
s ± 0.025



Insert Type
Clamping
Chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
TPKR 1603 PDTR	LT 30	16	3,18	90º	15º	Right	M0000053	217
TPKR 2204 PDTR	LT 30	22	4,76	90º	15º	Right	M0000983	218

Application Guide







Multi purpose 90° milling insert, with 3 cutting edges, designed for materials that generate long chips. Suitable for Roughing to Finishing - Slotting, Shoulder Face milling operations.





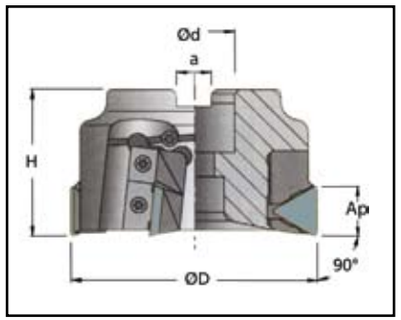
TPKR

Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	d	H	Ap	z
M2000699	LT 310 M-D63	63	22	50	14	6
M2000700	LT 310 M-D80	80	27	50	14	6
M2000701	LT 310 M-D100	100	32	50	14	7
M2000702	LT 310 M-D125	125	40	63	14	8

TPKR 2204 PDTR

Catalog Nr.	Description	D	d	H	Ap	z
M2000703	LT 320 M-D80	80	27	50	20	5
M2000704	LT 320 M-D100	100	32	50	20	6
M2000705	LT 320 M-D125	125	40	63	20	7
M2000706	LT 320 M-D160	160	40	63	20	9



Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	12.0	0.15	0.22	180	300
			180		12.0		0.22		260
			210		12.0		0.22		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	12.0	0.15	0.18	130	200
			230		12.0		0.18		180
			280	0.5	12.0	0.15	0.18	100	160
			320		12.0		0.18		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7.0	0.12	0.18	90	130
			280		7.0		0.18		120
			320	0.5	7.0	0.12	0.18	90	110
			350		7.0		0.18		100
			400	0.5	5.0	0.10	0.18	40	80
			480		3.0		0.16		70
			550		1.5		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	12.0	0.12	0.21	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	12.0	0.12	0.18	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	10.0	0.12	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	5.0	0.12	0.23	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	5.0	0.12	0.23	130	210
			Treated	0.5	5.0	0.12	0.18	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	7.0	0.15	0.23	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	7.0	0.12	0.18	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.16	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	10.0	0.12	0.18	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	10.0	0.12	0.20	35	60
		T40					0.18	28	40

TPKR

TPKR 2204 PDTR

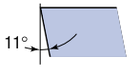
Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	18.0	0.18	0.25	180	300
			180		18.0		0.40		260
			210		18.0		0.35		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	18.0	0.15	0.23	130	200
			230		18.0		0.23		180
			280	0.5	18.0	0.15	0.20	100	160
			320		18.0		0.20		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	12.0	0.12	0.18	90	130
			280		12.0		0.18		110
			320	0.5	12.0	0.12	0.18	60	95
			350		12.0		0.18		80
			400	0.5	5.0	0.10	0.18	40	80
			480		3.0		0.16		70
			550		1.5		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.5	18.0	0.18	0.25	190	250
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.5	18.0	0.18	0.23	160	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.5	10.0	0.12	0.18	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.5	15.0	0.18	0.28	150	230
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.5	15.0	0.18	0.28	130	210
			Treated	0.5	15.0	0.18	0.23	90	150
Grey Cast Iron	9	GG 20	140 to 230	0.5	18.0	0.18	0.25	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	18.0	0.18	0.20	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3.0	0.10	0.16	30	60
Nickel Based Alloys	11	Inconel 625	--------	0.5	10.0	0.12	0.18	25	35
		Inconel 718						28	38
		Hastelloy C						40	65
Titanium Based Alloys	12	TiAl 6 V4	--------	0.5	10.0	0.12	0.20	35	60
		T40					0.18	28	40



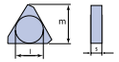
T P U N



Shape
Triangle 60°



Clearance Angle
11°



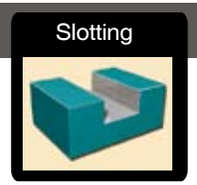
Tolerance
l ± 0.05 m ± 0.013
s ± 0.025



Insert Type
Clamping
No chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
TPUN 160308	LT 30	16	3,18	90º	15º	Right	M0000054	221

Application Guide







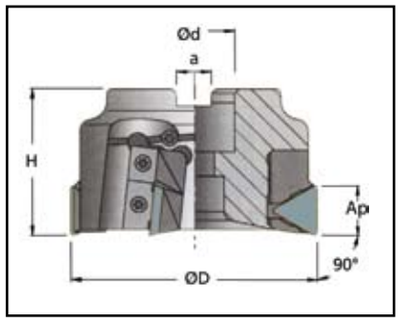
Multi purpose 90° milling insert, with 3 cutting edges and corner radius. Suitable for Roughing to Finishing - Slotting, Shoulder and Face milling operations.





Machining Recommendation Guide - Please see Pg. 8

Catalog Nr.	Description	D	d	H	Ap	z
M2000699	LT 310 M-D63	63	22	50	14	6
M2000700	LT 310 M-D80	80	27	50	14	6
M2000701	LT 310 M-D100	100	32	50	14	7
M2000702	LT 310 M-D125	125	40	63	14	8



Material Group	Group No	Material Examples*	Brinell hardness	d.o.c [mm] min	d.o.c [mm] max	feed [mm/tooth] min	feed [mm/tooth] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.5	12	0.15	0.25	180	300
			180		12		0.25		260
			210		12		0.25		220
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.5	7	0.12	0.23	130	200
			230		7		0.23		180
			280	0.5	7	0.12	0.22	100	160
			320		7		0.22		140
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.5	7	0.12	0.18	90	130
			280		7		0.18		120
			320	0.5	7	0.12	0.18	90	110
			350		7		0.18		100
			400	0.5	5	0.1	0.18	40	80
			480		3		0.16		70
			550		1.5		0.14		60
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	TPUN inserts are not recommended for Stainless Steel					
	5	X2 CrNiMo 17 2 2 316	230 to 270						
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------						
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed						
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed						
			Treated						
Grey Cast Iron	9	GG 20	140 to 230	0.5	12	0.15	0.25	150	240
		GG 25							220
		GG 30							190
Nodular Cast Iron	10	GGG 40	210	0.5	12	0.12	0.21	100	200
		GGG 50	260						160
		GGG 70	310						130
		G-X260NiCr42	450	0.5	3	0.1	0.16	30	60
Nickel Based Alloys	11	Inconel 625	--------	TPUN inserts are not recommended for Exotic materials					
		Inconel 718							
		Hastelloy C							
Titanium Based Alloys	12	TiAl 6 V4	--------						
		T40							

ONLY ONE GRADE

The Lamina Multi-Mat LT-30 Grade for Milling and Drilling can Machine most materials with

Only one grade
LT-30

Steel	Stainless Steel	Cast Iron	Super Alloys
Example **35 NC 6**	Example **316L**	Example **FC400-12**	Example **Inconel 718**

ALU-Milling

LT - 05 Aluminium

ALUMINIUM-MILLING INSERTS

Lamina's unique line of Milling inserts for Aluminum and soft material machining.
Based on revolutionary geometry and our unique coated grade, LT-05.



True Multi-Mat inserts for real productivity

LAMINA TECHNOLOGIES

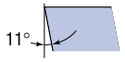
LAMINA TECHNOLOGIES



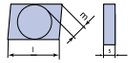
A P G T



Shape
80° Diamond



Clearance Angle
15°



Tolerance
l ± 0.05 m ± 0.013
s ± 0.025

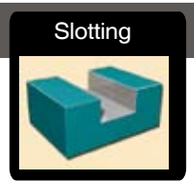


Insert Type
Screw Down Clamping
no chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
APGT 1003 PDER ALU	LT 05	16	4,76	90º	15º	Right	M0001007	225
APGT 1604 PDER ALU	LT 05	16	4,76	2,4	15º	Right	M0000963	225

Surfacing Insert Lead angle 90°

Application Guide







Highly positive inserts with a unique coating and 90° lead angle for Aluminum. Suitable for Roughing to Finishing - Slotting, Shoulder and Face milling operations.

Milling bodies
APGT 10 - see cutters of APLX 10 (page 147)
APGT 16 - see cutters of APKT 16 (page 142)

Machining Recommendation Guide - Please see Pg. 8

APGT 1003 ALU

Aluminium	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Si < 4%	13	AlMgSi 1	----	0.3	9.0	0.12	0.20	400	1200
4% < Si < 8%	13	AlSi 6 Cu 4	----			0.10	0.18	250	600
Si > 8%	14	AlSi 12	----	Recommended to use APLX 1003 PDTR - LT-30					

For high Si Aluminuim, it is recommended to use APLX 1003 PDTR.
See cutting conditions bellow.

Si > 8%	14	AlSi 12	----	0.5	9.0	0.08	0.20	200	400

APGT 1604 Alu

Aluminium	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Si < 4%	13	AlMgSi 1	----	0.5	15.5	0.15	0.32	400	1200
4% < Si < 8%	13	AlSi 6 Cu 4	----			0.12	0.25	250	600
Si > 8%	14	AlSi 12	----	Recommended to use APKT 1604 PDTR - LT-30					

For high Si Aluminuim, it is recommended to use APKT 1604 PDTR.
See cutting conditions bellow.

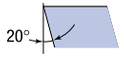
Si > 8%	14	AlSi 12	----	0.5	16.0	0.15	0.25	200	400



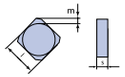
S E G T



Shape
Square 90°



Clearance Angle
20º



Tolerance
l ± 0.08 m ± 0.013
s ± 0.025



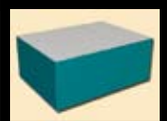
Insert Type
Screw down clamping chip breaker

Insert designation	Grade	l	s	P/r	D	Direction	Catalog Nr.	Page
SEGT 1204 AFEN ALU	LT 30	12	4,76	45º	25º	Neutral	M0001008	227

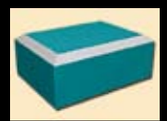
Surfacing Insert Lead angle 45°

Application Guide

Surfacing



Chamfering



Highly positive inserts with a unique coating and 90° lead angle for Aluminum. Suitable for Roughing to Finishing - Slotting, Shoulder and Face milling operations.

Milling bodies
SEGT 1204 - see cutters of SEKT 1204 (page 190)

Machining Recommendation Guide - Please see Pg. 8

Aluminium	Group No	Material Examples*	Brinell hardness	d.o.c [mm]		feed [mm/tooth]		V_c [m/min]	
				min	max	min	max	min	max
Si < 4%	13	AlMgSi 1	----	0.3	7.0	0.15	0.40	400	1200
4% < Si < 8%	13	AlSi 6 Cu 4	----			0.12	0.35	250	600
Si > 8%	14	AlSi 12	----	Recommended to use SEKT 1204 AFTN - LT-30					

For high Si Aluminuim, it is recommended to use SEKT 1204 AFTN. See cutting conditions bellow.

