

SIGMA TIZ



METAL CUTTING TOOLS

About us

Based on emerging industries requirement where the demand has high requirement of stringent quality and extremely high parameters SIGMA TOOLINGS has introduced new product series of carbide inserts which offers robust machining.

In 2019 SIGMA has introduced its collaboration for inserts with European Firm TIZ which is already a pioneer in carbide inserts and branded these inserts as "SIGMATIZ". These inserts are manufactured in Europe under stringent process with high grade technology and international quality parameters.

The comprehensive SIGMATIZ product range includes highly specialized carbide inserts for crankshaft machining, tube and pipe machining, sheet metal processing and heavy-duty machining operations in the steel industry.

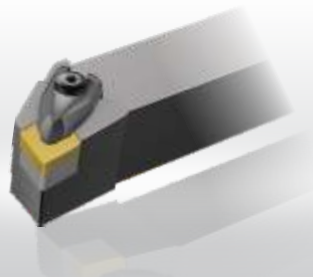
Our Unique inserts are featured with Nano CVD bonding layer through to the hardest diamond coatings.

Our Milling Cutters has special features of multi functionality where a high feed insert can be seated on same pocket of normal insert.

For high superior finish SIGMATIZ has introduced wiper inserts in all range "SIGMATEC" is a distinct insert which facilitates multi-operation like drilling, turning & chamfering with single insert.

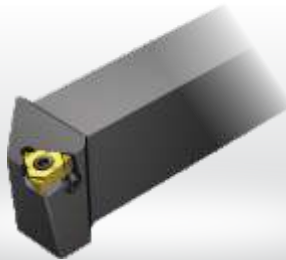


Turning



001 - 072

Threading



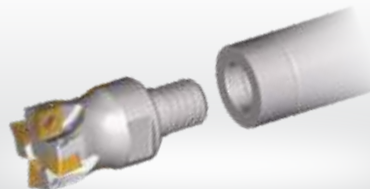
073 - 098

Milling



099 - 188

Extensions
Chucks



189 - 191

Aluminium
Machining



192 - 206

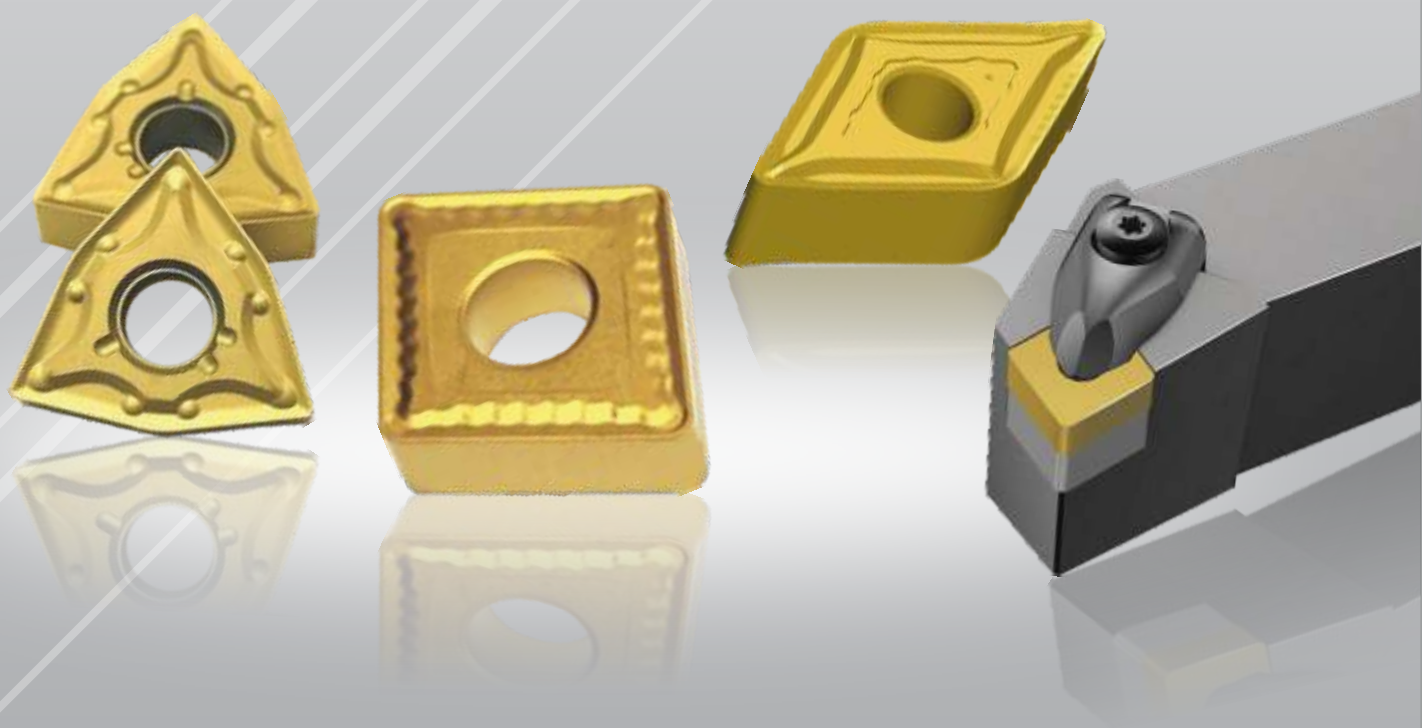
Indexable
Drills



207 - 214



TURNING INSERTS CATALOGUE



Turning

Technological Advantages & customer Benefits	003
Chip Groove Geometries	004
Depth of cut for different chip breakers	012
Grade Overview	013
ISO designation system	015
Indexable Inserts	017
Selection of Indexable insert size	046
Selection of indexable insert shape	047
Technical hints for finishing	048
Formulas for turning	050
Solution for turning problem	051
Cutting data recommendation for different grades	052

SIGMATEC

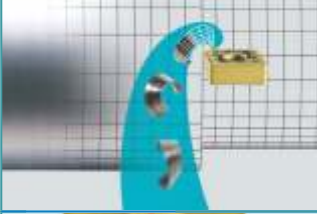


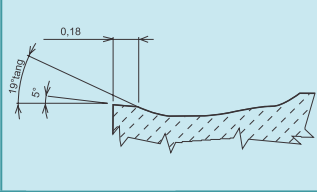
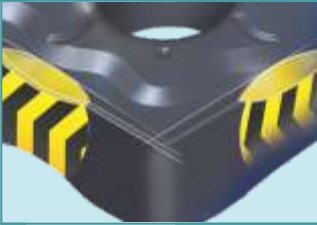




SIGMATEC Turning – Drilling – facing- chamfering tool	063
Different operation done with SIGMATEC insert	064
Technical hints on different application possibilities	065
SIGMATEC Designation System	067
SIGMATEC Tool Holder	068
Indexable Inserts	069
Technical hints & grade Overview	070
Cutting data recommendation	071
Machining Examples of SIGMATEC	072

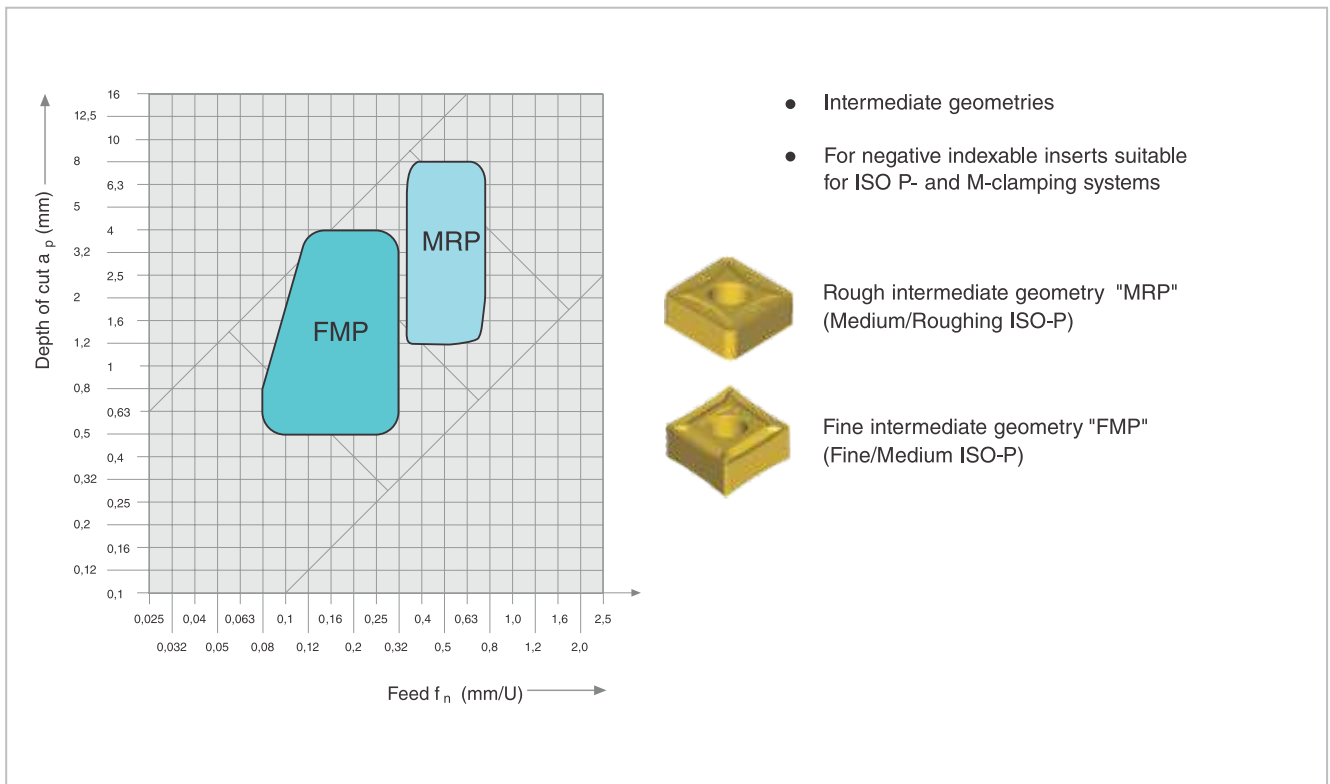
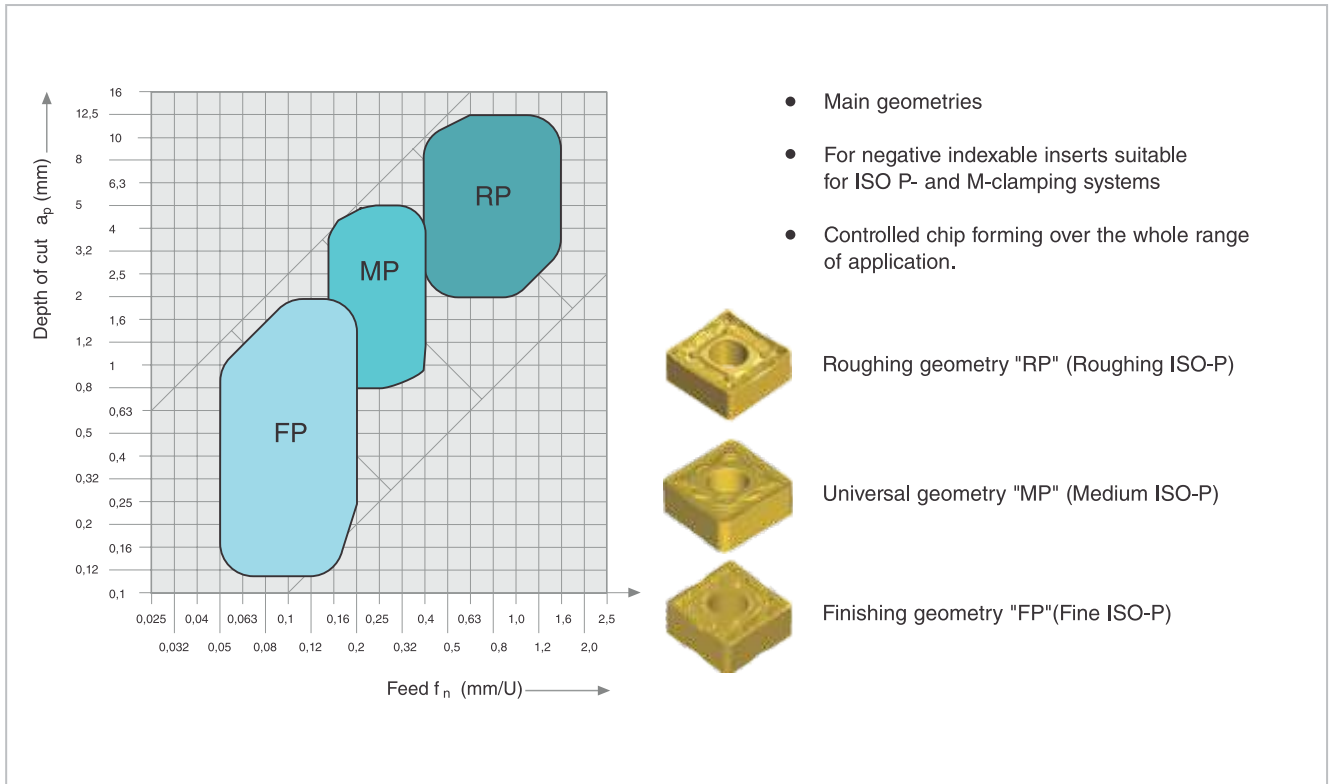
Thread Turning Tool

Thread turning Tool	073
Partial profile 60° & 55° insert	074
ISO metric Full Profile Insert	076
BSP Full Profile Insert	078
American UN Full Profile Insert	080
BSPT Full Profile Insert	084
NPT & NPTF Full Profile Insert	085
Trapezoidal DIN 103 Full Profile Insert	087
Tool Holders	089
Tool holder spare parts	091
Thread Turning grade Overview	092
Thread Turning Methods	093
Infeed Methods for thread cutting	094
Helix Angle for thread cutting	095
Machining Examples	096
Solution for thread turning	097
Cutting data recommendation for thread turning	098

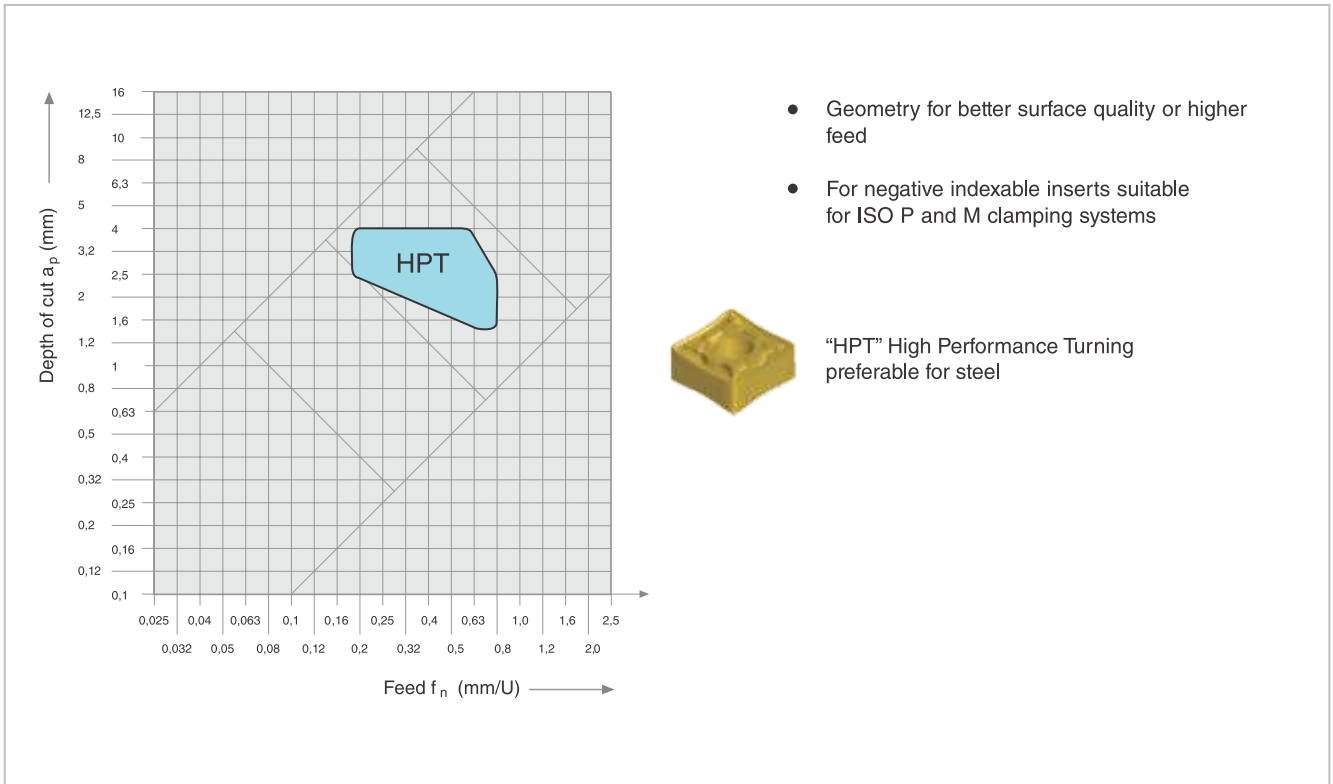
Technological advantages

Customer benefits

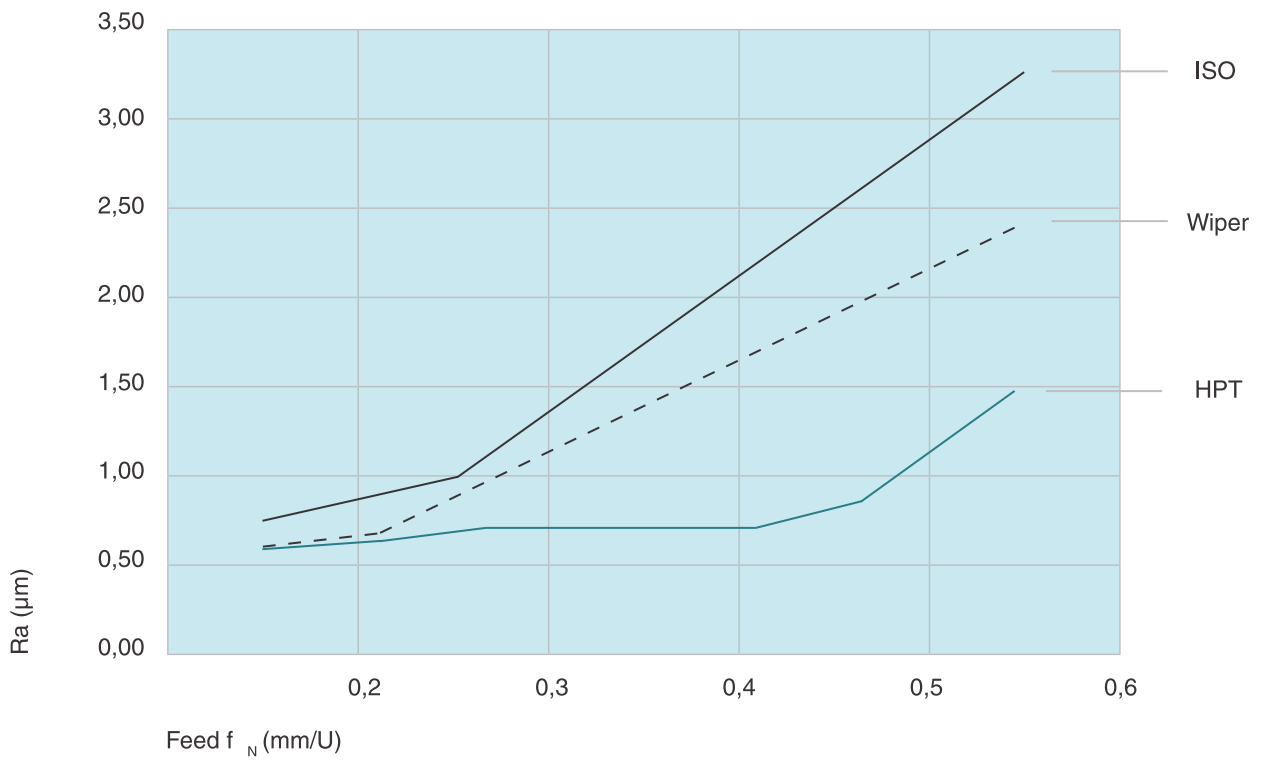
<p>Chip breaker optimised in the chip channel; remarkably soft cut</p>		<p>Reduced friction therefore less cratering, resulting in prolonged tool life</p>
<p>Corner radius dimension and application range are pressed along in the process</p>		<p>Simple allocation of indexable inserts</p>
<p>Newly developed chip breaker</p>		<p>Optimized chip breaking</p>
<p>Cutting edge area stabilised in the middle; optimised micro-geometry</p>		<p>No breakage at chip impact – turning against the shoulder</p>
<p>Chip impact protector</p>		<p>No chippings of the cutting edge caused by chip impact when turning against the shoulder</p>
<p>Special chip geometry with corner radius for little parts</p>		<p>Good chip breakage and smooth cut</p>
<p>Positive macrogeometry and sharp microgeometry</p>		<p>Good chip breaking characteristics on materials that are notoriously difficult to machine e.g. (superalloys)</p>
<p>Optimised gradient carbides</p>		<p>Carbide gradient grades tailored to specific applications for extra-high safety levels</p>
<p>Thick MT-CVD layer</p>		<p>Proven Nanolock compound. LCP15T and LCP25T with especially thick MT-CVD layer allow 60 % increase of tool life</p>

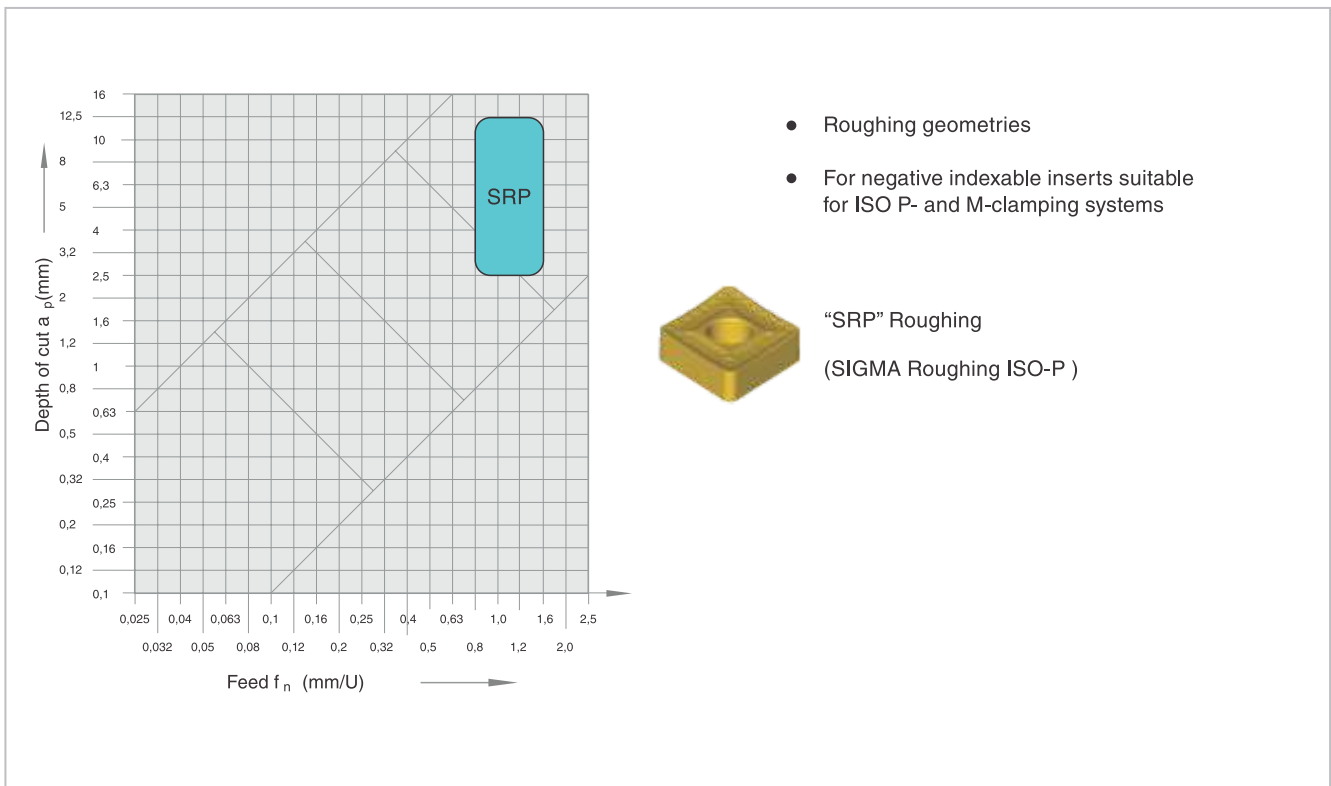
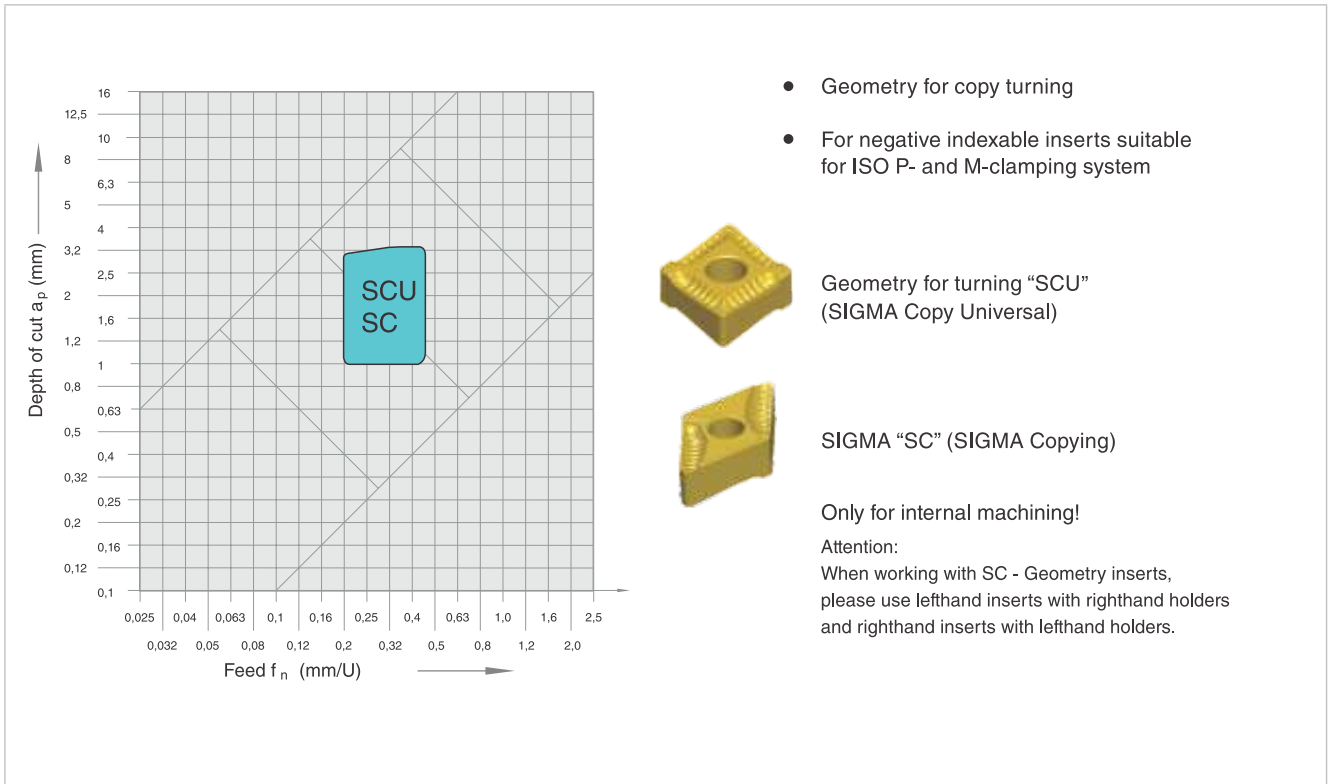


Chip groove geometries for steel

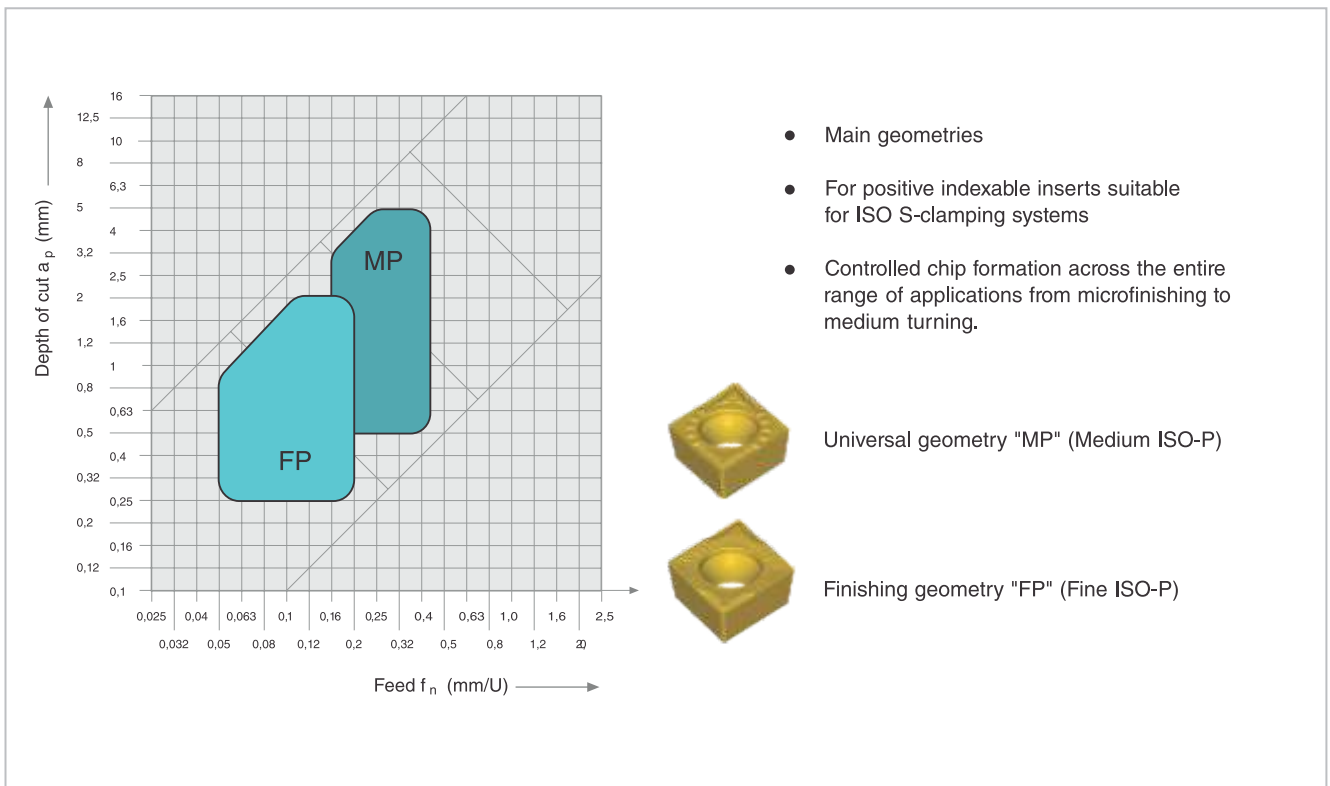
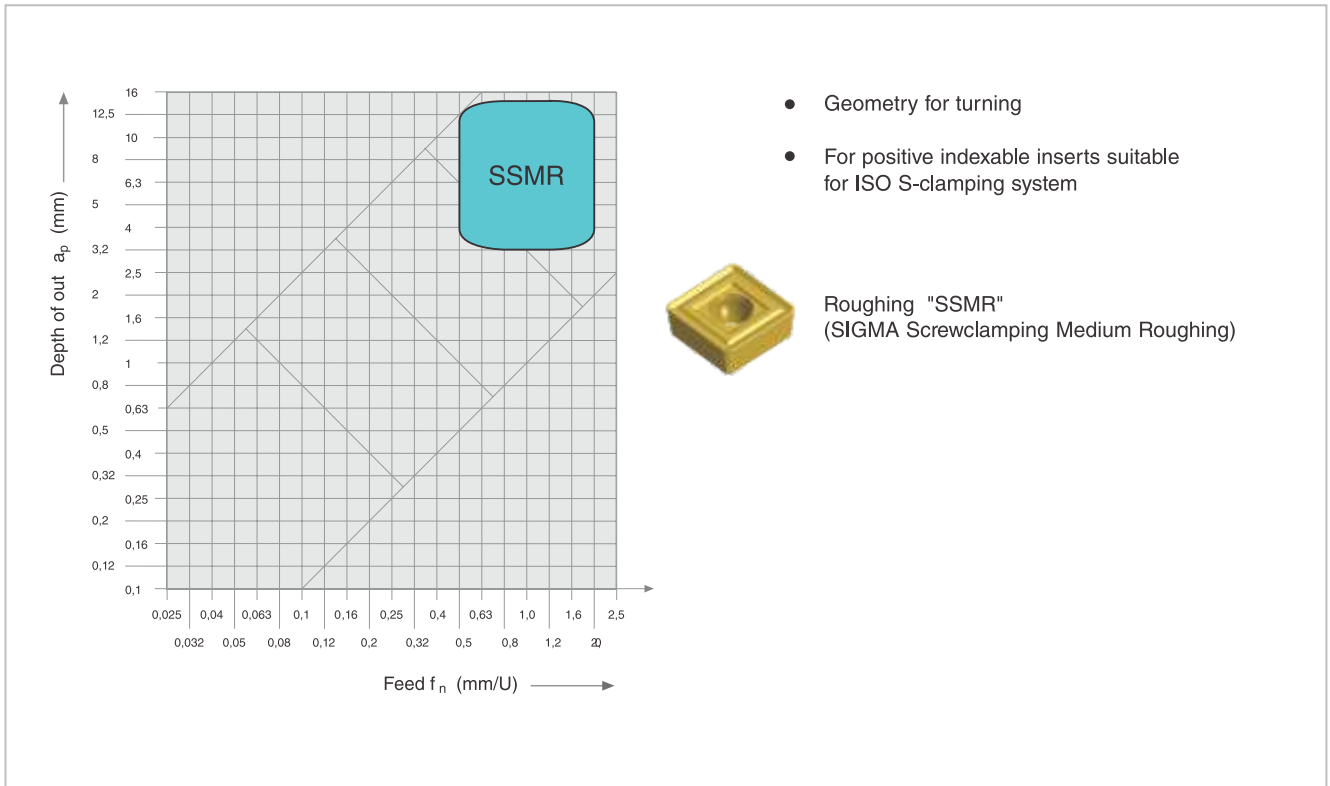