Si > 8%	14	AlSi 12	----	0.5	7.0	0.20	0.45	200	400

ONLY ONE GRADE

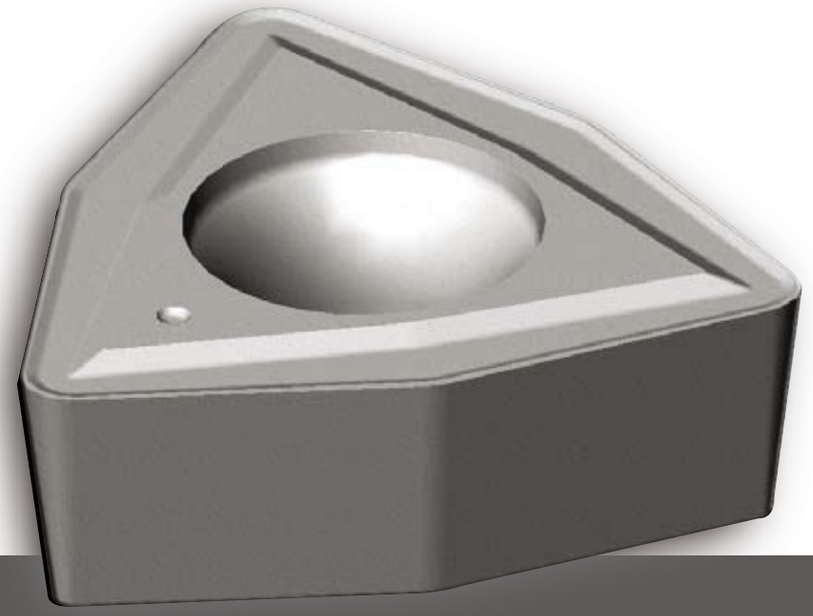
MULTI-MAT® DRILLING INSERTS

The Lamina Multi-Mat LT-30 Grade for Milling and Drilling can Machine most materials with

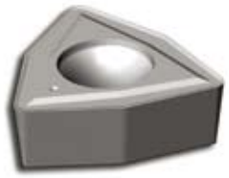
Only one grade

LT-30

Steel	Stainless Steel	Cast Iron	Super Alloys
Example **35 NC 6**	Example **316L**	Example **FC400-12**	Example **Inconel 718**



True Multi-Mat inserts for real productivity



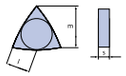
W C M X



Shape
80° Diamond



Clearance Angle
7° Positive rake



Tolerance
d ± 0.05 m ± 0.08
s ± 0.13



Insert Type
Special

Insert designation	Grade	l	s	r	Direction	Catalog Nr.	Page
WCMX 040208 NN	LT 30	4	2,38	0,8	Neutral	M3001122	231
WCMX 050308 NN	LT 30	5	3,18	0,8	Neutral	M3001121	232
WCMX 06T308 NN	LT 30	6	3,97	0,8	Neutral	M3000953	233
WCMX 080412 NN	LT 30	8	4,76	1,2	Neutral	M3000954	234

Trigon inserts for Drilling. Strong cutting edges for high feeds.

Material Group	Group No	Material Examples*	Brinell hardness	feed [mm/rev] min	feed [mm/rev] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.05	0.10	180	270
			180				230
			210				200
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.05	0.12	120	240
			230				190
			280	0.05	0.13	120	170
			320				150
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.07	0.13	70	170
			280				150
			320	0.07	0.11	70	130
			350				100
			400	0.07	0.14	70	120
			480		0.12		100
			550		0.10		80
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.05	0.11	170	230
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.07	0.12	120	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.08	0.12	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.07	0.11	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.07	0.11	150	210
			Treated	0.07	0.11	120	170
Grey Cast Iron	9	GG 20	140 to 230	0.10	0.14	150	230
		GG 25					210
		GG 30					170
Nodular Cast Iron	10	GGG 40	210	0.10	0.14	120	200
		GGG 50	260				170
		GGG 70	310				150
		G-X260NiCr42	450	0.10	0.16	120	150
Nickel Based Alloys	11	Inconel 625	--------	0.05	0.10	25	35
		Inconel 718					
		Hastelloy C					
Titanium Based Alloys	12	TiAl 6 V4	--------	0.05	0.10	35	60
		T40			0.10	28	40

WCMX 050308 NN

Material Group	Group No	Material Examples*	Brinell hardness	feed [mm/rev] min	feed [mm/rev] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.05	0.10	180	270
			180				230
			210				200
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.05	0.14	120	239
			230				190
			280	0.05	0.16	120	170
			320				150
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.07	0.16	70	170
			280				150
			320	0.07	0.13	70	130
			350				100
			400	0.07	0.16	70	120
			480		0.12		100
			550		0.10		80
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.05	0.11	170	230
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.07	0.12	120	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.08	0.14	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.07	0.12	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.07	0.12	150	210
			Treated	0.07	0.12	120	170
Grey Cast Iron	9	GG 20	140 to 230	0.10	0.18	150	230
		GG 25					210
		GG 30					170
Nodular Cast Iron	10	GGG 40	210	0.10	0.16	120	200
		GGG 50	260				170
		GGG 70	310				150
		G-X260NiCr42	450	0.10	0.16	120	150
Nickel Based Alloys	11	Inconel 625	--------	0.05	0.11	25	35
		Inconel 718					
		Hastelloy C					
Titanium Based Alloys	12	TiAl 6 V4	--------	0.05	0.11	35	60
		T40			0.10	28	40

WCMX 06T308 NN

Material Group	Group No	Material Examples*	Brinell hardness	feed [mm/rev] min	feed [mm/rev] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.06	0.12	180	270
			180				230
			210				200
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.06	0.16	120	239
			230				190
			280	0.06	0.18	120	170
			320				150
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.08	0.18	70	170
			280				150
			320	0.08	0.15	70	130
			350				100
			400	0.07	0.16	70	120
			480		0.12		100
			550		0.10		80
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.06	0.12	170	230
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.08	0.14	120	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.10	0.16	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.08	0.14	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.07	0.12	150	210
			Treated	0.07	0.12	120	170
Grey Cast Iron	9	GG 20	140 to 230	0.10	0.22	150	230
		GG 25					210
		GG 30					170
Nodular Cast Iron	10	GGG 40	210	0.10	0.18	120	200
		GGG 50	260				170
		GGG 70	310				150
		G-X260NiCr42	450	0.10	0.16	120	150
Nickel Based Alloys	11	Inconel 625	--------	0.06	0.12	25	35
		Inconel 718					
		Hastelloy C					
Titanium Based Alloys	12	TiAl 6 V4	--------	0.06	0.12	35	60
		T40			0.10	28	40

WCMX 080412 NN

Material Group	Group No	Material Examples*	Brinell hardness	feed [mm/rev] min	feed [mm/rev] max	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel	1	Ck15, Ck45 1020, 1045	150	0.10	0.18	180	270
			180				230
			210				200
Alloy Steel	2	42 CrMo 4 St 50-2 Ck60 1060 4140	180	0.12	0.22	120	239
			230				190
			280	0.12	0.25	120	170
			320				150
High Alloy Steel	3	X40 CrMoV 5 1 H 13 40 NiCrMo 6 4340 S 2-10-1-8 HSS M42	220	0.14	0.25	70	170
			280				150
			320	0.14	0.22	70	130
			350				100
			400	0.10	0.18	70	120
			480		0.16		100
			550		0.14		80
Austenitic Stainless Steel	4	X5 CrNi 18 9 304	210 to 250	0.10	0.18	170	230
	5	X2 CrNiMo 17 2 2 316	230 to 270	0.11	0.23	120	210
	6	X6 CrNiMoTi 17 12 2 316 Ti Duplex / Nitronic	--------	0.12	0.28	70	120
Ferritic Stainless Steel	7	X8 Cr 7 430	Annealed	0.12	0.25	150	210
Martensitic Stainless Steel	8	X15 Cr 13 410	Annealed	0.12	0.25	150	210
			Treated	0.12	0.25	120	170
Grey Cast Iron	9	GG 20	140 to 230	0.15	0.28	150	230
		GG 25					210
		GG 30					170
Nodular Cast Iron	10	GGG 40	210	0.12	0.23	120	200
		GGG 50	260				170
		GGG 70	310				150
		G-X260NiCr42	450	0.10	0.18	120	150
Nickel Based Alloys	11	Inconel 625	--------	0.12	0.18	25	35
		Inconel 718					
		Hastelloy C					
Titanium Based Alloys	12	TiAl 6 V4	--------	0.12	0.18	35	60
		T40			0.16	28	40

LT - Solid Mill

The Lamina, Multi-Material, Solid Carbide Milling Line



LT - 40, One grade for all materials

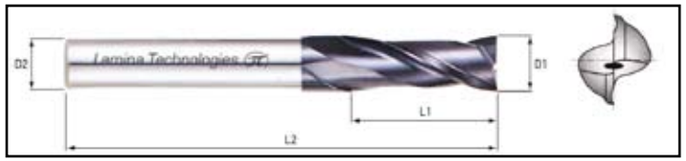
The advantages of LT - Solid Mill line:

- Newly developed grade LT-40, is made from fine grain powder and coated with specially developed PVD coating, to provide high hardness and at the same time high toughness.
- Special production processes allow for improved wear resistance and smoother machining.
- One grade for all materials.

What does our LT - Solid Mill line offer?

- Excellent performance at dry cutting conditions.
- Excellent performance on hardened steel (HRc 65).
- Optimized geometry for machining tough materials.
- Top performance on a large range of materials.
- Extended tool life at regular and extreme conditions.
- Superior surface finish.
- Fast chip ejection.

Index	Group
2 flute short 30º	SC410C SC410F
2 flute long 30º	SC415C SC415F
2 flute long 30º ball nose	SC420C SC420F
3 flute short 30º	SC425C SC425F
4 flute short 30º	SC430C SC430F
4 flute long 30º	SC435C SC435F
4 flute long 30º ball nose	SC440C SC440F
6,8 flute long 45º	SC445C SC445F
6 flute extra long 45º	SC450C SC450F
6,8 flute long 45º positive rake	SC455C SC455F
Multi flute rougher 20º	SC460C SC460F
Multi flute rougher 45º	SC465C SC465F



D1: Mill Diameter D2: Shank Diameter L1: Length of cut L2: Overall length

2 FLUTE, SHORT LENGTH, 30° HELIX

SC410C Cylindrical

Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000723	2 flute 2mm short 30º cyl.	2.0	-14	-28	4,0	0	-6	6,0	40,0
M4000724	2 flute 3mm short 30º cyl.	3.0	-14	-28	6,0	0	-6	8,0	45,0
M4000725	2 flute 4mm short 30º cyl.	4.0	-20	-38	6,0	0	-8	11,0	45,0
M4000726	2 flute 5mm short 30º cyl.	5.0	-20	-38	6,0	0	-8	13,0	50,0
M4000727	2 flute 6mm short 30º cyl.	6.0	-20	-38	6,0	0	-8	13,0	50,0
M4000728	2 flute 8mm short 30º cyl.	8.0	-25	-47	8,0	0	-9	19,0	60,0
M4000729	2 flute 10mm short 30º cyl.	10.0	-25	-47	10,0	0	-9	22,0	70,0
M4000730	2 flute 12mm short 30º cyl.	12.0	-32	-59	12,0	0	-11	26,0	75,0
M4000731	2 flute 16mm short 30º cyl.	16.0	-32	-59	16,0	0	-11	32,0	100,0
M4000732	2 flute 20mm short 30º cyl.	20.0	-40	-73	20,0	0	-13	38,0	105,0