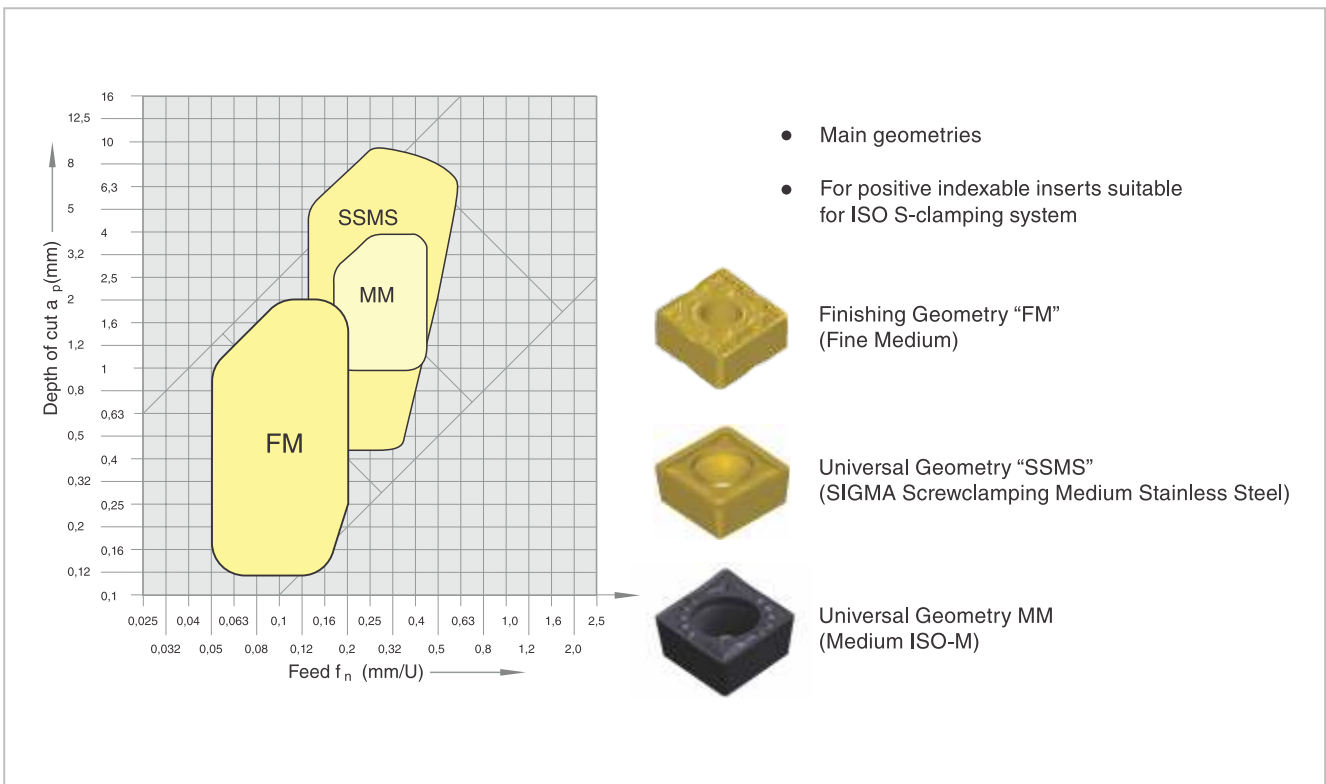
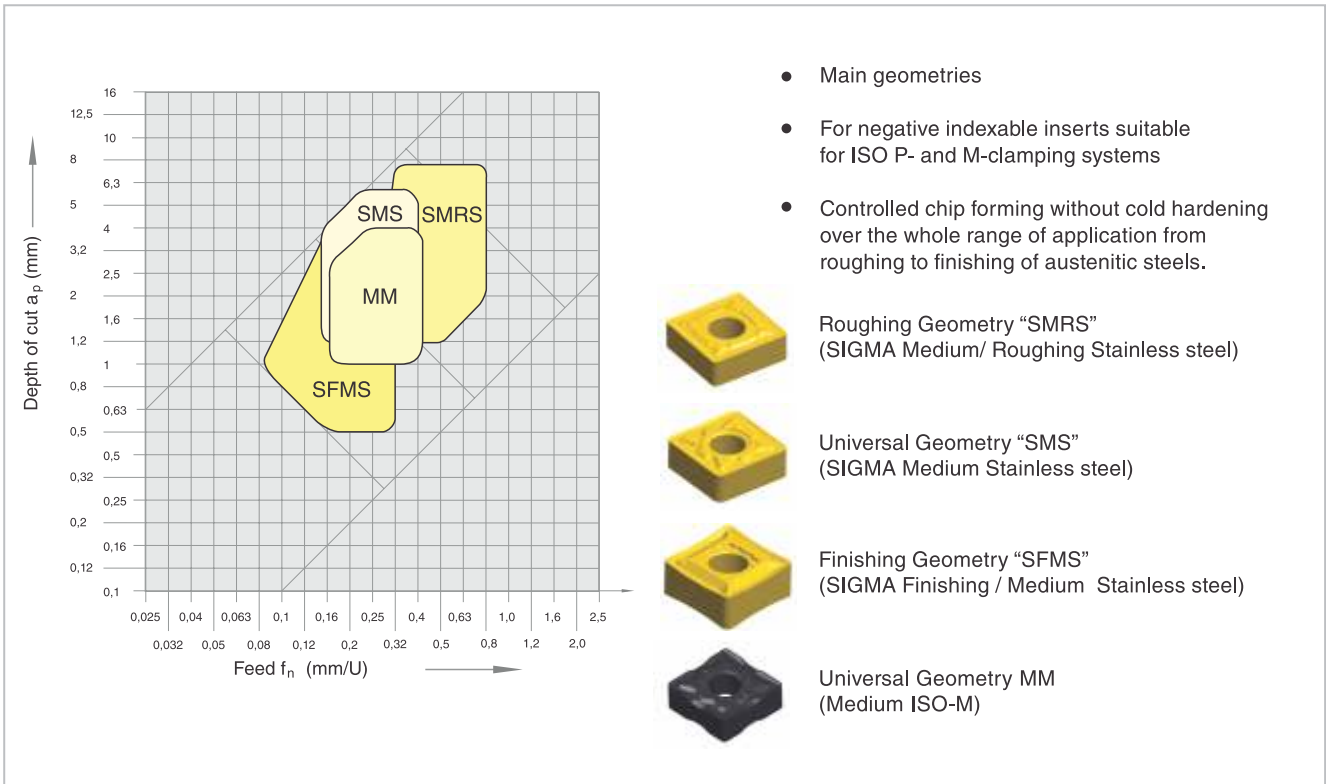
Ra - Values / CNMG 120408 ISO / HPT / Wiper



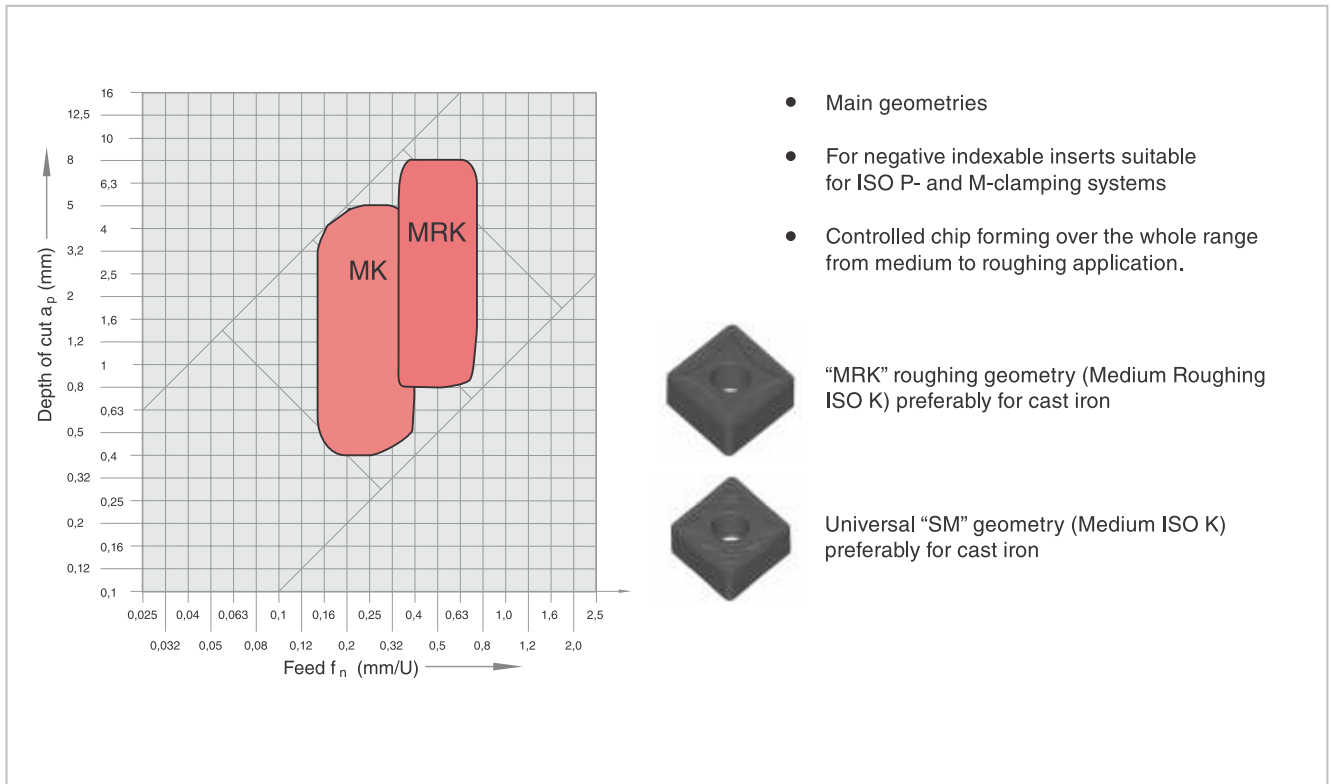


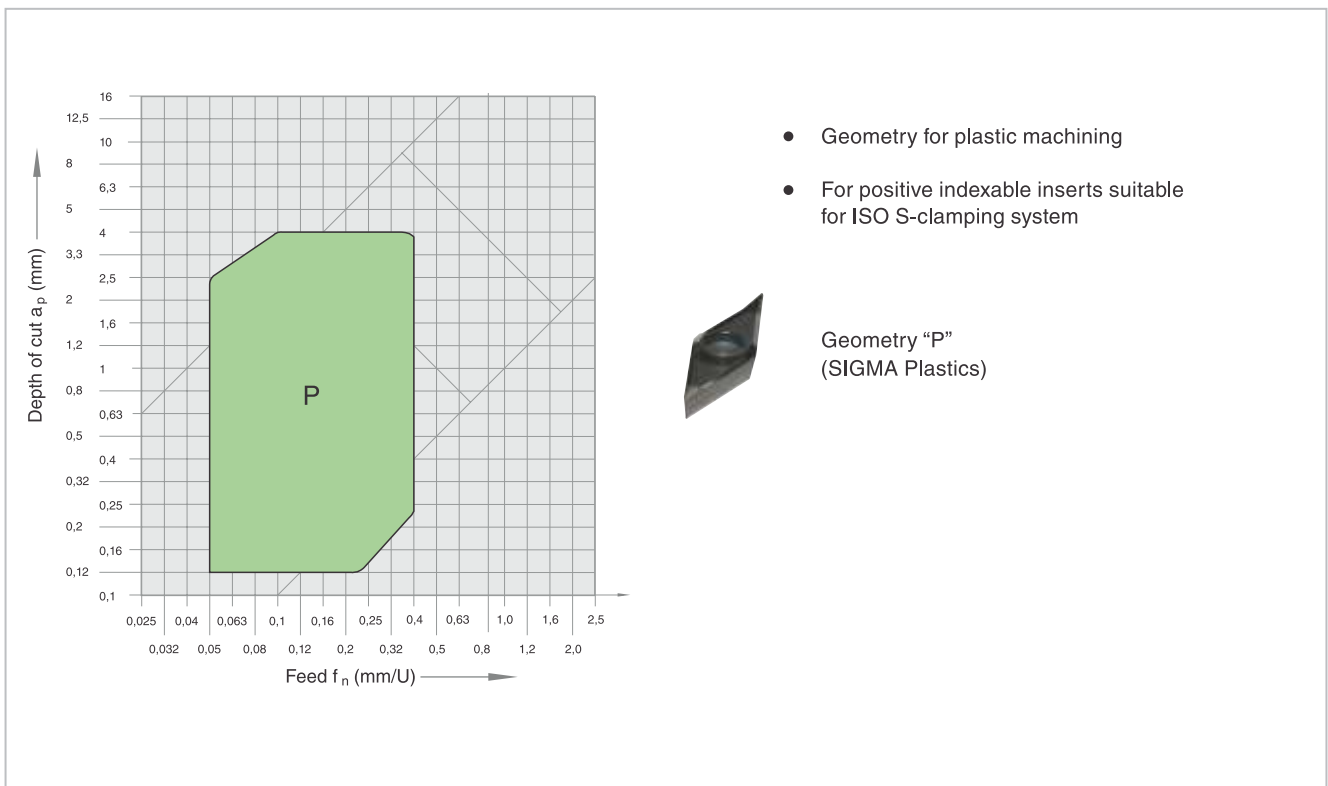
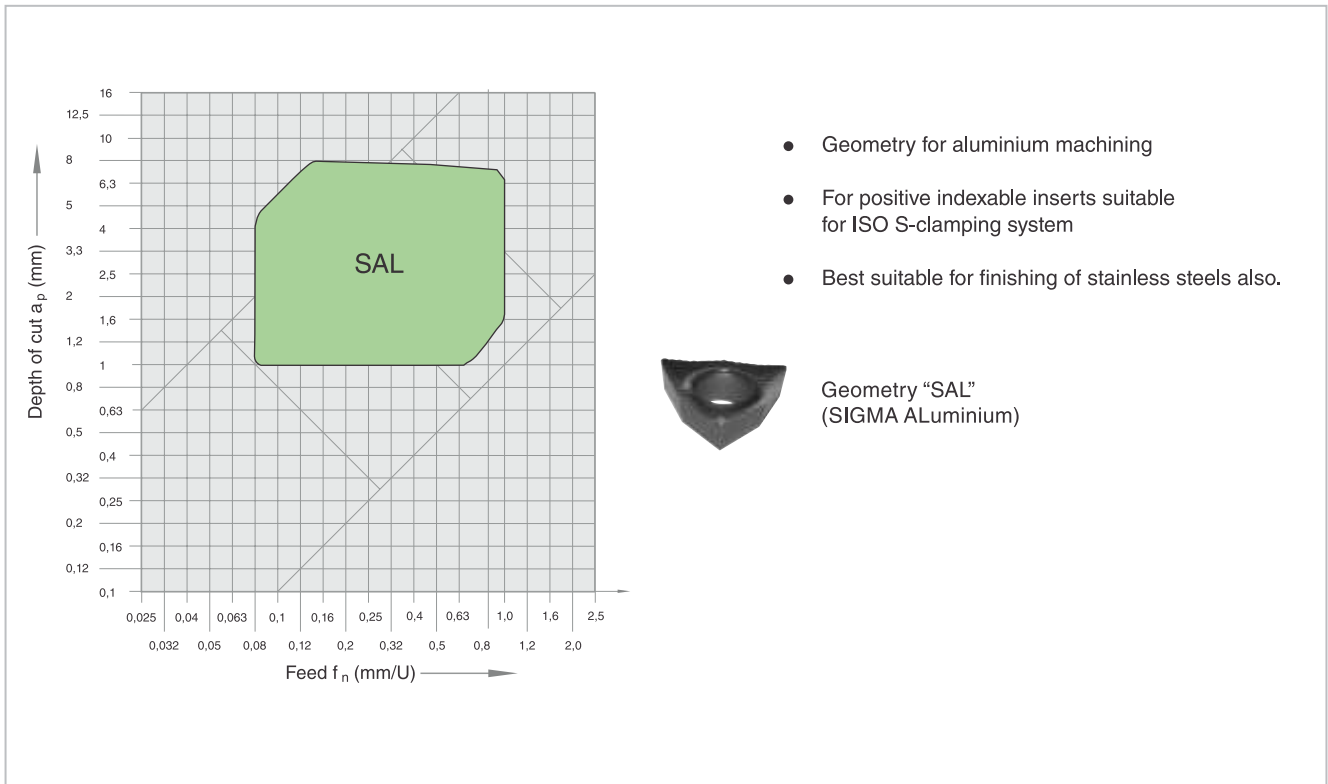
Chip groove geometries for steel



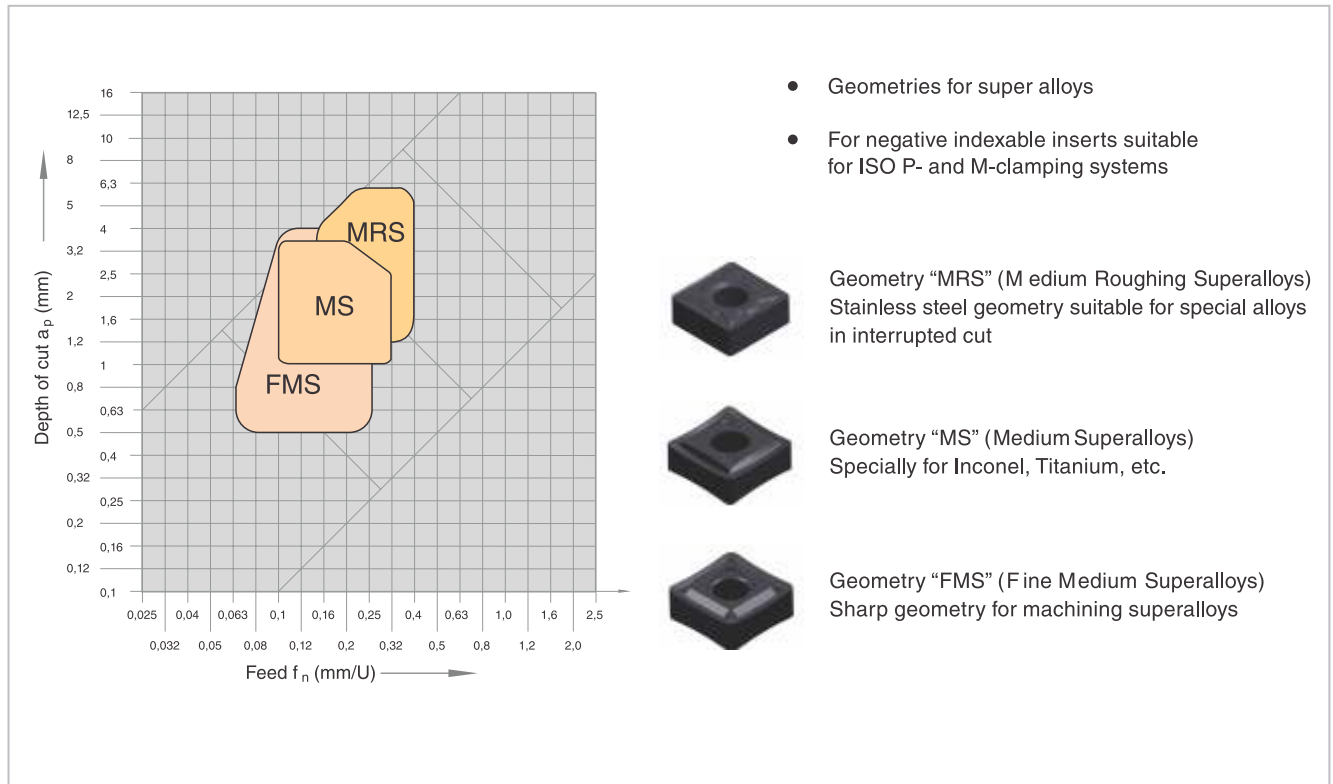


Chip groove geometries for cast iron

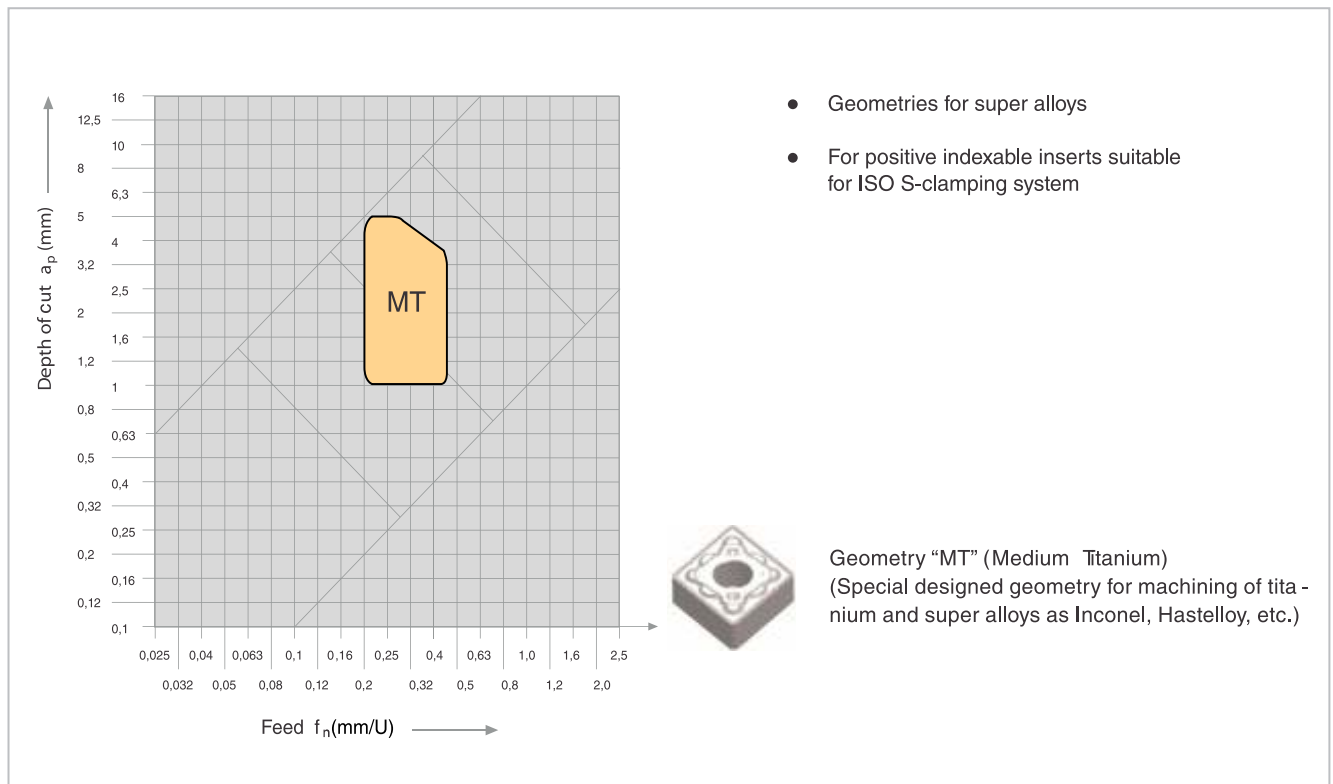




Chip groove geometries for super alloys



Chip groove geometries for titanium and super alloys



	a_p , mm	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	5,5	6	6,5	7	7,5	8	8,5	9	9,5	10	11	12		
Finishing f (mm/rev)	0,05–0,2					FP	FM																		
	0,1–0,3									FMP															
	0,1–0,3									FMS															
	0,1–0,3									SFMS															
Medium machining f (mm/rev)	0,2–0,4									MS															
	0,15–0,4								MM																
	0,16–0,4								MP	MK															
	0,16–0,4									SMS															
	0,2–0,45													MT											
	0,2–0,5													MRS											
	0,15–0,4														SM										
	0,2–0,6									HPT															
	0,2–0,5																					SSMS			
	0,15–0,65																							SAL	
	0,1–1,0																								P
	0,2–0,45														SC	SCU									
0,35–0,6																									
Roughing f (mm/rev)	0,5–2,0		SSMR																						
	0,32–0,8																								
	0,4–1,6		RP	SR, SRP																					

Grade overview

Grade	ISO	Application range					Material group						Application											
							P	M	K	N	S	H	T	M	D	S	G	P						
		01	05	10	15	20	25	30	35	40	45	50	Steel	Stainless	Grey cast iron	Non-ferrous metals	High temperature materials	Hard materials	Turning	Milling	Drilling	Threading	Grooving	Parting
SCP15T	HC-P15						■							●										
	HC-K15								■					●										
SCP25T	HC-P25						■							●										
	HC-M25							■						●										
SC240F	HC-P40						■							●										
	HC-M40							■						●										
SCM20T	HC-M20							■						●										
	HC-S20											■		●										
SCM25T	HC-M25							■						●										
	HC-P30						□							●										
SCM40T	HC-M40							■						●										
	HC-S40											■		●										
SC435D	HC-M35							■						●										
	HC-P35						□							●										
SCM45T	HC-M40							■						●						●				
	HC-P35						□							●						●				
SCK10T	HC-K10													●										
	HC-K15													●										
SCK20T	HC-K20													●										
SW610	HW-K10												■							●				
SC610T	HC-K10						□	■	■	■				●										
SC415X	HC-S15							■						●										
SC415Z	HC-S15							■						●										
SCS10T	HC-M10													●										
	HC-S10							■						●										
SCS20T	HC-M20													●										
	HC-S20							■						●										
SW611	HW-K10												■	■						●				

Application peak



Full range to ISO 513

01 05 10 15 20 25 30 35 40 45 50

■ Main application
□ Further applications

● Standard grade

Cutting grades

Main grades, coated

- SCP15T (HC-P15, HC-K15)
Wear resistant steel grade for not interrupted cut for high cutting speeds up to 300 m/min. As secondary application also for machining of cast iron.
- SCP25T (HC-P25, HC-M25)
(Universal turning grade)
Main grade for machining steel materials and easily machinable stainless steels at medium cutting speeds, including interrupted cutting work. This general purpose grade is characterised by the properties of high durability and excellent toughness across a wide range of applications.
- SC240F (HC-P40, HC-M40)
The SC240F Steeltec steel turning grade guarantees maximum performance in heavy interrupted cutting thanks to the combination of an extremely tough carbide with the „Nanolock yellow MT-CVD layer“.
- SCM20T (HC-M20, HC-S20)
Turning grade for machining of austenitic materials in the high cutting speed area of 170 – 220 m/min.
- SCM25T (HC-M25, HC-P25)
Turning grade for austenitic stainless steels in medium and high cutting speed area.
- SCM40T (HC-M40, HC-S40)
Very tough stainless grade for low cutting speeds suitable, also as alternative applicable on steel and super alloys.
- SC435D (HC-M35, HC-P35)
Main grade for turning of austenitic stainless steels at medium cutting speeds. Applicable also for super alloys.
- SCM45T (HC-M40, HC-P40)
Extreme tough, relative fine grained carbide substrate. Ideal grade for turning of austenitic stainless steel in the medium cutting speed area.
- SCK10T (HC-K10-K15)
Cast iron grades in K10 range, optimum for machining cast iron in an uninterrupted cut.
- SCK20T (HC-K20)
Cast iron turning grade for the area K15. Optimal for machining GG- and GGG- materials. Possible cutting speeds for GG up to 400 m/min.
- SC610T (HC-K10)
The ideal grade for working aluminium materials and other non-ferrous metals. Thanks to a very thin microplus® plasma CVD TiAlN coating it is also excellent for finish machining of stainless steels and grey cast iron.
- SCS10T (HC-M10, HC-S10)
Grade for turning of titanium. Selected temperature stable carbide plus TiBN - Plasma coating.
- SC415X (HC-S15)
Submicron grade with thin PVD-coating. Excellent appropriate for the production of small and smallest parts, f.e. watch industry and medical engineering. Preferred materials such as Inconel, titanium and stainless steel.
- SC415Z (HC-S15)
Special submicron grade for machining super alloys such as Inconel, titanium, etc.
- SCS20T (HC-M20, HC-S20)
Tough alternative grade to SC415Z for machining of super alloys as Inconel, Hastelloy, Waspaloy, etc.

Main grades, uncoated




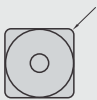
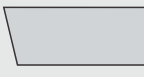
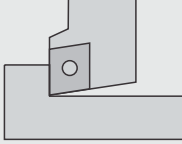


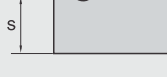



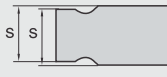
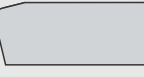
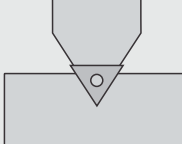


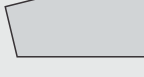


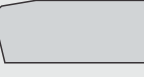
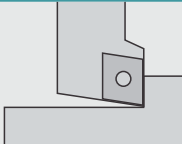







- SW610 (K10)
Turning grade with high wear resistance for machining of aluminium alloys, and non-ferrous metals at medium to higher cutting speeds, even under unfavourable machining conditions.
- SW611 (K05-K15)
For turning chilled iron casting, grey cast iron with spheroidal graphite and alloyed grey cast iron as well as for aluminium and aluminium alloys. Turning high grade and hardened steels, also for austenitic manganese steels.