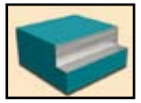
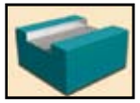
2 FLUTE, LONG LENGTH, 30° HELIX

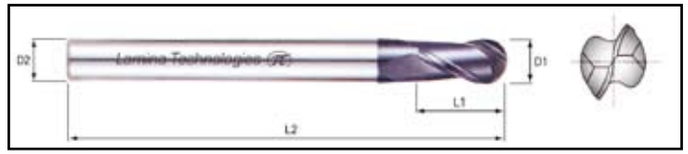
SC415C Cylindrical

Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000743	2 flute 6mm long 30° cyl.	6.0	-20	-38	6,0	0	-8	20,0	60,0
M4000744	2 flute 8mm long 30° cyl.	8.0	-25	-47	8,0	0	-9	25,0	70,0
M4000745	2 flute 10mm long 30° cyl.	10.0	-25	-47	10,0	0	-9	30,0	90,0
M4000746	2 flute 12mm long 30° cyl.	12.0	-32	-59	12,0	0	-11	30,0	90,0
M4000747	2 flute 16mm long 30° cyl.	16.0	-32	-59	16,0	0	-11	50,0	110,0
M4000748	2 flute 20mm long 30° cyl.	20.0	-40	-73	20,0	0	-13	55,0	110,0

For full machining recommendations - see pages 236 - 238

Application:

D1: Mill Diameter D2: Shank Diameter L1: Length of cut L2: Overall length

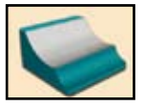
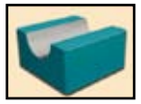
2 FLUTE, LONG LENGTH, 30º HELIX, BALL NOSE

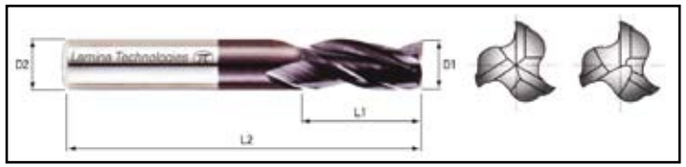
SC420C Cylindrical ball nose

Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000755	2 flute 2mm long 30º B.N.cyl.	2.0	-14	-28	6,0	0	-6	5,0	50,0
M4000756	2 flute 3mm long 30º B.N.cyl.	3.0	-14	-28	6,0	0	-6	8,0	60,0
M4000757	2 flute 4mm long 30º B.N.cyl.	4.0	-20	-38	6,0	0	-8	8,0	70,0
M4000758	2 flute 5mm long 30º B.N.cyl.	5.0	-20	-38	6,0	0	-8	10,0	80,0
M4000759	2 flute 6mm long 30º B.N.cyl.	6.0	-20	-38	6,0	0	-8	12,0	90,0
M4000760	2 flute 8mm long 30º B.N.cyl.	8.0	-25	-47	8,0	0	-9	14,0	100,0
M4000761	2 flute 10mm long 30º B.N.cyl.	10.0	-25	-47	10,0	0	-9	18,0	100,0
M4000762	2 flute 12mm long 30º B.N.cyl.1	2.0	-32	-59	12,0	0	-11	22,0	110,0
M4000763	2 flute 16mm long 30º B.N.cyl.	16.0	-32	-59	16,0	0	-11	30,0	140,0
M4000764	2 flute 20mm long 30º B.N.cyl.	20.0	-40	-73	20,0	0	-13	38,0	160,0

For full machining recommendations - see pages 236 - 238

Application:



D1: Mill Diameter D2: Shank Diameter L1: Length of cut L2: Overall length

3 FLUTE, SHORT LENGTH, 30° HELIX

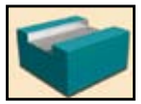
SC425C Cylindrical

Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000775	3 flute 3mm short 30° cyl.	3.0	-14	-28	6,0	0	-6	10,0	50,0
M4000776	3 flute 4mm short 30° cyl.	4.0	-20	-38	6,0	0	-8	12,0	50,0
M4000777	3 flute 5mm short 30° cyl.	5.0	-20	-38	6,0	0	-8	14,0	57,0
M4000778	3 flute 6mm short 30° cyl.	6.0	-20	-38	6,0	0	-8	16,0	57,0
M4000779	3 flute 8mm short 30° cyl.	8.0	-25	-47	8,0	0	-9	20,0	63,0
M4000780	3 flute 10mm short 30° cyl.	10.0	-25	-47	10,0	0	-9	22,0	72,0
M4000781	3 flute 12mm short 30° cyl.	12.0	-32	-59	12,0	0	-11	25,0	83,0
M4000782	3 flute 16mm short 30° cyl.	16.0	-32	-59	16,0	0	-11	32,0	92,0
M4000783	3 flute 20mm short 30° cyl.	20.0	-40	-73	20,0	0	-13	38,0	105,0

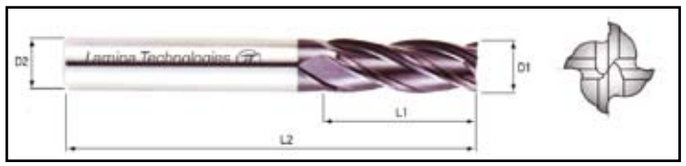
SC425F Flat

Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000784	3 flute 3mm short 30° flat	3.0	-14	-28	6,0	0	-6	10,0	50,0
M4000785	3 flute 4mm short 30° flat	4.0	-20	-38	6,0	0	-8	12,0	50,0
M4000786	3 flute 5mm short 30° flat	5.0	-20	-38	6,0	0	-8	14,0	57,0
M4000787	3 flute 6mm short 30° flat	6.0	-20	-38	6,0	0	-8	16,0	57,0
M4000788	3 flute 8mm short 30° flat	8.0	-25	-47	8,0	0	-9	20,0	63,0
M4000789	3 flute 10mm short 30° flat	10.0	-25	-47	10,0	0	-9	22,0	72,0
M4000790	3 flute 12mm short 30° flat	12.0	-32	-59	12,0	0	-11	25,0	83,0
M4000791	3 flute 16mm short 30° flat	16.0	-32	-59	16,0	0	-11	32,0	92,0
M4000792	3 flute 20mm short 30° flat	20.0	-40	-73	20,0	0	-13	38,0	105,0

Application:







D1: Mill Diameter D2: Shank Diameter L1: Length of cut L2: Overall length

4 FLUTE, SHORT LENGTH, 30° HELIX

SC430C Cylindrical

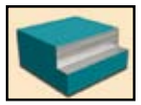
Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000793	4 flute 2mm short 30° cyl.	2.0	-14	-28	6,0	0	-6	6,0	40,0
M4000794	4 flute 3mm short 30° cyl.	3.0	-14	-28	6,0	0	-6	8,0	45,0
M4000795	4 flute 4mm short 30° cyl.	4.0	-20	-38	6,0	0	-8	11,0	45,0
M4000796	4 flute 5mm short 30° cyl.	5.0	-20	-38	6,0	0	-8	13,0	50,0
M4000797	4 flute 6mm short 30° cyl.	6.0	-20	-38	6,0	0	-8	13,0	50,0
M4000798	4 flute 8mm short 30° cyl.	8.0	-25	-47	8,0	0	-9	19,0	60,0
M4000799	4 flute 10mm short 30° cyl.	10.0	-25	-47	10,0	0	-9	22,0	70,0
M4000800	4 flute 12mm short 30° cyl.	12.0	-32	-59	12,0	0	-11	26,0	75,0
M4000801	4 flute 16mm short 30° cyl.	16.0	-32	-59	16,0	0	-11	32,0	100,0
M4000802	4 flute 20mm short 30° cyl.	20.0	-40	-73	20,0	0	-13	38,0	105,0

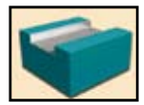
4 FLUTE, LONG LENGTH, 30° HELIX

SC435C Cylindrical

Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000921	4 flute 2 mm long 30° cyl.	2,0	-14	-28	6,0	0	-6	8,0	40,0
M4000922	4 flute 3 mm long 30° cyl.	3,0	-20	-38	6,0	0	-8	12,0	50,0
M4000923	4 flute 4 mm long 30° cyl.	4,0	-20	-38	6,0	0	-8	15,0	50,0
M4000924	4 flute 5 mm long 30° cyl.	5,0	-20	-38	6,0	0	-8	20,0	60,0
M4000813	4 flute 6 mm long 30° cyl.	6.0	-20	-38	6,0	0	-8	20,0	60,0
M4000814	4 flute 8 mm long 30° cyl.	8.0	-25	-47	8,0	0	-9	25,0	70,0
M4000815	4 flute 10 mm long 30° cyl.	10.0	-25	-47	10,0	0	-9	30,0	90,0
M4000816	4 flute 12 mm long 30° cyl.	12.0	-32	-59	12,0	0	-11	30,0	90,0
M4000817	4 flute 16 mm long 30° cyl.	16.0	-32	-59	16,0	0	-11	50,0	110,0

Application:







D1: Mill Diameter D2: Shank Diameter L1: Length of cut L2: Overall length

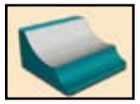
4 FLUTE, LONG LENGTH, 30° HELIX, BALL NOSE

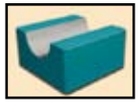
SC440C Cylindrical ball nose

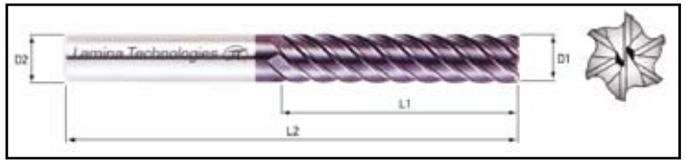
Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000825	4 flute 2mm long 30° B.N. cyl.	2.0	-14	-28	6,0	0	-6	5,0	50,0
M4000826	4 flute 3mm long 30° B.N. cyl.	3.0	-14	-28	6,0	0	-6	8,0	60,0
M4000827	4 flute 4mm long 30° B.N. cyl.	4.0	-20	-38	6,0	0	-8	8,0	70,0
M4000828	4 flute 5mm long 30° B.N. cyl.	5.0	-20	-38	6,0	0	-8	10,0	80,0
M4000829	4 flute 6mm long 30° B.N. cyl.	6.0	-20	-38	6,0	0	-8	12,0	90,0
M4000830	4 flute 8mm long 30° B.N. cyl.	8.0	-25	-47	8,0	0	-9	14,0	100,0
M4000831	4 flute 10mm long 30° B.N. cyl.	10.0	-25	-47	10,0	0	-9	18,0	100,0
M4000832	4 flute 12mm long 30° B.N. cyl.	12.0	-32	-59	12,0	0	-11	22,0	110,0
M4000833	4 flute 16mm long 30° B.N. cyl.	16.0	-32	-59	16,0	0	-11	30,0	140,0
M4000834	4 flute 20mm long 30° B.N. cyl.	20.0	-40	-73	20,0	0	-13	38,0	160,0

For full machining recommendations - see pages 236 - 238

Application:







D1: Mill Diameter D2: Shank Diameter L1: Length of cut L2: Overall length

6,8 FLUTE, LONG LENGTH, 45° HELIX

SC445C Cylindrical

Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000845	6 flute 6mm long 45° cyl.	6.0	-20	-38	6,0	0	-8	13,0	57,0
M4000846	6 flute 8mm long 45° cyl.	8.0	-25	-47	8,0	0	-9	19,0	63,0
M4000847	6 flute 10mm long 45° cyl.	10.0	-25	-47	10,0	0	-9	22,0	72,0
M4000848	6 flute 12mm long 45° cyl.	12.0	-32	-59	12,0	0	-11	26,0	83,0
M4000849	6 flute 16mm long 45° cyl.	16.0	-32	-59	16,0	0	-11	32,0	92,0
M4000850	8 flute 20mm long 45° cyl.	20.0	-40	-73	20,0	0	-13	38,0	104,0

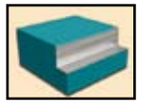
6 FLUTE, EXTRA LONG LENGTH, 45° HELIX

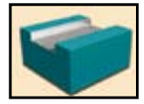
SC450C Cylindrical

Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000857	6 flute 6mm X-long 45° cyl.	6.0	-20	-38	6,0	0	-8	26,0	70,0
M4000858	6 flute 8mm X-long 45° cyl.	8.0	-25	-47	8,0	0	-9	36,0	90,0
M4000859	6 flute 10mm X-long 45° cyl.	10.0	-25	-47	10,0	0	-9	46,0	100,0
M4000860	6 flute 12mm X-long 45° cyl.	12.0	-32	-59	12,0	0	-11	56,0	110,0
M4000861	6 flute 16mm X-long 45° cyl.	16.0	-32	-59	16,0	0	-11	66,0	130,0
M4000862	6 flute 20mm X-long 45° cyl.	20.0	-40	-73	20,0	0	-13	76,0	140,0

For full machining recommendations - see pages 236 - 238

Application:









D1: Mill Diameter D2: Shank Diameter L1: Length of cut L2: Overall length

6,8 FLUTE, LONG LENGTH, 45° HELIX,

POSITIVE RAKE ANGLE

SC455C Cylindrical PR

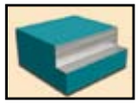
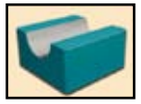
Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000869	6 flute 6mm long 45° cyl.	6.0	-20	-38	6,0	0	-8	13,0	57,0
M4000870	6 flute 8mm long 45° cyl.	8.0	-25	-47	8,0	0	-9	19,0	63,0
M4000871	6 flute 10mm long 45° cyl.	10.0	-25	-47	10,0	0	-9	22,0	72,0
M4000872	6 flute 12mm long 45° cyl.	12.0	-32	-59	12,0	0	-11	26,0	83,0
M4000873	6 flute 16mm long 45° cyl.	16.0	-32	-59	16,0	0	-11	32,0	92,0
M4000874	8 flute 20mm long 45° cyl.	20.0	-40	-73	20,0	0	-13	38,0	104,0

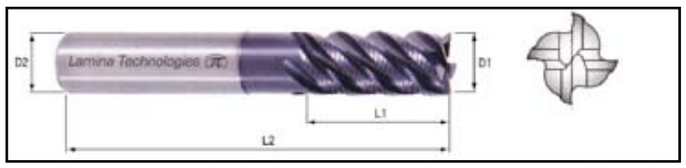
SC455F Flat

Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000875	6 flute 6mm long 45° flat	6.0	-20	-38	6,0	0	-8	13,0	57,0
M4000876	6 flute 8mm long 45° flat	8.0	-25	-47	8,0	0	-9	19,0	63,0
M4000877	6 flute 10mm long 45° flat	10.0	-25	-47	10,0	0	-9	22,0	72,0
M4000878	6 flute 12mm long 45° flat	12.0	-32	-59	12,0	0	-11	26,0	83,0
M4000879	6 flute 16mm long 45° flat	16.0	-32	-59	16,0	0	-11	32,0	92,0
M4000880	8 flute 20mm long 45° flat	20.0	-40	-73	20,0	0	-13	38,0	104,0

For full machining recommendations - see pages 236 - 238

Application:

D1: Mill Diameter D2: Shank Diameter L1: Length of cut L2: Overall length

MULTI-FLUTE, ROUGHING, LONG REACH, 45° HELIX

SC465C Cylindrical

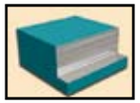
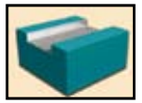
Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000893	3 flute 6mm rougher 45° L.R. Cyl.	6.0	-20	-38	6,0	0	-8	16,0	57,0
M4000894	3 flute 8mm rougher 45° L.R. Cyl.	8.0	-25	-47	8,0	0	-9	16,0	63,0
M4000895	4 flute 10mm rougher 45° L.R. Cyl.	10.0	-25	-47	10,0	0	-9	22,0	72,0
M4000896	4 flute 12mm rougher 45° L.R. Cyl.	12.0	-32	-59	12,0	0	-11	26,0	83,0
M4000897	5 flute 16mm rougher 45° L.R. Cyl.	16.0	-32	-59	16,0	0	-11	32,0	92,0
M4000898	6 flute 20mm rougher 45° L.R. Cyl.	20.0	-40	-73	20,0	0	-13	38,0	104,0

SC465F Flat

Catalog Nr.	Product designation	D1	Tolerance e8 µm		D2	Tolerance h6 µm		L1	L2
M4000899	3 flute 6mm rougher 45° L.R. flat	6.0	-20	-38	6,0	0	-8	16,0	57,0
M4000900	3 flute 8mm rougher 45° L.R. flat	8.0	-25	-47	8,0	0	-9	16,0	63,0
M4000901	4 flute 10mm rougher 45° L.R. flat	10.0	-25	-47	10,0	0	-9	22,0	72,0
M4000902	4 flute 12mm rougher 45° L.R. flat	12.0	-32	-59	12,0	0	-11	26,0	83,0
M4000903	5 flute 16mm rougher 45° L.R. flat	16.0	-32	-59	16,0	0	-11	32,0	92,0
M4000904	6 flute 20mm rougher 45° L.R. flat	20.0	-40	-73	20,0	0	-13	38,0	104,0

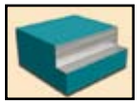
For full machining recommendations - see pages 236 - 238

Application:

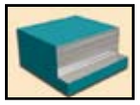
Material Group	Group No	Material Examples*	Brinell hardness	V_c [m/min] min	V_c [m/min] max
Low Carbon Steel		XC12	150	250	300
		S 250 Pb	180	200	270
			210	160	250
Alloy Steel		42 CrMo 4	180	160	250
		100 Cr 6	230	140	180
		32 NiCrMo 14.5	280		
			320	120	170
High Alloy Steel		X38 CrMoV 5	220	140	180
		X210 CrW 12	280	120	140
		X90 CrMoV 8	320	100	140
			350	90	120
Austenitic Stainless Steel	4	303 / 304 304 L	210 to 250	80	100
	5	316 / 316 L	230 to 270	80	100
	6	316 T 630 (F16PH)	--------	70	90
Ferritic Stainless Steel	7	430 / 439 / 444	Annealed	80	100
Martensitic Stainless Steel	8	410 / 420	Annealed	100	140
			Treated		
Grey Cast Iron	9	EN - GJL 200	140 to 230	200	250
		EN - GJL 250		160	200
		EN - GJL 300			
Nodular Cast Iron	10	EN - GJS 400	210	160	200
		EN - GJS 600	260	140	160
		EN - GJS 800	310	120	140
Nickel Based Alloys	11	Inconel 625	--------	40	60
		Inconel 718	--------		
		Hastelloy C	--------	40	60
Titanium Based Alloys	12	TiAl 6 V4	--------	50	100
		T40	--------	40	80
Aluminium alloys Si < 4%	13	Al99,5	--------	400	500
		AlCuMgPb	--------		
		AlZnMgCu1,5	--------		
Aluminium alloys Si 4-8%	13	G/AlSi6Cu4	--------	200	250
		G/AlSi8Cu3Fe	--------		
"Aluminium alloys Si > 8%"	14	G/AlSi12	--------	160	200
		G/AlSi12CuFe	--------		
Magnesium alloys	15	MgMn 2	--------	160	200
		MgAl9Zn	--------		
Copper alloys	16	CuZn39Pb2 M558	--------	400	500
	17	CuSn6/8	--------	200	250
		CuSn7ZnPb	--------		
	18	CuAl19Ni	--------	160	200

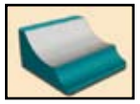
Icons


Profiling - Finishing

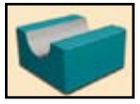

Slotting


Plunge - Slot


Profiling - Roughing


Contour - Finishing


Plunge - Slot Contouring


Contour - Slotting


Profiling thin material

As a simple starting point, we recommend to use the following cutting conditions:

Profiling	Finishing				Semi Finishing				Roughing			
	Feed per Tooth		Width of Cut	Depth of Cut	Feed per Tooth		Width of Cut	Depth of Cut	Feed per Tooth		Width of Cut	Depth of Cut
Tool Diameter (mm)	min	max	mm	mm	min	max	mm	mm	min	max	mm	mm
2	0.006	0.025	0.25	2.00	0.025	0.040	0.50	2.00	0.012	0.025	1.00	2.00
3	0.012	0.040	0.38	3.00	0.040	0.050	0.75	3.00	0.025	0.040	1.50	3.00
4	0.016	0.048	0.50	4.00	0.040	0.050	1.00	4.00	0.025	0.040	2.00	4.00
5	0.020	0.050	0.63	5.00	0.050	0.070	1.25	5.00	0.040	0.065	2.50	5.00
6	0.025	0.060	0.75	6.00	0.050	0.090	1.50	6.00	0.040	0.075	3.00	6.00
8	0.030	0.075	1.00	8.00	0.065	0.120	2.00	8.00	0.050	0.100	4.00	8.00
10	0.032	0.080	1.25	10.00	0.065	0.120	2.50	10.00	0.050	0.100	5.00	10.00
12	0.040	0.100	1.50	12.00	0.065	0.130	3.00	12.00	0.065	0.120	6.00	12.00
16	0.048	0.120	2.00	16.00	0.075	0.140	4.00	16.00	0.080	0.130	8.00	16.00
20	0.050	0.150	2.50	20.00	0.090	0.170	5.00	20.00	0.090	0.160	10.00	20.00