W		
Basic form		
A		85°
B		82°
C		80°
D		55°
E		75°
H		120°
K		55°
L		90°
M		86°
O		135°
P		108°
R		-
S		90°
T		60°
V		35°
W		80°

N	
Clearance angle	
A	
B	
C	
D	
E	
F	
G	
N	
P	
O	
Clearance angle requiring special indication	

M			
Tolerance classes			
Limits of tolerance			
	m	s	d
A	±0,005 ¹⁾	±0,025	±0,025
C	±0,013	±0,025	±0,025
E	±0,025	±0,025	±0,025
F	±0,005 ¹⁾	±0,025	±0,013
G	±0,025	±0,13	±0,025
H	±0,013	±0,025	±0,013
J	±0,005 ¹⁾	±0,025	±0,05 – ±0,15
K	±0,013 ¹⁾	±0,025	±0,05 – ±0,15
L	±0,025	±0,025	±0,05 – ±0,15
M	±0,08 – ±0,20	±0,13	±0,05 – ±0,15
U	±0,13 – ±0,38	±0,13	±0,08 – ±0,25
	d	m	d
M	6,35	±0,08	±0,05
	9,52	±0,08	±0,05
	12,7	±0,13	±0,08
	15,88	±0,15	±0,10
	19,05	±0,15	±0,10
	25,4	±0,18	±0,13
U	6,35	±0,13	±0,08
	9,52	±0,13	±0,08
	12,7	±0,20	±0,13
	15,88	±0,27	±0,18
	19,05	±0,27	±0,18
	25,4	±0,38	±0,25
<p>Indexable insert with unequal number of sides</p> <p>Indexable insert with equal number of sides</p>			
<ul style="list-style-type: none"> • Generally used for indexable inserts with ground face cutting edges. • The calculation for the "m" measurement is based on the precise radius in inches. 			

G	
Type of insert	
A	
without chip breaker, with cylindrical fixation hole	
F	
Chip breaker at both sides, without fixation hole	
G	
Chip breaker at both sides, with cylindrical fixation hole	
M	
Chip breaker at one side, with cylindrical fixation hole	
N	
without chip breaker, without fixation hole	
Q	
without chip breaker, with fixation hole conical from both sides	
R	
Chip breaker at one side, without fixation hole	
T	
Chip breaker at one side, with conical fixation hole	
U	
Chip breaker at both sides, with fixation hole conical from both sides	
W	
without chip breaker, with conical fixation hole	
X	
with special features to drawing	

06	04	04		
Length of cutting edge	Thickness	Corner radius	Edge condition	Cutting direction
<p>A</p>  <p>B</p> 			<p>F</p>  <p>sharp cutting edges</p>	<p>L</p> 
<p>C</p>  <p>E</p> 		<p>Examples:</p> <p>00 r = max 0,2 mm</p> <p>04 r = 0,4 mm ±0,1</p> <p>08 r = 0,8 mm ±0,1</p> <p>12 r = 1,2 mm ±0,1</p> <p>16 r = 1,6 mm ±0,1</p> <p>20 r = 2,0 mm ±0,1</p> <p>24 r = 2,4 mm ±0,1</p> <p>25 r = 2,5 mm ±0,1</p>	<p>E</p>  <p>Rounded cutting edges</p>	<p>The indexable insert can only be used for cuts to the left</p>
<p>D</p>  <p>H</p> 			<p>S</p>  <p>Chamfered and rounded cutting edges</p>	<p>N</p> 
<p>K</p>  <p>L</p> 	<p>Examples:</p> <p>01 s = 1,59 mm</p> <p>T1 s = 1,98 mm</p> <p>02 s = 2,38 mm</p> <p>03 s = 3,18 mm</p> <p>T3 s = 3,97 mm</p> <p>04 s = 4,76 mm</p> <p>05 s = 5,56 mm</p> <p>06 s = 6,35 mm</p> <p>07 s = 7,94 mm</p> <p>09 s = 9,52 mm</p> <p>12 s = 12,70 mm</p>		<p>T</p>  <p>Chamfered cutting edges</p>	<p>The indexable insert can be used for cuts either to the left or to the right</p>
<p>M</p>  <p>O</p> 			<p>K</p>  <p>Double-chamfered cutting edges</p>	<p>R</p> 
<p>P</p>  <p>R</p> 			<p>P</p>  <p>Double-chamfered and rounded cutting edges</p>	<p>The indexable insert can only be used for cuts to the right</p>
<p>S</p>  <p>T</p> 				
<p>V</p>  <p>W</p> 				
<p>Examples:</p> <p>06 l = 6,350 mm</p> <p>09 l = 9,525 mm</p> <p>11 l = 11,000 mm</p> <p>12 l = 12,700 mm</p> <p>15 l = 15,880 mm</p> <p>16 l = 16,500 mm</p> <p>19 l = 19,050 mm</p> <p>22 l = 22,000 mm</p> <p>25 l = 25,400 mm</p> <p>27 l = 27,500 mm</p> <p>33 l = 33,000 mm</p>				

Indexable inserts

	Ordering code	l	d	s	r	Grade																				
						HC						HWHCHW			HC											
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T					
CCGT...SAL 	CCGT 060202-SAL	6,40	6,35	2,38	0,2																					
	CCGT 060204-SAL	6,40	6,35	2,38	0,4																					
	CCGT 09T302-SAL	9,70	9,52	3,97	0,2																					
	CCGT 09T304-SAL	9,70	9,52	3,97	0,4																					
	CCGT 09T308-SAL	9,70	9,52	3,97	0,8																					
	CCGT 120404-SAL	12,90	12,70	4,76	0,4																					
	CCGT 120408-SAL	12,90	12,70	4,76	0,8																					
CCGT E.-SC 	CCGT 060204 EL-SC	6,40	6,35	2,38	0,4		●	●		●																
	CCGT 060204 ER-SC	6,40	6,35	2,38	0,4		●			●																
	CCGT 060208 EL-SC	6,40	6,35	2,38	0,8		●	●		●																
	CCGT 060208 ER-SC	6,40	6,35	2,38	0,8		●			●																
	CCGT 09T304 EL-SC	9,70	9,52	3,97	0,4		●	●		●																
	CCGT 09T304 ER-SC	9,70	9,52	3,97	0,4		●	●		●																
	CCGT 09T308 EL-SC	9,70	9,52	3,97	0,8		●	●		●																
	CCGT 09T308 ER-SC	9,70	9,52	3,97	0,8		●	●		●																
	CCGT 120408 EL-SC	12,90	12,70	4,76	0,8		●	●		●																
	CCGT 120408 ER-SC	12,90	12,70	4,76	0,8		●	●		●																
	CCGT 120412 EL-SC	12,90	12,70	4,76	1,2		●	●		●																
	CCGT 120412 ER-SC	12,90	12,70	4,76	1,2		●	●		●																
CCMT...SSMR 	CCMT 250924-SSMR	25,80	25,40	9,52	2,4	●	●																			
CCMT...SSMS 	CCMT 09T304-SSMS	9,70	9,52	3,97	0,4						●															
	CCMT 09T308-SSMS	9,70	9,52	3,97	0,8						●															
	CCMT 120404-SSMS	12,90	12,70	4,76	0,4						●															
	CCMT 120408-SSMS	12,90	12,70	4,76	0,8						●															
CCMT...F. 	CCMT 060202-FP	6,40	6,35	2,38	0,2	●	●																			
	CCMT 060204-FP	6,40	6,35	2,38	0,4	●	●																			
	CCMT 060208-FP	6,40	6,35	2,38	0,8	●	●																			
	CCMT 09T304-FP	9,70	9,52	3,97	0,4	●	●																			
	CCMT 09T308-FP	9,70	9,52	3,97	0,8	●	●																			
	CCMT 120404-FP	12,90	12,70	4,76	0,4	●	●																			
	CCMT 060202-FM	6,40	6,35	2,38	0,2							●	●													
	CCMT 060204-FM	6,40	6,35	2,38	0,4							●	●													
	CCMT 09T304-FM	9,70	9,52	3,97	0,4							●	●													

Order example : 10 pieces CCGT 060202-SAL SC610T

● Available from stock

For cutting data standard values see from page 52

	Ordering code	l	d	s	r	Grade													
						HC						HWHCHW				HC			
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z
	CCMT 060202-MM	6,40	6,35	2,38	0,2				●	●	●								
	CCMT 060204-MM	6,40	6,35	2,38	0,4				●	●	●								
	CCMT 09T304-MM	9,70	9,52	3,97	0,4				●		●								
	CCMT 09T308-MM	9,70	9,52	3,97	0,8				●		●								
	CCMT 120404-MM	12,90	12,70	4,76	0,4						●								
	CCMT 120408-MM	12,90	12,70	4,76	0,8						●								
	CCMT 09T304 MK	9,70	9,52	3,97	0,4								▲	▲					
	CCMT 09T308 MK	9,70	9,52	3,97	0,8								▲	▲					
	CCMT 120408 MK	12,90	12,70	4,76	0,8								▲	▲					
	CCMT 060202-MP	6,40	6,35	2,38	0,2	●	●												
	CCMT 060204-MP	6,40	6,35	2,38	0,4	●	●												
	CCMT 060208-MP	6,40	6,35	2,38	0,8	●	●												
	CCMT 09T304-MP	9,70	9,52	3,97	0,4	●	●												
	CCMT 09T308-MP	9,70	9,52	3,97	0,8	●	●												
	CCMT 120404-MP	12,90	12,70	4,76	0,4	●	●												
	CCMT 120408-MP	12,90	12,70	4,76	0,8	●	●												
	CCMT 09T304-MT	9,70	9,52	3,97	0,4												●	●	
	CCMW 09T304	9,70	9,52	3,97	0,4								●						

Order example : 10 pieces CCMT 060202-MM SCM20T

For cutting data standard values see from page 52

Indexable inserts

	Ordering code	l	d	s	r	Grade												
						HC						HWHCHW			HC			
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X
CNGG....-SCU 	CNGG 120408-SCU	12,90	12,70	4,76	0,8	●	●										●	
CNGG...-FMS 	CNGG 120404-FMS	12,90	12,70	4,76	0,4												●	●
	CNGG 120408-FMS	12,90	12,70	4,76	0,8												●	●
	CNGG 120412-FMS	12,90	12,70	4,76	1,2												●	●
CNGG....-MS 	CNGG 120404-MS	12,90	12,70	4,76	0,4												●	
	CNGG 120408-MS	12,90	12,70	4,76	0,8												●	
	CNGG 120412-MS	12,90	12,70	4,76	1,2												●	
CNGG...-MRS 	CNGG 120408-MRS	12,90	12,70	4,76	0,8												●	●
	CNGG 120412-MRS	12,90	12,70	4,76	1,2												●	●

Order example : 10 pieces CNGG 120408-SCU SC415Z

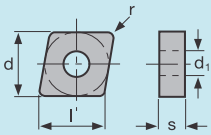




For cutting data standard values see from page 52

	Ordering code	l	d	s	r	Grade														
						HC						HWHCHW				HC				
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T
CNMA 	CNMA 120408	12,90	12,70	4,76	0,8								▲	▲						
	CNMA 120412	12,90	12,70	4,76	1,2								▲	▲						
	CNMA 190616	19,30	19,05	6,35	1,6								▲							
CNMG....-SFMS 	CNMG 090304-SFMS	9,70	9,52	3,18	0,4				●	●	●									
	CNMG 120404-SFMS	12,90	12,70	4,76	0,4				●	●	●									
	CNMG 120408-SFMS	12,90	12,70	4,76	0,8				●	●	●									
	CNMG 120412-SFMS	12,90	12,70	4,76	1,2				●	●	●									
CNMG....-SMRS 	CNMG 120408-SMRS	12,90	12,70	4,76	0,8				●	●	●									
	CNMG 120412-SMRS	12,90	12,70	4,76	1,2				●	●	●									
	CNMG 160612-SMRS	16,10	15,87	6,35	1,2				●	●	●									
	CNMG 160616-SMRS	19,30	19,05	6,35	1,6					●	●									
	CNMG 190612-SMRS	19,30	19,05	6,35	1,2				●	●	●									
CNMG....-SMS 	CNMG 120408-SMS	12,90	12,70	4,76	0,8				●											
	CNMG 120412-SMS	12,90	12,70	4,76	1,2				●											
	CNMG 160612-SMS	16,10	15,87	6,35	1,2				●											
CNMG....E.-SC 	CNMG 120404 EL-SC	12,90	12,70	4,76	0,4	●	●		●											
	CNMG 120404 ER-SC	12,90	12,70	4,76	0,4	●	●		●											
	CNMG 120408 EL-SC	12,90	12,70	4,76	0,8	●	●		●											
	CNMG 120408 ER-SC	12,90	12,70	4,76	0,8	●	●		●											

Order example : 10 pieces CNMA 120408 SCK10T

For cutting data standard values see from page 52

Indexable inserts

	Ordering code	l	d	s	r	Grade											
						HC				HWHCHW				HC			
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610
CNMG....-FMP 	CNMG 120404-FMP	12,90	12,70	4,76	0,4	●	●										
	CNMG 120408-FMP	12,90	12,70	4,76	0,8	●	●	●									
CNMG....FP 	CNMG 120404-FP	12,90	12,70	4,76	0,4	●	●										
	CNMG 120408-FP	12,90	12,70	4,76	0,8	●	●										
CNMG...-HPT 	CNMG 120408-HPT	12,90	12,70	4,76	0,8	●	●										
	CNMG 120412-HPT	12,90	12,70	4,76	1,2	●	●										
CNMG....-MK 	CNMG 120404-MK	12,90	12,70	4,76	0,4												
	CNMG 120408-MK	12,90	12,70	4,76	0,8												
	CNMG 120412-MK	12,90	12,70	4,76	1,2												
	CNMG 120416-MK	12,90	12,70	4,76	1,6												

Order example : 10 pieces CNMG 120404 FMP SCP15T

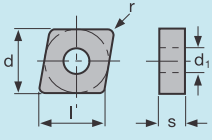




For cutting data standard values see from page 52

	Ordering code	l	d	s	r	Grade																
						HC						HWHCHW				HC						
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T	
CNMG...-MM 	CNMG 120408-MM	12,90	12,70	4,76	0,8				●		●	●										
	CNMG 120412-MM	12,90	12,70	4,76	1,2				●		●	●										
	CNMG 160612-MM	16,10	15,87	4,76	1,2				●		●	●										
	CNMG 160616-MM	16,10	15,87	6,35	1,6				●		●	●										
	CNMG 190612-MM	19,30	19,05	6,35	1,2				●		●	●										
	CNMG 190616-MM	19,30	19,05	6,35	1,6				●		●	●										
CNMG...-MP 	CNMG 090308-MP	9,70	9,52	3,18	0,8	●	●	●														
	CNMG 120408-MP	12,90	12,70	4,76	0,8	●	●	●														
	CNMG 120412-MP	12,90	12,70	4,76	1,2	●	●	●														
	CNMG 120416-MP	12,90	12,70	4,76	1,6	●	●	●														
	CNMG 160608-MP	16,10	15,87	6,35	0,8	●	●	●														
	CNMG 160612-MP	16,10	15,87	6,35	1,2	●	●	●														
	CNMG 160616-MP	16,10	15,87	6,35	1,6	●	●	●														
	CNMG 190612-MP	19,30	19,05	6,35	1,2	●	●	●														
CNMG 190616-MP	19,30	19,05	6,35	1,6	●	●	●															
CNMG...-MRK 	CNMG 120408-MRK	12,90	12,70	4,76	0,8									▲	▲							
	CNMG 120412-MRK	12,90	12,70	4,76	1,2									▲	▲							
	CNMG 120416-MRK	12,90	12,70	4,76	1,6									▲	▲							
	CNMG 120612-MRK	12,90	12,70	6,35	1,2									▲	▲							
	CNMG 120616-MRK	12,90	12,70	6,35	1,6									▲	▲							
	CNMG 160612-MRK	16,10	16,10	6,35	1,2									▲	▲							
	CNMG 160616-MRK	16,10	16,10	6,35	1,6									▲	▲							
CNMG...-MRP 	CNMG 120408-MRP	12,90	12,70	4,76	0,8	●	●	●														
	CNMG 120412-MRP	12,90	12,70	4,76	1,2	●	●	●														
	CNMG 120416-MRP	12,90	12,70	4,76	1,6	●	●	●														
	CNMG 160608-MRP	16,10	15,87	6,35	0,8	●	●	●														
	CNMG 160612-MRP	16,10	15,87	6,35	1,2	●	●	●														
	CNMG 160616-MRP	16,10	15,87	6,35	1,6	●	●	●														
	CNMG 190612-MRP	19,30	19,05	6,35	1,2	●	●	●														
	CNMG 190616-MRP	19,30	19,05	6,35	1,6	●	●	●														
CNMG 190624-MRP	19,30	19,05	6,35	2,4	●	●	●															
CNMG...-MS 	CNMG 120404-MS	12,90	12,70	4,76	0,4																●	
	CNMG 120408-MS	12,90	12,70	4,76	0,8																	●
	CNMG 120412-MS	12,90	12,70	4,76	1,2																	●

Order example : 10 pieces CNMG 120408-MM SCM20T

For cutting data standard values see from page 52

Indexable inserts

	Ordering code	l	d	s	r	Grade																			
						HC					HWHCHW			HC											
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T				
																									
CNMG...MT 	CNMG 120408-MT	12,90	12,70	4,76	0,8																				
CNMM....-RP 	CNMM 120408-RP	12,90	12,70	4,76	0,8	●	●	●																	
	CNMM 120412-RP	12,90	12,70	4,76	1,2	●	●	●																	
	CNMM 160612-RP	16,10	15,87	6,35	1,2	●	●	●																	
	CNMM 160616-RP	16,10	15,87	6,35	1,6	●	●	●																	
	CNMM 190612-RP	19,30	19,05	6,35	1,2	●	●																		
	CNMM 190616-RP	19,30	19,05	6,35	1,6	●	●	●																	
	CNMM 190624-RP	19,30	19,05	6,35	2,4	●	●	●																	
CNMM....-SR 	CNMM 190616-SR	19,30	19,05	6,35	1,6	●	●	●																	
CNMM....-SRP 	CNMM 250724-SRP	25,80	25,40	7,94	2,4	●	●	●																	
	CNMM 250924-SRP	25,80	25,40	9,52	2,4	●	●	●																	

Order example : 10 pieces CNMG 120408-MT SCS10T


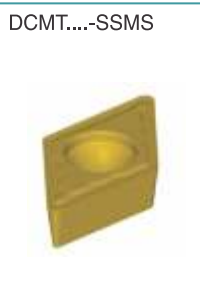
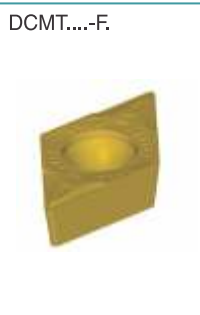
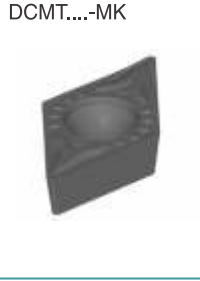

For cutting data standard values see from page 51

	Ordering code	l	d	s	r	Grade															
						HC						HWHCHW				HC					
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T
	DCGT 0702008	7,70	6,35	2,38	0,08																
	DCGT 0702015	7,70	6,35	2,38	0,15																
	DCGT 11T3015	11,60	9,52	3,97	0,15																
	DCGT 11T3035	11,60	9,52	3,97	0,35																
	DCGT 070202-SAL	7,70	6,35	2,38	0,2										●	●					
	DCGT 070204-SAL	7,70	6,35	2,38	0,4										●	●					
	DCGT 11T302-SAL	11,60	9,52	3,97	0,2										●	●					
	DCGT 11T304-SAL	11,60	9,52	3,97	0,4										●	●					
	DCGT 11T308-SAL	11,60	9,52	3,97	0,8										●	●					
	DCGT 070204 EL-SC	7,70	6,35	2,38	0,4	●	●		●												
	DCGT 070204 ER-SC	7,70	6,35	2,38	0,4	●	●		●												
	DCGT 11T304 EL-SC	11,60	9,52	3,97	0,4	●	●		●												
	DCGT 11T304 ER-SC	11,60	9,52	3,97	0,4	●	●		●												
	DCGT 11T308 EL-SC	11,60	9,52	3,97	0,8	●	●	●	●												
	DCGT 11T308 ER-SC	11,60	9,52	3,97	0,8	●	●	●	●												
	DCGT 0702008 FL-SC	7,70	6,35	2,38	0,08															●	
	DCGT 0702008 FR-SC	7,70	6,35	2,38	0,08															●	
	DCGT 0702015 FL-SC	7,70	6,35	2,38	0,15															●	
	DCGT 0702015 FR-SC	7,70	6,35	2,38	0,15															●	
	DCGT 11T3015 FL-SC	11,60	9,52	3,97	0,15															●	
	DCGT 11T3015 FR-SC	11,60	9,52	3,97	0,15															●	
	DCGT 11T3035 FL-SC	11,60	9,52	3,97	0,35															●	
	DCGT 11T3035 FR-SC	11,60	9,52	3,97	0,35															●	
	DCGT 040102-FM	4,0	3,1	1,59	0,2																

Order example : 10 pieces DCGT 0702008 SC415X

For cutting data standard values see from page 51

Indexable inserts

						Grade																								
						HC					HWHCHW			HC																
		l	d	s	r	SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T									
Ordering code	l	d	s	r																										
 <p>DCGT....-P</p>	DCGT 040102-P	3,8	3,1	1,59	0,2																									
 <p>DCMT....-SSMS</p>	DCMT 11T304-SSMS	11,60	9,52	3,97	0,4																									
	DCMT 11T308-SSMS	11,60	9,52	3,97	0,8																									
 <p>DCMT....-F.</p>	DCMT 070202-FP	7,70	6,35	2,38	0,2	●	●																							
	DCMT 070204-FP	7,70	6,35	2,38	0,4	●	●																							
	DCMT 11T302-FP	11,60	9,52	3,97	0,2	●	●																							
	DCMT 11T304-FP	11,60	9,52	3,97	0,4	●	●																							
	DCMT 070202-FM	7,70	6,35	2,38	0,2			●	●																					
	DCMT 070204-FM	7,70	6,35	2,38	0,4				●	●																				
	DCMT 11T302-FM	11,60	9,52	3,97	0,2			●	●																					
	DCMT 11T304-FM	11,60	9,52	3,97	0,4				●	●																				
 <p>DCMT....-MK</p>	DCMT 070202-MK	7,70	6,35	2,38	0,2																									
	DCMT 070204-MK	7,70	6,35	2,38	0,4																									
	DCMT 11T304-MK	11,60	9,52	3,97	0,4																									
	DCMT 11T308-MK	11,60	9,52	3,97	0,8																									
 <p>DCMT....-MM</p>	DCMT 070204-MM	7,70	6,35	2,38	0,4																									
	DCMT 11T304-MM	11,60	9,52	3,97	0,4																									
	DCMT 11T308-MM	11,60	9,52	3,97	0,8																									

Order example : 10 pieces DCGT 040102-P SC610T

For cutting data standard values see from page 52

	Ordering code	l	d	s	r	Grade											
						HC						HWHCHW				HC	
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610
DCMT....MP 	DCMT 070204-MP	7,70	6,35	2,38	0,4	●	●										
	DCMT 11T304-MP	11,60	9,52	3,97	0,4	●	●										
	DCMT 11T308-MP	11,60	9,52	3,97	0,8	●	●										
DCMT...MT 	DCMT 11T304-MT	11,60	9,52	3,97	0,4												● ●
	DCMT 11T308-MT	11,60	9,52	3,97	0,8												▲ ▲
DCMW.... 	DCMW 11T304	11,60	9,52	3,97	0,4												●
	DCMW 11T308	11,60	9,52	3,97	0,8												●
DNGG...FMS 	DNGG 150404-FMS	15,50	12,70	4,76	0,4												● ●
	DNGG 150408-FMS	15,50	12,70	4,76	0,8												● ●
	DNGG 150412-FMS	15,50	12,70	4,76	1,2												● ●
	DNGG 150604-FMS	15,50	12,70	6,35	0,4												● ●
	DNGG 150608-FMS	15,50	12,70	6,35	0,8												● ●
	DNGG 150612-FMS	15,50	12,70	6,35	1,2												● ●
DNMA... 	DNMA 150608	15,50	12,70	6,35	0,8												▲
	DNMA 150612	15,50	12,70	6,35	1,2												▲

Order example : 10 pieces DCMT 070204-MP SCP15T

For cutting data standard values see from page 52

Indexable inserts

	Ordering code	l	d	s	r	Grade											
						HC						HWHCHW			HC		
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610
	DNMG 110404-SFMS	11,60	9,52	4,76	0,4				●	●	●						
	DNMG 110408-SFMS	11,60	9,52	4,76	0,8												
	DNMG 150604-SFMS	15,50	12,70	6,35	0,4				●	●	●						
	DNMG 150608-SFMS	15,50	12,70	6,35	0,8				●	●	●						
	DNMG 150612-HPT	15,50	12,70	6,35	1,2	●	●										
	DNMG 150608-SMRS	15,50	12,70	6,35	0,8					●	●	●					
	DNMG 150612-SMRS	15,50	12,70	6,35	1,2					●	●	●					
	DNMG 110408-SMS	11,60	9,52	4,76	0,8					●							
	DNMG 150408-SMS	15,50	12,70	4,76	0,8					●							
	DNMG 150608-SMS	15,50	12,70	6,35	0,8					●							
	DNMG 150612-SMS	15,50	12,70	6,35	1,2					●							
	DNMG 110404 EL-SC	11,60	9,52	4,76	0,4	●	●	●									
	DNMG 110404 ER-SC	11,60	9,52	4,76	0,4	●	●	●									
	DNMG 110408 EL-SC	11,60	9,52	4,76	0,8	●	●	●									
	DNMG 110408 ER-SC	11,60	9,52	4,76	0,8	●	●	●									
	DNMG 150404 EL-SC	15,50	12,70	4,76	0,4		●										
	DNMG 150404 ER-SC	15,50	12,70	4,76	0,4		●										
	DNMG 150408 EL-SC	15,50	12,70	4,76	0,8		●										
	DNMG 150408 ER-SC	15,50	12,70	4,76	0,8		●										
	DNMG 150604 EL-SC	15,50	12,70	6,35	0,4	●	●	●		●							
	DNMG 150604 ER-SC	15,50	12,70	6,35	0,4	●	●	●		●							
	DNMG 150608 EL-SC	15,50	12,70	6,35	0,8	●	●	●		●							
	DNMG 150608 ER-SC	15,50	12,70	6,35	0,8	●	●	●		●							

Order example : 10 pieces DNMG 110404-SFMS SCM20T

For cutting data standard values see from page 52

	Ordering code	l	d	s	r	Grade														
						HC				HWHCHW				HC						
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T
	DNMG 110404-FMP	11,60	9,52	4,76	0,4	●	●	●												
	DNMG 110408-FMP	11,60	9,52	4,76	0,8	●	●													
	DNMG 150408-FMP	15,50	12,70	4,76	0,8	●	●													
	DNMG 150604-FMP	15,50	12,70	6,35	0,4	●	●	●												
	DNMG 150608-FMP	15,50	12,70	6,35	0,8	●	●	●												
	DNMG 110404-FP	11,60	9,52	4,76	0,4	●	●													
	DNMG 110408-FP	11,60	9,52	4,76	0,8	●	●													
	DNMG 150404-FP	15,50	12,70	4,76	0,4	●	●													
	DNMG 150408-FP	15,50	12,70	4,76	0,8	●	●													
	DNMG 150604-FP	15,50	12,70	6,35	0,4	●	●													
	DNMG 150608-FP	15,50	12,70	6,35	0,8	●	●													
	DNMG 110404-MK	11,60	9,52	4,76	0,4									△	△					
	DNMG 110408-MK	11,60	9,52	4,76	0,8									▲	▲					
	DNMG 150608-MK	15,50	12,70	6,35	0,8									▲	▲					
	DNMG 110408-MP	11,60	9,52	4,76	0,8	●	●	●												
	DNMG 150408-MP	15,50	12,70	4,76	0,8	●	●	●												
	DNMG 150412-MP	15,50	12,70	4,76	1,2	●	●	●												
	DNMG 150608-MP	15,50	12,70	6,35	0,8	●	●	●												
	DNMG 150612-MP	15,50	12,70	6,35	1,2	●	●	●												
	DNMG 150616-MP	15,50	12,70	6,35	1,6	●	●													
	DNMG 150608-MRK	15,50	12,70	4,76	0,8									▲	▲					
	DNMG 150612-MRK	15,50	12,70	4,76	1,2									▲	▲					
	DNMG 150408-MRP	15,50	12,70	4,76	0,8	●	●	●												
	DNMG 150412-MRP	15,50	12,70	4,76	1,2	●	●	●												
	DNMG 150608-MRP	15,50	12,70	6,35	0,8	●	●	●												
	DNMG 150612-MRP	15,50	12,70	6,35	1,2	●	●	●												
	DNMG 150616-MRP	15,50	12,70	6,35	1,6	●	●	●												

Order example : 10 pieces

DNMG 110404-FMP SCP15T

For cutting data standard values see from page 52

Indexable inserts

	Ordering code	l	d	s	r	Grade											
						HC						HWHCHW			HC		
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610
	DNMG 110404-MM	11,60	9,52	4,76	0,4												
	DNMG 110408-MM	11,60	9,52	4,76	0,8												
	DNMG 150404-MM	15,50	12,70	4,76	0,4				●								
	DNMG 150408-MM	15,50	12,70	4,76	0,8				●								
	DNMG 150604-MM	15,50	12,70	6,35	0,4				●								
	DNMG 150608-MM	15,50	12,70	6,35	0,8				●	●							
	DNMG 150612-MM	15,50	12,70	6,35	1,2				●	●	●						
	DNMG 150404-MS	15,50	12,70	4,76	0,4											●	
	DNMG 150408-MS	15,50	12,70	4,76	0,8											●	
	DNMG 150412-MS	15,50	12,70	4,76	1,2											●	
	DNMG 150604-MS	15,50	12,70	6,35	0,4											●	
	DNMG 150608-MS	15,50	12,70	6,35	0,8											●	
	DNMG 150612-MS	15,50	12,70	6,35	1,2											●	
	DNMG 150608-MT	15,50	12,70	6,35	0,8											● ●	
	DNMG 140405TL20	14,00	11,95	4,76	0,5	●	●										
	DNMG 140405TR20	14,00	11,95	4,76	0,5	●	●										
	DNMG 140405TL25	14,00	11,95	4,76	0,5		●										
	DNMG 140405TR25	14,00	11,95	4,76	0,5	●	●										
	DNMG 140410TL25	14,00	11,95	4,76	1,0	●	●										
	DNMG 140410TR25	14,00	11,95	4,76	1,0	●	●										
	DNMM 150608-RP	15,50	12,70	6,35	0,8	●	●	●									
	DNMM 150612-RP	15,50	12,70	6,35	1,2	●	●	●									
	DNMM 150616-RP	15,50	12,70	6,35	1,6	●	●	●									

Order example : 10 pieces DNMG 110404-MM SCM20T

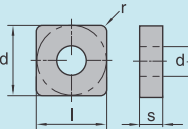
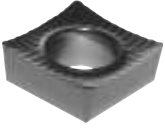
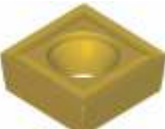
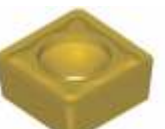

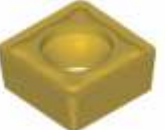
For cutting data standard values see from page 52