Slotting	Finishing				Semi Finishing				Roughing			
	Feed per Tooth		Width of Cut	Depth of Cut	Feed per Tooth		Width of Cut	Depth of Cut	Feed per Tooth		Width of Cut	Depth of Cut
Tool Diameter (mm)	min	max	mm	mm	min	max	mm	mm	min	max	mm	mm
2					0.012	0.020	2.00	2.00	0.016	0.040	2.00	2.00
3					0.016	0.030	3.00	3.00	0.024	0.048	3.00	3.00
4					0.020	0.032	4.00	4.00	0.032	0.050	4.00	4.00
5					0.020	0.040	5.00	5.00	0.040	0.070	5.00	5.00
6					0.024	0.048	6.00	6.00	0.048	0.085	6.00	6.00
8					0.032	0.050	8.00	8.00	0.050	0.100	8.00	8.00
10					0.035	0.055	10.00	10.00	0.060	0.110	10.00	10.00
12					0.040	0.060	12.00	12.00	0.065	0.120	12.00	12.00
16					0.045	0.075	16.00	16.00	0.080	0.130	16.00	16.00
20					0.048	0.080	20.00	20.00	0.090	0.160	20.00	20.00

contouring	Finishing				Semi Finishing				Roughing			
	Feed per Tooth		Width of Cut	Depth of Cut	Feed per Tooth		Width of Cut	Depth of Cut	Feed per Tooth		Width of Cut	Depth of Cut
Tool Diameter (mm)	min	max	mm	mm	min	max	mm	mm	min	max	mm	mm
2	0.032	0.045	0.25	2.00	0.032	0.045	0.50	2.00				
3	0.036	0.050	0.38	3.00	0.036	0.050	0.75	3.00				
4	0.040	0.055	0.50	4.00	0.040	0.055	1.00	4.00				
5	0.045	0.065	0.63	5.00	0.045	0.065	1.25	5.00				
6	0.050	0.070	0.75	6.00	0.050	0.070	1.50	6.00				
8	0.060	0.080	1.00	8.00	0.060	0.080	2.00	8.00				
10	0.070	0.100	1.25	10.00	0.070	0.100	2.50	10.00				
12	0.080	0.120	1.50	12.00	0.080	0.120	3.00	12.00				
16	0.100	0.150	2.00	16.00	0.100	0.150	4.00	16.00				
20	0.120	0.200	2.50	20.00	0.120	0.200	5.00	20.00				

Formulas

rpm = sfm * 3.82 / tool diameter

rpm = (m/min * 1000) / (3.14 * tool diameter)

feed per min = feed per tooth * number of teeth * rpm

Drill selection recommendation, according to application:

1. Profiling - finishing cut :use 4 or 6 flute mill.

2. Slotting - semi-roughing cut and high feed rates: use 3 flute mill for regular chip removal use a 2 flute mill for long chips (soft material)
use Roughing mill for maximum chip removal

3. Plunge - slot cut: use 3 flute mill for higher feed rate and 2 flute mill for soft material.

4. Profiling - roughing cut: use Roughing mill for rapid material removal and higher feed rates.

5. Contour- finishing cut: use 2 or 4 ball nose mill.

6. Slot-contouring cut: use 2 flute ball nose for maximum chip removal.
use 4 flute ball nose for finishing.

7. For profiling of thin material s: use 6 flute mill.

8. For Aluminum machining: Finishing cut - use 6 or 8 positive rake flute mill
slotting cut - use 2 flute short mill.

Machining Tips:

1. Climb milling is preferred with CNC machines.

2. Use ramping down operation to avoid vibrations.

3. When opening a pocket, helical interpolation operation is preferred.

Material Reference List

Material group	number	DIN	AFNOR	BS	UNI	JIS	AISI/SAE
		Low Carbon Steel					
1	1.0036	US137-3	-	-	FE 37BFU	-	-
1	1.0401	C15	CC12	080M15	C15 / C16	S15C	1015
1	1.0402	C22	CC20	050A20	C20 / C21	S20C / S22C	1020
1	1.0501						
1	1.0503	C45	CC45	080M46	C45	S45C / S45CM	1045
1	1.0715	9 SMn 28	S250	230M07	CF 9 SMn 28	SUM22	1213
1	1.0718	9 SMnPb 28	S 250Pb	-	CF 9 SMnPb 28	SUM22L/SUM23L	12L3
1	1.0722	10 SPb 20	-	-	-	-	-
1	1.0725	15 SMn 13	-	-	-	-	-
1	1.0726	35 S 20	-	-	-	-	-
1	1.0756	35 SPb 20	-	-	-	-	-
1	1.076	38 SMn 28	-	-	-	-	-
1	1.0762	44 SMn 28	-	-	-	-	-
1	1.0763	44 SMnPb 28	-	-	-	-	-
1	1.0764	36 SMn 14	-	-	-	-	-
1	1.0765	36 SMnPb 14	-	-	-	-	-
1	1.1121	Ck 10	XC 10	040 A10	2 C 10	S9 CK / S 10 C	1010
1	1.1133	20 Mn 5	20 M 5	120 M19	20 Mn 7	SMnC 420	1022 / 1518
1	1.1141	Ck 15	XC 12	080 M15	C16	S15 / S15CK	1015
1	1.1157	40 Mn 4	40 M 5	150 M36	-	-	1035 / 1041
1	1.1158	C25E (CK 25)	XC 25	070M25	C25	S25C / S28C	1025
1	1.1166	35 Mn 5	-	-	-	SMn 433H	1536
1	1.1170	28 Mn 6	20 M 5	(150 M8)	C 28 Mn	SCMn 1	1330
1	1.1173	30 Mn 5	35 M 5	(150 M28)	-	SMn 433H / SCMn 2	1306 / 1330
1	1.1181	C35E (CK 35)	XC 32	080 A35	C 35	S 35C	1035 / 1038
1	1.1183	Cf 35	XC 38TS	080 A35	C36 / C38	S35C / S35CM	1035
1	1.1191	C45E (Ck 45)	XC 45	080 M46 / 060 A47	C45	S45C / S48C / S45CM	1045
		Alloy Steel					
2	1.0050	St 50-2	-	-	FE 50	SS50 / SS490	-
2	1.0060	St 60-2	-	-	FE 60-2	SM570 / SM58	-
2	1.0070	St 70-2	-	-	FE 70-2	FE70-2	-
2	1.0535	C55	-	070M55	C55	S55C / S55CM	1055
2	1.0601	C60	CC55	080A62	C60	S58C	1060
2	1.1203	C55E (CK 55)	XC 55	060 A57 / 070 M55	C50	S55C / S55CM	1055
2	1.1213	Cf 53	XC 48TS	060A52	C53	S50C / S50CM	1050
2	1.1221	C60E (CK 60)	XC 60	060 A62	C60	S58C / S60CM	1060 / 1064
2	1.1525	C 80 W1	C 90 E2U	-	C 80 KU	-	W 108
2	1.1545	C 105 W1	C 105 E2U	-	C 100 KU	SK3 / SUP4	W110
2	1.1563	C 125 W	C 120 E3U	-	C 120 KU	SK2	W 112
2	1.1573	C 135 W	C 140 E3U	-	C 140 KU	-	-
2	1.1625	C 80 W2	-	BW 1B	-	SK5 / SK6	W1
2	1.1750	C 75 W	-	BW 1A	-	-	W1
2	1.2330	35 CrMo 4	34 CD 4	708 A37 / (BP20)	35 CrMo 4	-	4135 / P20
2	1.2332	47 CrMo 4	-	-	40 CrMo 4	-	4142
2	1.5415	15 Mo 3	15 D 3	1501-240	16 Mo3 KW	STBA12 / STFA12	ASTM A204 GrA
2	1.5423	16 Mo 5	-	1503-245-420	16 Mo5	SB 450M / SB 480M	4520
2	1.5622	14 Ni 6	16 N 6	-	14 Ni 6	SL9N590	ASTM A350LF5
2	1.5711	40 NiCr 6	38 NC 6	-	-	3140	-
2	1.5713	13 NiCr 6	10 NC 6	-	-	3115	-
2	1.5732	14 NiCr 10	14 NC 11	-	16 NiCr 11	SNC 415(H)	3415
2	1.5752						
2	1.5919	15 CrNi 6	-	-	-	-	3115
2	1.7003						
2	1.7006	46 Cr 2	42 C 2	-	45 Cr 2	-	5045 / 5046

Material group	number	DIN	AFNOR	BS	UNI	JIS	AISI/SAE
		Alloy Steel					
2	1.7015	15 Cr 3	15 C 2	523 M15	-	SCr 415(H)	5015 / 5115
2	1.7033	34 Cr 4	32 C 4	530 A32	34 CR 4 (KB)	SCr 430(H)	5132
2	1.7035	41 Cr 4	42 C 4	530 M40	-	SCr 440(H)(M)	5140
2	1.7045	41 Cr 4	41 C 4	530 A40	41 Cr 4	SCr 440	5140
2	1.7147	20 MnCr 5	20 MC 5	-	20 MnCr 5	SMnC 420H	5120
2	1.7176	55 Cr 3	55 C 3	527 A60	55 Cr 3	SUP9(A)	5155 / 5160
2	1.7218	25 CrMo 4	25 CD 4	708 A25	25 CrMo 4(KB)	SCM 420/SCM 430	4130
2	1.7220	34 CrMo 4	35 CD 4	708 A37	35 CrMo 4	SCCr M3/SCM 435H	4137 / 4135
2	1.7223	41 CrMo 4	42 CD 4TS	708 M40	41 CrMo 4	SCM 440	4140 / 4142
2	1.7225	42 CrMo 4	42 CD 4	708 M40	42 CrMo 4	SCM 440(H) / SNB 7	4140 / 4142
2	1.7227	42 CrMoS 4	-	-	-	-	-
2	1.7228	50 CrMo 4	50 CD 4	708 A47	-	SCM 445(H)	4150
2	1.7242	16 CrMo 4	-	-	18 CrMo 4	SCM 418(H)	-
2	1.7262	15 CrMo 5	12 CD 4	-	-	SCM 415(H)	-
2	1.7264	20 CrMo 5	18 CD 4	-	-	SCM 421 / SCM 420H	-
2	1.7335	13 CrMo 4 4	15 CD 3.5 / 4.5	1502 620 540	14 CrMo 3	SFVAF12	A182 A387 Gr.12
2	1.7337	16 CrMo 4 4	15 CD 4 5	-	18 CrMo 4 5 KW	-	A 387 Gr 12 Cl2
2	1.7361	32 CrMo 12	30 CD 12	722 M24	32 CrMo 12	-	-
2	1.2067	102 Cr 6	Y 100 C 6	(BL3)	-	SUJ 2	L1 / L3
2	1.2080	X210 Cr 12	Z200 C 12	BD3	X205 Cr 12KU	SKD 1	D3
2	1.2210	115 CrV 3	100 C 3	-	107 CrV3 KU	-	L2
2	1.2241	51 CrV 4	-	-	-	-	-
		High Alloy Steel					
3	1.2311	40 CrMnMo 7	-	-	35 CrMo 8 KU	-	-
3	1.2343	X38 CrMoV 5 1	Z38 CDV 5	BH11	X37 CrMoV51 KU	SKD 6	H 11
3	1.2344	X40 CrMoV 5 1	Z40 CDV 5	BH13	X40 CrMoV 511KU	SKD 61	H 13
3	1.2363	X100 CrMoV 5 1	Z100 CDV 5	BA2	X100 CrMoV 5 1KU	SKD 12	A2
3	1.2365	X32 CrMoV 3 3	32 DCV 12 28	BH10	30 CrMoV 12 27KU	-	H10
3	1.2379	X155 CrVMo 12 1	Z160 CDV 12	BD2	X155 CrVMo121 KU	SKD 11	D2
3	1.2419	105 WCr 6	105 WC 13	-	107 WCr 5 KU	SKS 31 / SKS 2 / SKS 3	-
3	1.2436	X210 CrW 12	Z210 CW 12 1	-	X215 CrW 12 1 KU	SKD 2	-
3	1.2510	100 MnCrW 4	90 MWCV 5	BO1	95 MnWCr 5KU	BO 1	O1
3	1.2542	45 WCrV 7	45 WCV 20	BS1	45 WCrV 8 KU	-	S1
3	1.2550	60 WCrV 7	55 WC 20	BS1	58 WCr 9 KU	-	S1
3	1.2567	30 WCrV 17 2	Z32 WCV 5	-	X30 WCrV 5 3 KU	SKD 4	-
3	1.2581	~X30 WCrV 9 3	Z30 WCV 9	BH21	X30 WCrV 9 3 KU	SKD 5	H 21
3	1.2601	X165 CrMoV 12	-	-	X165 CrMoW 12 KU	-	-
3	1.2606	X37 CrMoW 5 1	Z35 CWDV 5	BH12	X35 CrMoW 05 KU	SKD 62	H 12
3	1.2713	55 NiCrMoV 6	55 NCDV 7	BH 244/5	-	SKT 4	L6
3	1.2721	50 NiCr 13	-	-	-	-	-
3	1.2762	75 CrMoNiW 6 7	-	-	-	-	-
3	1.2842	90 MnCrV 8	90 MV 8	BO2	88 MnV 8 KU	-	O2
3	1.2885	X32 CrMoCoV 3 3 3	-	BH 10A	-	-	(H10A)
3	1.3202	S 12-1-4-5	-	BT15	HS12-1-5-5	-	T15
3	1.3207	S 10-4-3-10	Z130 WKCDV 10 10 4 4 3	BT42	HS10-4-3-10	SKH 57	-
3	1.3243	S 6-5-2-5	Z90 KCV 6 5 5 4 2	334	HS 6-5-2-5	SKH 55	-
3	1.3246	S 7-4-2-5	Z110 WKCDV 7 5 4 4 2	-	HS 7-4-2-5	-	M 41
3	1.3247	S 2-10-1-8	Z110 DKCWV 9 8 4 2 1	BM42	HS2-9-1-8	SKH 59	M 42
3	1.3249	S 2-9-8	-	(BM34)	-	-	M33 / M34
3	1.3343	S 6-5-2	Z 85 WDCV 6 5 4 2	BM2	HS 6-5-2-5	SKH 51	M2
3	1.3344	S 6-5-3	Z130 WDCV 6 5 4 4	-	-	SKH 52 / SKH 53	M2 Class 2
3	1.3346	S 2-9-1	Z85 DCWV 8 4 2 1	BM1	-	-	H41 / M1
3	1.3401	G-X120 Mn 12	Z120 M 12	BW10	-	-	A128 75
3	1.3501	100 Cr 2	100 C 2	-	-	-	E 50100