	Ordering code	l	d	s	r	Grade																			
						HC						HWHCHW				HC									
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T				
	RCGT 0602MO-SAL	-	6,00	2,38	-													●	●						
	RCGT 0803MO-SAL	-	8,00	3,18	-														●	●					
	RCGT 1003MO-SAL	-	10,00	3,18	-														●	●					
	RCGT 1204MO-SAL	-	12,00	4,76	-														●	●					
	RCMT 0602MO	-	6,00	2,38	-														●						
	RCMT 1606-MT	-	16,00	6,35	-																			●	
	RCMT 2006-MT	-	20,00	6,35	-																			●	
	RCMX 1003MO	-	10,00	3,18	-			●																	
	RCMX 1204MO	-	12,00	4,76	-		●	●																●	
	RCMX 1606MO	-	16,00	6,35	-	●	●	●						▲	▲										
	RCMX 2006MO	-	20,00	6,35	-	●	●	●					▲	▲											
	RCMX 2507MO	-	25,00	7,94	-	●	●	●					▲												
	RCMX 3209MO	-	32,00	9,52	-	●	●	●																	

Order example : 10 pieces RCGT 0602MO-SAL SC610T



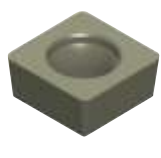
For cutting data standard values see from page 52

Indexable inserts

	Ordering code	l	d	s	r	Grade																	
						HC	HWHCHW			HC													
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T		
SCGT...-SAL 	SCGT 120408-SAL	12,70	12,70	4,76	0,8											●	●						
SCMT... 	SCMT 120404	12,70	12,70	4,76	0,4			●															
SCMT...-SSM 	SCMT 09T308-SSM SCMT 120408-SSM	9,52 12,70	9,52 12,70	3,97 4,76	0,8 0,8	●	●																
SCMT...-SSMR 	SCMT 250924-SSMR	25,40	25,40	9,52	2,4	●	●	●															
SCMT...-SSMS 	SCMT 120408-SSMS	12,70	12,70	4,76	0,8						●												

Order example : 10 pieces SCGT 120408-SAL SC610T

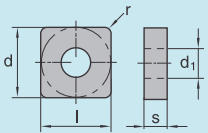

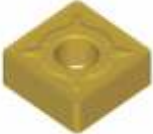


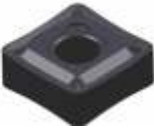
For cutting data standard values see from page 52

	Ordering code	l	d	s	r	Grade														
						HC				HWHCHW				HC						
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T
SCMT....-SSR 	SCMT 250916-SSR	25,40	25,40	9,52	1,6	●	●	●												
	SCMT 250924-SSR	25,40	25,40	9,52	2,4	●	●													
SCMT....-FP 	SCMT 09T304-FP	9,52	9,52	3,97	0,4	●	●													
	SCMT 09T308-FP	9,52	9,52	3,97	0,8	●	●													
	SCMT 120404-FP	12,70	12,70	4,76	0,4	●	●													
SCMT....-MK SCMT....-MP 	SCMT 120408-MK	12,70	12,70	4,76	0,8								▲							
	SCMT 09T308-MP	9,52	9,52	3,97	0,8	●	●													
	SCMT 120408-MP	12,70	12,70	4,76	0,8	●	●													
	SCMT 120412-MP	12,70	12,70	4,76	1,2	●	●													
SCMW.... 	SCMW 09T304	9,52	9,52	3,97	0,4														●	
	SCMW 120404	12,70	12,70	4,76	0,4															●
SNMA.... 	SNMA 120408	12,70	12,70	4,76	0,8								▲	▲						
	SNMA 120412	12,70	12,70	4,76	1,2								▲	▲						
	SNMA 120416	12,70	12,70	4,76	1,6								▲							
	SNMA 190616	19,05	19,05	4,76	1,6									▲						

Order example : 10 pieces SCMT 2509216-SSR SCP15T

For cutting data standard values see from page 52

Indexable inserts

	Ordering code	l	d	s	r	Grade																
						HC						HWHCHW			HC							
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T	
SNMG...-BFMS 	SNMG 090304-SFMS	9,52	9,52	3,18	0,4																	
SNMG...-SMRS 	SNMG 120408-SMRS	12,70	12,70	4,76	0,8						●											
	SNMG 120412-SMRS	12,70	12,70	4,76	1,2						●											
	SNMG 190612-SMRS	19,05	19,05	6,35	1,2						●											
	SNMG 190616-SMRS	19,05	19,05	6,35	1,6							●										
SNMG...-SMS 	SNMG 120408-SMS	12,70	12,70	4,76	0,8						●											
	SNMG 120412-SMS	12,70	12,70	4,76	1,2						●											
SNMG....-FMP 	SNMG 120404-FMP	9,52	9,52	4,76	0,4	●	●															
SNMG....-FMS 	SNMG 120408-FMS	12,70	12,70	4,76	0,8																●	
	SNMG 120412-FMS	12,70	12,70	4,76	1,2																	●

Order example : 10 pieces SNMG 090304-SFMS SC435D


For cutting data standard values see from page 52

	Ordering code	l	d	s	r	Grade											
						HC				HWHCHW				HC			
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610
SNMG....-FP 	SNMG 120404-FP	12,70	12,70	4,76	0,4	●	●										
SNMG....-MM 	SNMG 120408-MM	12,70	12,70	4,76	0,8						●	●					
	SNMG 120412-MM	12,70	12,70	4,76	1,2						●	●					
	SNMG 150612-MM	15,87	15,87	6,35	1,2				●		●	●					
	SNMG 150616-MM	15,87	15,87	6,35	1,6				●		●	●					
	SNMG 190612-MM	19,05	19,05	6,35	1,2				●		●	●					
	SNMG 190616-MM	19,05	19,05	6,35	1,6				●		●	●					
SNMG....-MK SNMG....-MP 	SNMG 120408-MK	12,70	12,70	4,76	0,8								▲				
	SNMG 120412-MK	12,70	12,70	4,76	1,2								▲				
	SNMG 120408-MP	12,70	12,70	4,76	0,8	●	●	●									
	SNMG 120412-MP	12,70	12,70	4,76	1,2	●	●	●									
	SNMG 150608-MP	15,87	15,87	6,35	0,8	●	●	●									
SNMG....-MRK 	SNMG 120408-MRK	12,70	12,70	4,76	0,8								▲	▲			
	SNMG 120412-MRK	12,70	12,70	4,76	1,2								▲	▲			
	SNMG 150612-MRK	15,87	15,87	4,76	1,2								▲	▲			
	SNMG 190612-MRK	19,05	19,05	6,35	1,2								▲				
	SNMG 190616-MRK	19,05	19,05	6,35	1,6								▲				
SNMG...-MRP 	SNMG 120408-MRP	12,70	12,70	4,76	0,8	●	●	●									
	SNMG 120412-MRP	12,70	12,70	4,76	1,2	●	●	●									
	SNMG 150608-MRP	15,87	15,87	6,35	0,8	●	●	●									
	SNMG 150612-MRP	15,87	15,87	6,35	1,2	●	●	●									
	SNMG 150616-MRP	15,87	15,87	6,35	1,6	●	●	●									
	SNMG 190612-MRP	19,05	19,05	6,35	1,2	●	●	●									
	SNMG 190616-MRP	19,05	19,05	6,35	1,6	●	●	●									

Order example : 10 pieces SNMG 120404-FP SCP15T

For cutting data standard values see from page 52

Indexable inserts

	Ordering code	l	d	s	r	Grade													
						HC				HWHCHW				HC					
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z
SNMG....-MRS 	SNMG 120408-MRS	12,70	12,70	4,76	0,8														
	SNMG 120412-MRS	12,70	12,70	4,76	1,2														
SNMM...-SR 	SNMM 190616-SR	19,05	19,05	6,35	1,6	●	●	●											
	SNMM 190624-SR	19,05	19,05	6,35	2,4	●	●	●											
	SNMM 250724-SR	25,40	25,40	7,94	2,4		●	●											
	SNMM 250924-SR	25,40	25,40	9,52	2,4		●	●											
SNMM....-SRP 	SNMM 250724-SRP	25,40	25,40	7,94	2,4	●	●	●											
	SNMM 250732-SRP	25,40	25,40	7,94	3,2	●	●	●											
	SNMM 250924-SRP	25,40	25,40	9,52	2,4	●	●	●											
	SNMM 250932-SRP	25,40	25,40	9,52	3,2	●	●	●											
SNMM....-RP 	SNMM 120408-RP	12,70	12,70	4,76	0,8	●	●	●											
	SNMM 120412-RP	12,70	12,70	4,76	1,2	●	●	●											
	SNMM 150612-RP	15,87	15,87	6,35	1,2	●	●	●											
	SNMM 150616-RP	15,87	15,87	6,35	1,6	●	●	●											
	SNMM 190612-RP	19,05	19,05	6,35	1,2	●	●	●											
	SNMM 190616-RP	19,05	19,05	6,35	1,6	●	●	●											
	SNMM 190624-RP	19,05	19,05	6,35	2,4	●	●	●											
	SNMM 190632-RP	19,05	19,05	6,35	3,2		●	●											
SNMM 250724-RP	25,40	25,40	7,94	2,4		●													
SNMM.... 	SNMM 250716	25,40	25,40	7,94	1,6		●												
	SNMM 250724	25,40	25,40	7,94	2,4		●	●											

Order example : 10 pieces SNMG 120408-MRS SC415Z

For cutting data standard values see from page 52

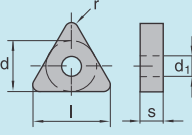
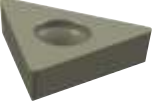
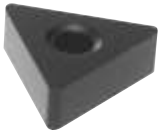



	Ordering code	l	d	s	r	Grade																				
						HC						HWHCHW				HC										
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T					
TCGT....-SAL 	TCGT 110204-SAL	11,00	6,35	2,38	0,4																					
	TCGT 16T304-SAL	16,50	9,52	3,97	0,4																					
TCGT....-E.-SC 	TCGT 110204 EL-SC	11,00	6,35	2,38	0,4		●	●		●																
	TCGT 110204 ER-SC	11,00	6,35	2,38	0,4		●																			
	TCGT 16T304 EL-SC	16,50	9,52	3,97	0,4		●	●		●																
	TCGT 16T304 ER-SC	16,50	9,52	3,97	0,4		●	●		●																
	TCGT 16T308 EL-SC	16,50	9,52	3,97	0,8		●	●		●																
	TCGT 16T308 ER-SC	16,50	9,52	3,97	0,8		●	●		●																
TCMT....-SSMS 	TCMT 110204-SSMS	11,00	6,35	2,38	0,4																					
	TCMT 110208-SSMS	11,00	6,35	2,38	0,8																					
	TCMT 16T304-SSMS	16,50	9,52	3,97	0,4																					
	TCMT 16T308-SSMS	16,50	9,52	3,97	0,8																					
TCMT....-FP 	TCMT 110202-FP	11,00	6,35	2,38	0,2		●	●																		
	TCMT 110204-FP	11,00	6,35	2,38	0,4		●	●																		
TCMT....-MP 	TCMT 110204-MP	11,00	6,35	2,38	0,4		●	●																		
	TCMT 110208-MP	11,00	6,35	2,38	0,8		●	●																		
	TCMT 16T304-MP	16,50	9,52	3,97	0,4		●	●																		
	TCMT 16T308-MP	16,50	9,52	3,97	0,8		●	●																		

Order example : 10 pieces

TCGT 110204-SAL SC610T

For cutting data standard values see from page 52

Indexable inserts

	Ordering code	l	d	s	r	Grade													
						HC						HWHCHW			HC				
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z
TCMW... 	TCMW 110204	11,00	6,35	2,38	0,4														
	TCMW 16T304	16,50	9,52	3,97	0,4														
TNMA... 	TNMA 160408	16,50	9,52	4,76	0,8														
	TNMA 160412	16,50	9,52	4,76	1,2														
	TNMA 220416	22,00	12,70	4,76	1,6														
TNMG...-SFMS 	TNMG 160404-SFMS	16,50	9,52	4,76	0,4														
	TNMG 160408-SFMS	16,50	9,52	4,76	0,8														
TNMG....-SMS 	TNMG 160408-SMS	16,50	9,52	4,76	0,8														
	TNMG 160412-SMS	16,50	9,52	4,76	1,2														
	TNMG 220408-SMS	22,00	12,70	4,76	0,8														
	TNMG 220412-SMS	22,00	12,70	4,76	1,2														
TNMG....-E.-SC 	TNMG 160404 EL-SC	16,50	9,52	4,76	0,4														
	TNMG 160404 ER-SC	16,50	9,52	4,76	0,4														
	TNMG 160408 EL-SC	16,50	9,52	4,76	0,8														
	TNMG 160408 ER-SC	16,50	9,52	4,76	0,8														

Order example : 10 pieces TCMW 110204 SW611

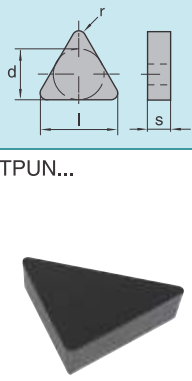
For cutting data standard values see from page 52



	Ordering code	l	d	s	r	Grade											
						HC				HWHCHW				HC			
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610
TNMG...-FMP 	TNMG 160404-FMP	16,50	9,52	4,76	0,4	●	●	●									
	TNMG 160408-FMP	16,50	9,52	4,76	0,8	●	●	●									
	TNMG 160412-FMP	16,50	9,52	4,76	1,2		●										
TNMG...-FP 	TNMG 160404 FP	16,50	9,52	4,76	0,4	●	●										
	TNMG 160408 FP	16,50	9,52	4,76	0,8	●	●										
TNMG...-MK TNMG...-MP 	TNMG 160408-MK	16,50	9,52	4,76	0,8								▲	▲			
	TNMG 160408-MP	16,50	9,52	4,76	0,8	●	●	●									
	TNMG 160412-MP	16,50	9,52	4,76	1,2	●	●	●									
	TNMG 160416-MP	16,50	9,52	4,76	1,6	●	●	●									
	TNMG 220408-MP	22,00	12,70	4,76	0,8	●	●	●									
	TNMG 220412-MP	22,00	12,70	4,76	1,2	●	●										
TNMM...-RP 	TNMM 160408-RP	16,50	9,52	4,76	0,8	●	●	●									
	TNMM 220408-RP	22,00	12,70	4,76	0,8	●	●	●									
	TNMM 220412-RP	22,00	12,70	4,76	1,2	●	●	●									
TPMR...-FM 	TPMR 110304-FM	11,00	6,35	3,18	0,4	●	●	●									
	TPMR 110308-FM	11,00	6,35	3,18	0,8	●	●	●									
	TPMR 160304-FM	16,50	9,52	3,18	0,4	●	●	●									
	TPMR 160308-FM	16,50	9,52	3,18	0,8	●	●	●									

Order example : 10 pieces TNMG 160404-FMP SCP15T

For cutting data standard values see from page 52

Indexable inserts

						Grade												
		l	d	s	r	HC					HWHCHW			HC				
SCP15T	SCP25T					SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T
	Ordering code																	
	TPUN 160308	16,50	9,52	3,18	0,8											●		

						Grade												
		l	d	s	r	HC					HWHCHW			HC				
SCP15T	SCP25T					SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T
	Ordering code																	
	VBMT 160404	16,60	9,52	4,760	0,4	●	●											
	VBMT 160408	16,60	9,52	4,76	0,8	●	●											
	VBMT 160412	16,60	9,52	4,76	1,2	●	●											
	VBMT 160404-MM	16,60	9,52	4,76	0,4					●	●							
	VBMT 160408-MM	16,60	9,52	4,76	0,8					●	●							
	Ordering code																	
	VCGT 1103008	11,10	6,35	3,18	0,08											●		
	VCGT 1103015	11,10	6,35	3,18	0,15											●		