Material group	number	DIN	AFNOR	BS	UNI	JIS	AISI/SAE
				High Alloy Steel			
3	1.3505	100 Cr 6	100 C 6	534 A99	100 Cr 6	SUJ2 / SUJ4	52100
3	1.4086	G-X120 Cr 29	-	452 C11	-	-	-
3	1.4125	X105 CrMo 17	Z100 CD 17	-	-	SUS 440C	440C
3	1.4871	X53 CrMnNiN 21 9	Z53 CMN 21 9 Az	349 S54	X53 CrMnNiN 21 9	SUH 35 / SUH 36	EV8
3	1.4922	X20 CrMoV 12 1	-	-	X20 CrMoV 12 1	-	-
3	1.5662	X8 Ni 9	-	1502-502-650	X10 Ni 9	SL 9N53 / 60	A353
3	1.5680	X12 Ni 5	Z18 N 5	-	-	SL 5N 590	2515 2517
3	1.5710	36 NiCr 6	35 NC 6	640 A35	-	SNC 236	3135
3	1.5736	36 NiCr 10	30 NC 11	-	-	SNC 631(H)	3435
3	1.5755	31 NiCr 14	18 NC 13	653 M 31	-	SNC 836	-
3	1.5864	35 NiCr 18	-	-	-	-	-
3	1.6511	36 CrNiMo 4	40 NCD 3	817 M37	38 NiCrMo 4(KB)	-	9840 4340
3	1.6523	21 NiCrMo 2	20 NCD 2	805 M20	20 NiCrMo 2	SNCM 220(H)	8620
3	1.6546	40 NiCrMo 22	-	311-TYPE 7	40 NiCrMo 2(KB)	SNCM 240	8740
3	1.6562	40 NiCrMo 8 4	-	817 M40	40 NiCrMo 7(KB)	-	E 4340
3	1.6565	40 NiCrMo 6	-	817 A37 / 818 M40	-	SNCM 439	4340 / 9850
3	1.6580	30 CrNiMo 8	30 CND 8	823 M30	30 NiCrMo 8	SNCM 431	-
3	1.6582	34 CrNiMo 6	35 NCD 6	817 M40	34 CrNiMo 6	SNCM 447	4340 / 4337
3	1.6587	17 CrNiMo 6	18 NCD 6	820 A16	-	-	-
3	1.6657	14 NiCrMo 34	16 NCD 13	832 M13	15 NiCrMo 13	-	9310
3	1.6746	32 NiCrMo 14 5	35 NCD 14	-	-	-	-
3	1.6747	30 NiCrMo 16 6	35 NCD 16	835 M30	-	-	-
3	1.6773	36 NiCrMo 16	-	-	-	-	-
3	1.7102	54 SiCr 6	54 SC 6	-	-	-	401
3	1.7108	60 SiCr 7	60 SC 7	-	60 SiCr 8	-	9262
3	1.7131	16 MnCr 5	16 MC 5	527 M17 / 590 H17	16 MnCr 5	-	5115
3	1.7238	49 CrMo 4	-	-	-	-	-
3	1.7362	12 CrMo 19 5	Z 10 CD 5 5	3606-625	16 CrMo 20 5	SFVAF5A / SFVAF5B	-
3	1.7380	10 CrMo 9 10	10 CD 9 10	3606-622	12 CrMo 9 10	SFVAF22A:B / SCMV4	A 182 F11/A 387 Gr.22
3	1.7561	42 CrV 6	-	-	-	-	-
3	1.7701	51 CrMoV 4	51 CDV 4	-	51 CrMoV 4	-	-
3	1.7715	14 MoV 6 3	-	1503-660-440	-	-	-
3	1.7733	24 CrMoV 5 5	20 CDV 6	-	21 CrMoV 5 11	-	-
3	1.7755	GS-45 CrMoV 10 4	-	-	-	-	-
3	1.8070	21 CrMoV 5 11	-	-	35 NiCr 9	-	-
3	1.8159	50 CrV 4	51 CV 4	735 A51	50 CrV 4	SUP 10	6145 / 6150
3	1.8507	34 CrAlMo 5	30 CAD 6.12	-	34 CrAlMo 7	-	A 355 Cl.D
3	1.8509	41 CrAlMo 7	40 CAD 6 12	905 M39	41 CrAlMo 7	SACM 645 / SACM 1	A 355 Cl.A / E71400
3	1.8515	31 CrMo 12	30 DC 12	722 M24	30 CrMo 12	-	-
3	1.8519	31 CrMoV 9	-	-	-	-	-
3	1.8523	39 CrMoV 13 9	-	897 M39	36 CrMoV 12	-	-
	1.8550	34 CrAlNi 7	30 CAD 6 12	905 M31	-	-	-
				Austenitic stainless Steel			
4	1.4005	X12 CrS 13	Z11 CF 13	416 S21	X12 CrS 13	SUS 416	416
4	1.4104	X14 CrMoS 17	Z13 CF 17	441 S29	X10 CrS 17	SUS 430F	430F
4	1.4113	x6 CrMoS 17 1	Z8 CD 17 01	434 S17	X8 CrMo 17	SUS 434	434
4	1.4301	X5 CrNi 18 9	Z6 CN 18 9	304 S15 / LW21 / LWCF	X5 CrNi 18 10	SUS 304	304 / 304H
4	1.4303	X4 CrNi 18 12	Z5 CN 18 11FF	305 S17 / 305 S19	X7 CrNi 18 10	SUS 305 / SUS 305J1	305 / 308
4	1.4305	X8 CrNiS18 9	Z8 CNF 18 9	303 S22 / 303 S31	X10 CrNiS 18 9	SUS 303	303
4	1.4306	X2 CrNi 18 9	Z2 CN 18 9	304 S11 / LW20 / LWCF	X3 CrNi 18 11	SUS 304L / SCS19	304L
4	1.4308	G-X5 CrNi 19 10	Z6 CN 18 10M	304 C15 / (LT196)	-	SCS 13	CF8
4	1.4310	X10 CrNi 18 8	Z12 CN 17 8	301 S21 / 301 S22	X12 CrNi 18 07	SUS 301	301
4	1.4311	X2 CrNiN 18 10	Z2 CN 18 7 Az	304 S61	X2 CrNiN 18 10	SUS 304LN	304LN
4	1.4312	G-X10 CrNi 18 8	Z10 CN18 9M	302 C25 / ANC3A	-	SCS 12 / SCS 13A	-

Material group	number	DIN	AFNOR	BS	UNI	JIS	AISI/SAE
				Austenitic stainless Steel			
4	1.4567	X3 CrNiCu 18.9.4	-	304 Cu	X3 CrNiCu 18.9.4	XM7	304Cu
4	1.4568	X7 CrNiAl 17 7	Z CNA 17 7	301 S81	-	-	-
4	1.4570	X8 CrNiCuS 18.9.2	-	303 Cu	X8 CrNiCuS 18.9.2	SUS 303Cu	303Cu
				Austenitic stainless Steel			
5	1.4401	X2 CrNiMo 17 12 2	Z6 CND 17 11 2	316 S13 / 316 S31	X5 CrNiMo 17 12	SUS 316	316
5	1.4404	X2 CrNiMo 17 12 2	Z2 CND 17 12 2	316 S11 / 316 S13	X2 CrNiMo 17 12	SUS 316L	316L
5	1.4406	X2 CrNiMoN 17 11 2	Z3 CND 17 11 Az	316 S61 / 316 S63	X2 CrNiMoN 17 12	SUS 316LN	316LN
5	1.4408	G-X 5 CrNiMo 19 11 2	-	316 C16 / (LT196) / A	-	SCS14	CF-8M
5	1.4429	X2 CrNiMoN 17 13 3	Z2 CND 17 12 Az	316 S63	X2 CrNiMoN 17 13	(SUS 316LN)	316LN
5	1.4435	X2 CrNiMo 18 14 3	Z2 CND 17 12 3	316 S11 / 316 S31	X2 CrNiMo 17 13	SUS 316L	316L
5	1.4436	X3 CrNiMo 17 13 3	Z6 CND 18 12 3	316 S19 / 316 S33 / LW	X5 CrNiMo 17 13	SUS 316	316
5	1.4438	X2 CrNiMo 18 15 4	Z2 CND 19 15 4	317 S12	X2 CrNiMo 18 16	SUS 317L	317L
5	1.4449	X3 CrNiMo 18 12 3	-	317 S16	X5 CrNiMo 18 15	SUS 317	317
				Austenitic and duplex stainless Steel			
6	1.4057	X17 CrNi 16.2	Z15 CN 16 2	431 S29	X16 CrNi 16	SUS 431	431
6	1.4313	X3 CrNiMo 13 4	Z4 CND 13 4	425 C11	-	SCS 5	-
6	1.4319	X3 CrNiN 17 8	-	301 S26 / 302 S26	-	SUS 302	302
6	1.434	G-X40 CrNi 27 4	-	-	-	-	-
6	1.4362	X2 CrNiN 23 4	Z2 CN 23 04 AZ	-	-	-	S32304
6	1.4410	X2 CrNiMoN 25 7 4	-	-	-	-	-
6	1.4417	X2 CrNiMoSi 19 5	-	-	-	-	S31500
6	1.4460	X8 CrNiMoN 27 5 2	Z5 CND 27 5 Az	-	-	SUS 329J1	329
6	1.4462	X2 CrNiMoN 22 5 3	Z23CND 22 5 3 Az	318 S13	-	SUS 329J3L	-
6	1.4500	G-X7 NiCrMoCuNb 25 20	23 NCDU 25 20M	-	-	-	-
6	1.4510	X3 CrTi 17	Z4 CT 17	-	X6 CrTi 17	SUS 430LX	430 Ti / 439
6	1.4511	X3 CrNb 17	Z4 CNb 17	-	X6 CrNb 17	SUS 430LX	-
6	1.4521	X2 CrMoTi 18 2	-	-	-	SUS 444	443 / 444
6	1.4539	X1 NiCrMoCuN 25 20 3	Z2 NCDU 25 20	-	-	-	904L / UNS N08904
6	1.4541	X10 CrNiMoTi 18 10	Z6 CNT 18 10	321 S12 / 321 S51	X6 CrNiTi 18 11	SUS 321	321
6	1.4542	X5 CrNiCuNb 16 4	Z7 CNU 17 4	-	-	SUS 630 / SCS24	630
6	1.4546	X5 CrNiNb 18 10	-	347 SD31	X6 CrNiNb 18 11	-	348
6	1.455	X6 CrNiNb 18 10	Z6 CNNb 18 10	347 S20 / 347 S31	X6 CrNiNb 18 11	SUS 347	347 / 348
6	1.4552	G-X5 CrNiNb 19 11	Z4 CNNb 18 10M	347 C17	-	SCS 21	-
6	1.4558	X2 NiCrAlTi 32 20	-	NA15	-	-	N 08800
6	1.4562	X1 NiCrMoCu 32 28 7	-	-	-	-	N 08031
6	1.4563	X1 NiCrMoCuN 31 27 4	Z 1 NCDU 31 27	-	-	-	N 08028
6	1.4571	X6 CrNiMoTi 17 12 2	Z6 CNDT 17 12	320 S18 / 320 S31	X6 CrNiMoTi 17 12	SUS 316Ti	316Ti
6	1.4580	X6 CrNiMoNb 17 12 2	Z6 CNDNb 17 12	318 S17	X6 CrNiMoNb17 12	-	(316 Cb)
6	1.4581	G-X5 CrNiMoNb 19 11 2	Z4 CNDNb 18 12M	318 C17 / ANC4C	G-X 6 CrNiMoNb 20 11	-	-
6	1.4583	X10 CrNiMoNb 18 12	-	-	X6 CrNiMoNb 17 13	-	318
6	1.4585	G-X7 CrNiMoCuNb 18-18	-	-	X6 CrNiMoSi 17 12	-	-
6	1.4747	X80 CrNiSi 20	Z80 CNS 20 2	443 S65	X80 CrNiSi 20	SUH 4	HNV6
6	1.4821	X20 CrNiSi 25 4	Z20 CNS 25 04	-	-	-	-
6	1.4823	G-X40 CrNiSi 27 4	-	-	-	-	-
6	1.4828	X15 CrNiSi 20 12	Z17 CNS 20 12	309 S24	X16 CrNi 23 14	SUH 309	309
6	1.4833	X12 CrNi 22.13	Z15 CN 24 13	309 S13	X6 CrNi 23 14	-	309S
6	1.4837	G-X40 CrNiSi 25 12	-	309 C30	G-X40 CrNiSi 25 12	SCH 17 / SCH 13A	-
6	1.4841	X15 CrNiSi 25 20	Z15 CNS 25 20	314 S25	X15 CrNiSi 25 20	SUH 310	310 / 314
6	1.4845	X12 CrNi 25 21	Z12 CN 25 20	310 S24	X6 CrNi 25 20	SUS 310	310
6	1.4848	G-X40 CrNiSi 25 20	-	310 C40 / 310 C45	G-X40 CrNiSi 26 20	SCH 21 / SCH 22	HK
6	1.4864	X 12 NiCrSi 35 16	Z12 NCS 33 16	NA17	-	SUH 330	330
6	1.4865	G-X40 NiCrSi 38 18	-	330 C11 / 330 C40	G-X50 NiCrSi 39 19	SCH 15 / SCH 16	-
6	1.4873	X45 CrNiW 18 9	Z45 CNW 18 9	-	X45 CrNiW 18 9	SUH 31	-

Material group	number	DIN	AFNOR	BS	UNI	JIS	AISI/SAE
		Austenitic and duplex stainless Steel					
6	1.4876	X10 NiCrAlTi 32 20	Z10 NC 32 21	NA15(H)	-	NCF 800(TP)	B163
6	1.4878	X12 CrNiTi 18 9	Z6 CNT 18 10	321 S51	(X6 CrNiTi 18 11)	SUS 321	321
6	1.4882	X50 CrMnNiNbN 21 9	Z50 CMNNb 21 9	-	-	-	-
6	1.4958	X5 NiCrAlTi 31 20	-	-	-	-	-
6	1.4977	X40 CoCrNi 20 20	Z42 CNKDWNb	-	-	-	-
		Ferritic stainless Steel					
7	1.4000	X6 Cr 13	Z6 C 13	403 S17	X6Cr 13	SUS 403 / SUS 410S	403 / 410S / 429
7	1.4001	X7 Cr 14	Z8 C 13FF	403 S17	X6 Cr 13	SUS 403 / SUS 401S	403 / 401S / 429
7	1.4002	X6 CrAl 13	Z8 CA 12	405 S17	X6 CrAl 13	SUS 405	405
7	1.4008	G-X 7 CrNiMo 12 1	Z12 CN 13M	410 C21	GX12 Cr 13	-	-
7	1.4016	X8 Cr 17	Z8 C 17	430 S17 / 430 S18	X8 Cr 17	SUS 430	430
7	1.4742	X10 CrAl 18	Z12 CAS 18	430 S15	X8 Cr 17	SUH 21	-
7	1.4762	X10 CrAl 24	Z10 CAS 24	-	X16 Cr 26	(SUH 446)	-446
		Martensitic stainless Steel					
8	1.2083	X42 Cr 13	Z40 C 14	-	-	SUS 420J2	420
8	1.4006	X12 Cr 13	Z10 C 13	410 S21 / 410 C21	X12 Cr 13	SUS 410	410
8	1.4011	G-X 12 Cr 12	-	ANC1A	-	-	CA-15
8	1.4021	X20 Cr 13	Z20 C 13	420 S37	X20 Cr 13	SUS 420J1	420
8	1.4024	X15 Cr 13	Z15 C 13	420 S29	-	SUS 410J1	410
8	1.4027	G-X20 Cr 14	Z20 C 13M	420 C24 / 420 C29	-	SCS 2	-
8	1.4028	X30 Cr 13	Z30 C 13	420 S45	(G) X 30 Cr 13	SUS 420J2	420F
8	1.4031	X39 Cr 13	Z40 C 14	-	X40 Cr 13	SUS 420J2	-
8	1.4034	X46 Cr 13	Z44 C 14	(420 S45)	X40 Cr 14	-	-
8	1.4531	X40 CrSiMo 10 2	Z40 CSD 10	-	-	SUH 3	-
8	1.4718	X45 CrSi 9 3	Z45 CS 9	401 S45	X45 CrSi 8	SUH 1	HNV3
8	1.4720	X20 CrMo13	-	-	-	-	-
8	1.4724	X10 CrAl 13	Z10 C 13	-	X10 CrAl 12	SUS 405	405
		Gray cast Iron					
9	0.6010	EN-GJL 100 / GG 10	Ft 10D	-	G 10	FC 100	CLASS 20
9	0.6015	EN-GJL 150 / GG 15	Ft 15D	GRADE 150	G 15	FC 150	CLASS 25
9	0.6020	EN-GJL 200 / GG 20	Ft 20D	GRADE 220	G 20	FC 200	CLASS 30
9	0.6025	EN-GJL 250 / GG 25	Ft 25D	GRADE 260	G 25	FC 250	CLASS 35
9	0.6030	EN-GJL 300 / GG 30	Ft 30D	GRADE 300	G 30	FC 300	CLASS 45
9	0.6035	EN-GJL 350 / GG 35	Ft 35D	GRADE 350	G 35	FC 350	CLASS 50
9	0.6040	EN-GJL 400 / GG 40	Ft 40D	GRADE 400	-	-	CLASS 55
		Nodular cast Iron					
10	0.7033	EN-GJS 350/GGG 35.3	-	-	-	-	-
10	0.7040	EN-GJS 400/GGG 40	FCS 400-12	SNG420/12	GGG 40	FCD 400	60-40-18
10	0.7043	EN-GJS400-15/GGG 40.3	FCS 370-17	SNG370/17	-	-	-
10	0.7050	EN-GJS 500/GGG 50	FCS 500-7	SNG500/7	GGG 50	FCD 500	80-55-06
10	0.7060	EN-GJS 6007/GGG 60	FCS 600-3	SNG600/3	GGG 60	FCD 600	-
10	0.7070	EN-GJS 700/GGG 70	FCS 700-2	SNG700/2	GGG 70	FCD 700	1000-70-03
10	0.8035	GTW-35	MB35-7	W340/3	-	-	-
10	0.8040	GTW-40	MB40-10	W410/4	GMB40	-	-
10	0.8045	GTW-45	-	-	GMB45	-	-
10	0.8055	GTW-55	-	-	-	-	-
10	0.8065	GTW-65	-	-	-	-	-
10	0.8135	GTS-35	MN35-10	B340/12	-	FCMW 330	32510
10	0.8145	GTS-45	-	P440/7	-	FCMW 370	40010
10	0.8155	GTS-55	MP50-5	PS10/4	-	FCMP 490	50005
10	0.8165	GTS-65	MP60-3	P570/3	-	FCMP 540	70003

Material group	number	DIN	AFNOR	BS	UNI	JIS	AISI/SAE
		Nodular cast Iron					
10	0.8170	GTS-70	M870-2	P690/2	-	-	90001
		Nickel based Alloys					
11	2.4360	NiCu 30 Fe	NU 30	NA13	-	Monel 400	Monel 400
11	2.4375	NiCu 30 Al	ND 30 AT	NA18	-	Monel K-500	Monel K-500
11	2.4610	NiMo 16Cr 16Ti	-	-	-	Hastelloy C-4	Hastelloy C-4
11	2.4630	NiCr 20 Ti	NC 20 T	HR 5, 203-4	-	Nimonic 75	Nimonic 75
11	2.4642	NiCr 29 Fe	NC 30 Fe	-	-	Inconel 690	Inconel 690
11	2.4668	NiCr 19 FeNbMo	NC 19 Fe Nb	-	-	Inconel 718	Inconel 718
11	2.4669	NiCr 15 Fe7TiAl	NC 15 TNb A	-	-	Inconel X-750	Inconel X-750
11	2.4685	G-NiMo 28	-	-	-	Hastelloy B	Hastelloy B
11	2.4694	NiCr 16 Fe 7 TiAl	-	-	-	Inconel 751	Inconel 751
11	2.4810	G-NiMo 30	-	-	-	Hastelloy C	Hastelloy C
11	2.4856	NiCr 22Mo 9Nb	NC 22 FeDNb	NA21	-	Inconel 625	Inconel 625
11	2.4858	NiCr 21 Mo	NC 21 FeDU	NA16	-	Incoloy 825	Incoloy 825
		Titanium based Alloys					
12	3.7025	Ti 1	-	2TA1	-	-	R 50250 / Titan Grade 2
12	3.7115	TiAl 5 Sn 2	-	-	-	-	-
12	3.7124	TiCu 2	-	2TA21-24	-	-	-
12	3.7145	TiA l6 Sn 2 Zr 4 Mo 2 S	-	-	-	-	R 54620
12	3.7165	TiAl 6 V 4	TA 6 V	TA 10-13; TA28	-	-	R 56400 / Titan Grade 5
12	3.7175	TiAl 6 V 6 Sn 2	-	-	-	-	-
12	3.7185	TiAl 4 Mo 4 Sn 2	-	TA 45-51; TA 57	-	-	-
12	3.7195	TiAl 3 V 2.5	-	-	-	-	-
12	3.7225	TI-35A 0.2PD	-	TP1	-	-	R 52250 / Titan Grade 1
12	3.7235	Ti-50A 0.2PD	-	-	-	-	Titan Grade 7
		Cobalt based Alloys					
	---	Stellite 6	Stellite 6	-	-	-	VF2
	---	Stellite 7	Stellite 7	-	-	-	-
	----	Stellite 12	Stellite 12	-	-	-	VF7
	-----	Stellite F	Stellite F	-	-	-	-
		Bronze					
13	2.0966	CuAl10 Ni5 Fe4	CuAl9 Ni5 Fe3 M1	CA 104	-	-	CDA / C63000
13	2.1052	CuSn12 Ni	-	1400 PB2	-	-	CDA / C 91700
13	2.1090	CuSn7 ZNPb	U-E7 Z5 Pb4	BS 1400	-	-	CDA / C 93200
13	2.1176	CuPb10 SN	U PB8	1400 LB2	-	-	CDA / C 94400
		Aluminium with low Silicon					
14	3.1255	AlCuSiMn	A-U4SG	-	-	-	-
14	3.1325	AlCuMg 1	A-U4G	-	-	-	-
14	3.1645	AlCuMgPb	A-U4Pb	-	-	-	-
14	3.2153	G-AlSi7 Cu3	-	-	-	-	-
14	3.2315	AlMgSi 1	A-SGM0,7	-	-	-	-
14	3.3355	AlMg5	-	-	-	-	-
14	3.3535	AlMg 3	A-G3M	-	-	-	-
		Aluminium with high Silicon					
15	3.2573	G-AlSi9	-	-	-	-	-
15	3.2581	G-AlSi12	-	-	-	-	-
15	3.2583	G-AlSi12 Cu	-	-	-	-	-

Insert reference table

Look up your existing insert designation in the left column - the compatible Lamina insert is shown in the right column. Lamina Milling grade LT-30 will replace the grade of the insert being used.

Reference Insert	Lamina Insert
A	
APCR 1003 PDFR-P	APLX 1003 PDTR
APCT 1003 PDR-HM	APLX 1003 PDTR
APCT 160408FR	APKT 1604 PDTR
APET 100 305ER	APLX 1003 PDTR
APET 100 308ER	APLX 100308 PDTR
APET 160404 HS	APKT 1604 PDTR
APET 160408ER	APKT 1604 PDTR
APET 160408HS	APKT 1604 PDTR
APET 160408TR	APKT 1604 PDTR
APEX 1604 PDFR	APKT 1604 PDTR
APEX 160408FR-E07	APMT 1604 PDTR
APEX 160408FR-E08	APMT 1604 PDTR
APFT 1604 PDR	APKT 1604 PDTR
APFT 1604 PDTR	APKT 1604 PDTR
APFT 1604PDR-M12	APKT 1604 PDTR
APFT 1604PDTR-D15	APKT 1604 PDTR
APFT 1604PDTR-E08	APKT 1604 PDTR
APFW 1604 PDER	APKT 1604 PDTR
APFW 1604 PDTR	APKT 1604 PDTR
APHT 1604 PDER	APKT 1604 PDTR
APHT 1604 PDFR	APKT 1604 PDTR
APHT 1604 PDTR	APKT 1604 PDTR
APHW 100304 PDER	APLX 1003 PDTR
APHW 100308 PDER	APLX 100308 PDTR
APHW 1604 PDER	APKT 1604 PDTR
APHW 1604 PDSR	APKT 1604 PDTR
APHW 160408 PDER	APKT 1604 PDTR
APKR 1003 PDR-HM	APLX 1003 PDTR
APKT 100 304ER	APLX 1003 PDTR
APKT 100 305ER	APLX 1003 PDTR
APKT 1003 PDER	APLX 1003 PDTR
APKT 1003 PDFR	APLX 1003 PDTR
APKT 1003PDRB	APLX 1003 PDTR
APKT 1003 PDR-HM	APLX 1003 PDTR
APKT 1003 PDR-HM90	APLX 1003 PDTR
APKT 1003 PDRJ	APLX 1003 PDTR
APKT 1003 PDTR-76	APLX 1003 PDTR
APKT 1003 PDTR-RM	APLX 1003 PDTR
APKT 100308 PDTR-RM	APLX 100308 PDTR
APKT 1003PDTR-8M	APLX 1003 PDTR
APKT 1604 PDER	APLX 1003 PDTR
APKT 1604 PDER-M61	APKT 1604 PDTR
APKT 1604 PDRB	APKT 1604 PDTR
APKT 1604 PDR-HM	APKT 1604 PDTR
APKT 1604 PDTR	APKT 1604 PDTR
APKT 160404R	APKT 1604 PDTR
APKT 160408E	APKT 1604 PDTR
APKT 160408R	APKT 1604 PDTR
APKT 160408TR-D15	APKT 1604 PDTR
APKT 1604PDTR-M14	APKT 1604 PDTR
APKT 1604PDTR-ME14	APKT 1604 PDTR
APKX 1604PDR-ME11	APMT 1604 PDTR
APKX 1604PDR-ME12	APMT 1604 PDTR
APMT 1604 PDER	APKT 1604 PDTR
APMT 160408-M	APMT 1604 PDTR
APMW 1604 PDTR	APKT 1604 PDTR
APMX 160408TR-M14	APKT 1604 PDTR
APMX 160408TR-ME11	APMT 1604 PDTR
APPT 160408 PDER GD	APKT 1604 PDTR
APPT 160408 PDSR GD	APKT 1604 PDTR
H	
HM90 APCR 100304 PDFRDP	APLX 1003 PDTR
HM90 APCR 100304 PDFR-P	APLX 1003 PDTR
HM90 APKT 1003 PDR	APLX 1003 PDTR
HM90 APKT 1003 PDTR-8M	APLX 1003 PDTR
HM90 APKT 100304 PDR	APLX 1003 PDTR
O	
ODET 0605 APEN	ODMT 060508 TN
ODMT 0605 APEN	ODMT 060508 TN
ODMW 060508	ODMW 060508 TN
ODMW 060508T	ODMW 060508 TN
ODPT 060508 ENGPW	ODMT 060508 TN
ODPW 060508 ENGN	ODMW 060508 TN
OFCN 0704 TN-EMR	OFER 070405 TN
OFCN 0704 TN-MR	OFER 070405 TN
OFCR 0704 TN-EML	OFER 070405 TN
OFCT 05T3 AFFN-P	OFMT 05T305 TR
OFCT 05T3 TN-EM	OFMT 05T305 TR
OFCT 05T3 TN-M	OFMT 05T305 TR
OFEN 070405TN-D18	OFER 070405 TN
OFER 070405N-E07	OFER 070405 TN
OFER 070405N-M10	OFER 070405 TN
OFER 070405TN-M16	OFER 070405 TN
OFER 070405TN-ME10	OFER 070405 TN
OFER 070405TN-ME15	OFER 070405 TN
OFET 070405TN-M16	OFMT 070405 TR
OFET 070405TN-ME10	OFMT 070405 TR
OFET 070405TN-ME15	OFMT 070405 TR
OFEX 05T305N-E04	OFMT 05T305 TR
OFEX 05T305N-M05	OFMT 05T305 TR
OFEX 05T305TN-D09	OFMT 05T305 TR

Insert reference table

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Reference Insert	Lamina Insert
OFEX 05T305TN-M08	OFMT 05T305 TR
OFEX 05T305TN-ME07	OFMT 05T305 TR
OFMR 0704 AER-76	OFER 070405TN
OFMR 0704 AER-M	OFER 070405TN
OFMR 0704 AETN	OFER 070405TN
OFMR 070405TR-ME13	OFER 070405TN
OFMT 050405TR-M14	OFMT 050405TR
OFMT 050405TR-ME12	OFMT 050405TR
OFMT 05T3 AFN-HR	OFMT 05T305 TR
OFMT 05T3 TN-ML	OFMT 05T305 TR
OFMT 05T305 TN-76	OFMT 05T305 TR
OFMT 070405TN-M15	OFMT 070405 TR
OFMT 070405 TN-ME13	OFMT070405 TR
R	
R245-12T3 E-KL	SEKT 12T3 AFTN
R245-12T3 E-ML	SEKT 12T3 AFTN
R245-12T3 E-PL	SEKT 12T3 AFTN
R245-12T3 K-MM	SEKT 12T3 AFTN
R245-12T3 M-KH	SEKT 12T3 AFTN
R245-12T3 M-KL	SEKT 12T3 AFTN
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R245-12T3 M-PH	SEKT 12T3 AFTN
R245-12T3 M-PL	SEKT 12T3 AFTN
R245-12T3 M-PM	SEKT 12T3 AFTN
r290-12T308	SPMT 12T308
S	
SDCW 1204 AEEN	SDKT 1204 AETN
SDCW 1204 AEFN	SDKT 1204 AETN
SDCW 1204 AETN	SDKT 1204 AETN
SDGT 1204 AFFN	SDKT 1204 AETN
SDHT 1204 AEEN	SDKT 1204 AETN
SDHT 1204 AETN	SDKT 1204 AETN
SDKT 1204 AEEN	SDKT 1204 AETN
SDMT 1204 AFPN P63	SDKT 1204 AETN
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SEEN 1504 AFEN	SEKN 1504 AFTN
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SEER 1204 AFER	SEKR 1204 AFTN
SEET 13T3 AGEN-JL	SEKT 12T3 AFTN
SEET 1204 AFER	SEKT 1204 AFTN
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SEKN 1203 AFTN	SEKN 1203 AFTN
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SEMT 13T3 AGSN-IM	SEKT 12T3 AFTN
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SENN 1504 AFTN	SEKN 1504 AFTN
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SEPT 13T3 AGEN GD	SEKT 12T3 AFTN
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SPER 1204 ENGB	SPKR 1204 EDTR
T	
TPCN 160308	TPUN 160308
TPKN 1603 PP-R-42	TPK 1603 PDTR
TPKN 2204 P2R	TPKN 2204 PDTR
TPMN 160308	TPUN 160308

Notes

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