Order example : 10 pieces TPUN 160308 SW610

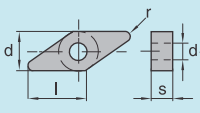





For cutting data standard values see from page 52

	Ordering code	l	d	s	r	Grade															
						HC						HWHCHW			HC						
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T
	VCGT 110302-SAL	11,10	6,35	3,18	0,2														●	●	
	VCGT 110304-SAL	11,10	6,35	3,18	0,4														●	●	
	VCGT 160402-SAL	16,60	9,52	4,76	0,2														●	●	
	VCGT 160404-SAL	16,60	9,52	4,76	0,4														●	●	
	VCGT 160408-SAL	16,60	9,52	4,76	0,8														●	●	
	VCGT 160412-SAL	16,60	9,52	4,76	1,2														●	●	
	VCGT 220530-SAL	22,10	12,70	5,56	3,0														●	●	
	VCGT 050102-FM	5,40	3,10	1,59	0,2																
	VCGT 050102-P	5,40	3,10	1,59	0,2														●	●	
	VCGT 070202-P	6,85	3,97	2,38	0,2															●	
	VCGT 070204-P	6,85	3,97	2,38	0,4															●	
	VCGT 110302-P	11,10	6,37	3,18	0,2															●	
	VCGT 110304-P	11,10	6,37	3,18	0,4															●	
	VCGT 160404-P	16,60	9,52	4,76	0,4															●	
	VCGT 160408-P	16,60	9,52	4,76	0,8															●	
	VCMT 160404-SSMS	16,60	9,52	4,76	0,4														●		
	VCMT 160408-SSMS	16,60	9,52	4,76	0,8														●		
	VCMT 160412-SSMS	16,60	9,52	4,76	1,2														●		
	VCMT 070202-FP	6,85	3,97	2,38	0,2	●	●														
	VCMT 070204-FP	6,85	3,97	2,38	0,4	●	●														
	VCMT 110304-FP	11,10	6,35	3,18	0,4	●	●														
	VCMT 160404-FP	16,60	9,52	4,76	0,4	●	●														
	VCMT 160408-FP	16,60	9,52	4,76	0,8	●	●														
	VCMT 070202-FM	6,85	3,97	2,38	0,2															●	●
	VCMT 070204-FM	6,85	3,97	2,38	0,4															●	●

Order example : 10 pieces VCGT 110302-SAL SC610T

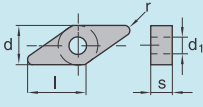
For cutting data standard values see from page 52

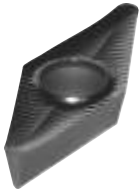
Indexable inserts

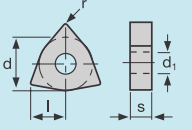
	Ordering code	l	d	s	r	Grade											
						HC						HWHCHW			HC		
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610
	VCMT 160404-MP	16,60	9,52	4,76	0,4	●	●										
	VCMT 160408-MP	16,60	9,52	4,76	0,8	●	●										
	VCMT 160404-MM	16,60	9,52	4,76	0,4				●		●						
	VCMT 160408-MM	16,60	9,52	4,76	0,8				●		●						
	VCMT 160412-MM	16,60	9,52	4,76	1,2				●		●						
	VNMG 160404-FP	16,60	9,52	4,76	0,4	●	●										
	VNMG 160408-FP	16,60	9,52	4,76	0,8	●	●										
	VNMG 160408-FMP	16,60	9,52	4,76	0,8	●	●										
	VNMG 160404-FMS	16,60	9,52	4,76	0,4												●
	VNMG 160408-FMS	16,60	9,52	4,76	0,8												●
	VNMG 160408-MP	16,60	9,52	4,76	0,8	●	●	●									
	VNMG 160412-MP	16,60	9,52	4,76	1,2	●	●	●									


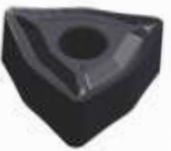

Order example : 10 pieces VCMT 160404-MP SCP15T

For cutting data standard values see from page 52

	Ordering code	Grade																				
		l	d	s	r	HC				HWHCHW		HC										
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T	
VPGT....-SAL	VPGT 220516-SAL	22,10	12,70	5,56	1,6											•						



	Ordering code	Grade																				
		l	d	s	r	HC				HWHCHW		HC										
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T	
WCGT....-SAL	WCGT 06T302-SAL	6,50	9,52	3,97	0,2											•						
	WCGT 06T304-SAL	6,50	9,52	3,97	0,4											•	•					
	WCGT 06T308-SAL	6,50	9,52	3,97	0,8											•	•					
	WCGT 080404-SAL	8,60	12,70	4,76	0,4											•	•					
	WCGT 080408-SAL	8,60	12,70	4,76	0,8											•	•					
WNGG....-FMS	WNGG 060408-FMS	6,50	9,52	4,76	0,8																•	
	WNGG 080404-FMS	8,60	12,70	4,76	0,4																	•
	WNGG 080408-FMS	8,60	12,70	4,76	0,8																	•
	WNGG 080412-FMS	8,60	12,70	4,76	1,2																	•
WNGG....-MS	WNGG 080404-MS	8,60	12,70	4,76	0,4																	•
	WNGG 080408-MS	8,60	12,70	4,76	0,8																	•
	WNGG 080412-MS	8,60	12,70	4,76	1,2																	•

Order example : 10 pieces VPGT 220516-SAL SW610

For cutting data standard values see from page 52

Indexable inserts

	Ordering code	l	d	s	r	Grade														
						HC						HWHCHW			HC					
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T
WNMA... 	WNMA 080408	8,60	12,70	4,76	0,8								▲	▲						
	WNMA 080412	8,60	12,70	4,76	1,2								▲	▲						
WNMG...-SFMS 	WNMG 060404-SFMS	6,50	9,52	4,76	0,4															
	WNMG 080404-SFMS	8,60	12,70	4,76	0,4															
	WNMG 080408-SFMS	8,60	12,70	4,76	0,8															
WNMG...-SMRS 	WNMG 080408-SMRS	8,60	12,70	4,76	0,8															
	WNMG 080412-SMRS	8,60	12,70	4,76	1,2															
WNMG...-SMS 	WNMG 060408-SMS	6,50	9,52	4,76	0,8															
	WNMG 080408-SMS	8,60	12,70	4,76	0,8															
	WNMG 080412-SMS	8,60	12,70	4,76	1,2															
	WNMG 080416-SMS	8,60	12,70	4,76	1,6															
WNMG...-E.-SC 	WNMG 080404 ER-SC	8,60	12,70	4,76	0,4	●	●	●												
	WNMG 080408 EL-SC	8,60	12,70	4,76	0,8	●	●	●												
	WNMG 080408 ER-SC	8,60	12,70	4,76	0,8	●	●	●												
	WNMG 080412 EL-SC	8,60	12,70	4,76	1,2	●	●	●												
	WNMG 080412 ER-SC	8,60	12,70	4,76	1,2	●	●	●												

Order example : 10 pieces WNMA 080408 SCK10T

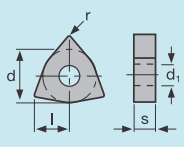



For cutting data standard values see from page 52

	Ordering code	l	d	s	r	Grade											
						HC				HWHCHW				HC			
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610
	WNMG 060404-FMP	6,50	9,52	4,76	0,4	●	●	●									
	WNMG 060408-FMP	6,50	9,52	4,76	0,8	●	●										
	WNMG 080404-FMP	8,60	12,70	4,76	0,4	●	●	●									
	WNMG 080408-FMP	8,60	12,70	4,76	0,8	●	●	●									
	WNMG 080408-HPT	8,60	12,70	4,76	0,8	●	●										
	WNMG 080412-HPT	8,60	12,70	4,76	1,2	●	●										
	WNMG 060404-MM	6,50	9,52	4,76	0,4						●						
	WNMG 080408-MM	8,60	12,70	4,76	0,8				●		●						
	WNMG 080412-MM	8,60	12,70	4,76	1,2				●		●						
	WNMG 080416-MM	8,60	12,70	4,76	1,6						●						
	WNMG 060408-MK	6,50	9,52	4,76	0,8							▲	▲				
	WNMG 080404-MK	8,60	12,70	4,76	0,4							△	△				
	WNMG 080408-MK	8,60	12,70	4,76	0,8							▲	▲				
	WNMG 060408-MP	8,60	9,52	4,76	0,8	●	●	●									
	WNMG 080408-MP	8,60	12,70	4,76	0,8	●	●	●									
	WNMG 080412-MP	8,60	12,70	4,76	1,2	●	●	●									
	WNMG 080416-MP	8,60	12,70	4,76	1,6	●	●										

Order example : 10 pieces WNMG 060404-FMP SCP15T

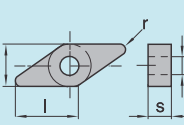

For cutting data standard values see from page 52

Indexable inserts

	Ordering code	l	d	s	r	Grade																		
						HC						HWHCHW			HC									
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T			
WNMG....-MRK	WNMG 080408-MRK	8,60	12,70	4,76	0,8								▲	▲										
WNMG....-MRP	WNMG 080412-MRK	8,60	12,70	4,76	1,2								▲	▲										
	WNMG 080408-MRP	8,60	12,70	4,76	0,8	●	●	●																
	WNMG 080412-MRP	8,60	12,70	4,76	1,2	●	●	●																
	WNMG 080416-MRP	8,60	12,70	4,76	1,6	●	●	●																
	WNMG....-MS	WNMG 080404-MS	8,60	12,70	4,76	0,4																●		
	WNMG 080408-MS	8,60	12,70	4,76	0,8																●			
	WNMG 080412-MS	8,60	12,70	4,76	1,2																	●		
	WNMG....-MT	WNMG 080408-MT	8,60	12,70	4,76	0,8																●	●	
																								

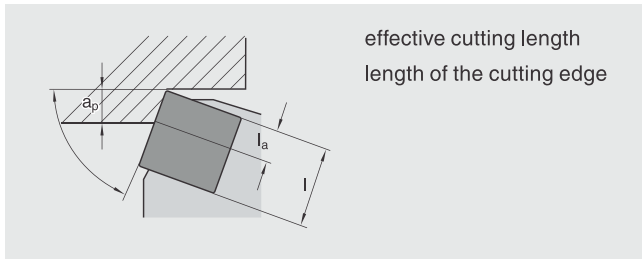
Order example : 10 pieces WNMG 080408-MRK SCK10T

For cutting data standard values see from page 124

	Ordering code	l	d	s	r	Grade																		
						HC						HWHCHW			HC									
						SCP15T	SCP25T	SC240F	SCM20T	SC435D	SCM25T	SCM40T	SCK10T	SCK20T	SW611	SC610T	SW610	SC415X	SC415Z	SCS10T	SCS20T			
XCGT...-P	XCGT 260407-P	-	9,52	4,76	0,7																●			
	XCGT 260410-P	-	9,52	4,76	1,0																	●		
	XCGT 280408-P	-	9,45	4,76	0,8																●			

Order example : 10 pieces XCGT 260407-P SW610

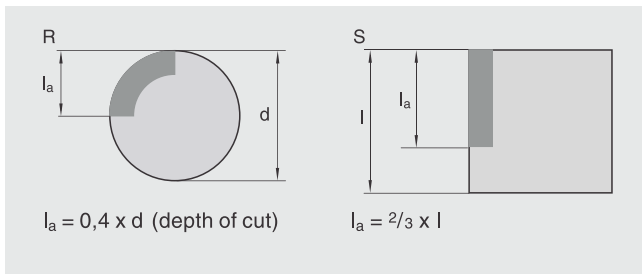
For cutting data standard values see from page 52



Depth of cut

- Determine the largest depth of cut a_p .
- Determine the effective length of cutting edge (l_a) required. The setting angle (γ) and the depth of cut (a_p) should be taken into consideration.
- The smallest length of cutting edge (l_a) required can be found in the table to the left.

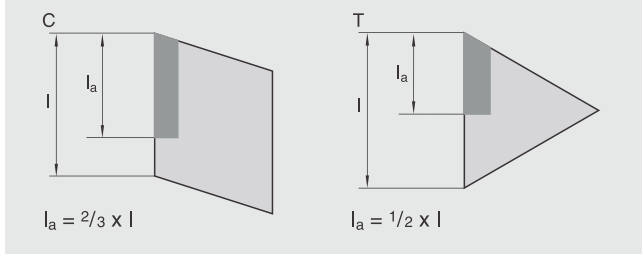
Angle of approach	Depth of cut (a_p) mm											
	1	2	3	4	5	6	7	8	9	10	15	
	Required effective length of the cutting edge (l_a) mm											
90	1	2	3	4	5	6	7	8	9	10	15	
105 75	1,1	2,1	3,1	4,1	5,2	6,2	7,3	8,3	9,3	11	16	
120 60	1,2	2,3	3,5	4,7	5,8	7	8,2	9,3	11	12	18	
135 45	1,4	2,9	4,3	5,7	7,1	8,5	10	12	13	15	22	
150 30	2	4	6	8	10	12	14	16	18	20	30	
165 15	4	8	12	16	20	24	27	31	35	39	58	



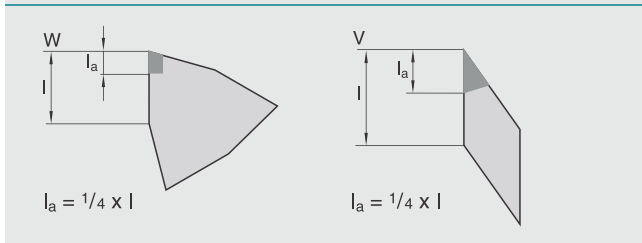
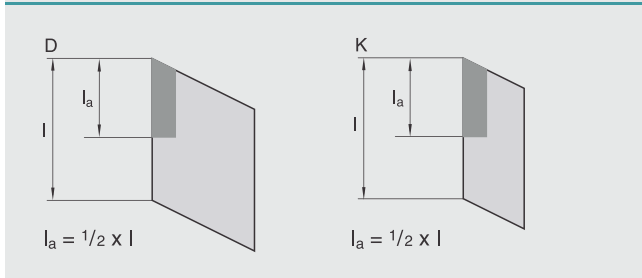
The effective length of the cutting edge

The point angle of an indexable insert has a great influence on the stability of the cutting edges. Every indexable insert has a maximum effective cutting edge length. The maximum values given in the table are designed for working safety when rough cutting with a continuous cut.

If the effective length of the cutting edges is lower than the depth of cut, a larger indexable insert should be used or the depth of cut should be reduced.

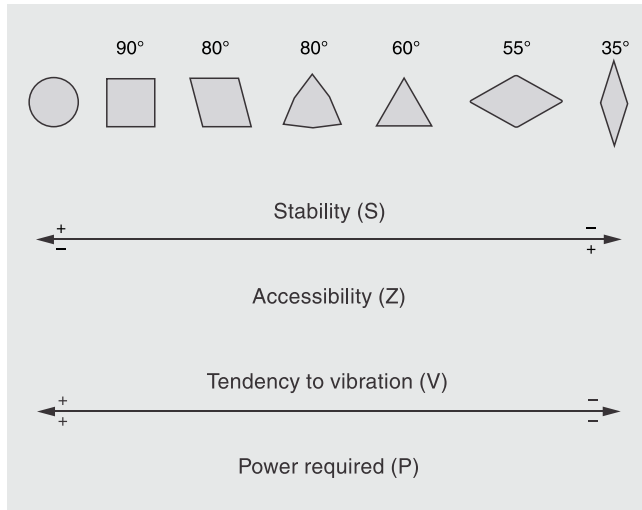


For additional safety during difficult cutting jobs, a larger or thicker indexable insert should be used. When turning against a shoulder, the depth of cut can be increased considerably. So that no problems arise here, a larger indexable insert should be used or an additional face turning operation should be performed.



Technical hints

Selection of indexable insert shape



Indexable insert shape

The diagram shows the most common indexable insert shapes from round tips right down to 35° indexable inserts.

The arrow on the scale shows that the stability of the cutting edge (S) grows with increasing point angle, Whereas the accessibility (Z) becomes improved by smaller point angles.

Tendency to vibration (V) and power requirement (P) rise with larger point angles.

When turning shapes the maximum copy angle must not be exceeded for inward copying. The angle between the secondary cutting edge and the workpiece shape produced should be at least 2°.

Technical hints

Selection of indexable insert shape

Corner radius (r) mm	0,4	0,8	1,2	1,6	2,4
Recommended max. feed rate (f _n) mm/rev	0,25–0,35	0,4–0,7	0,5–1,0	0,7–1,3	1,0–1,8

Corner radius and feed

The corner radius of the indexable insert is a key factor with regard to:

- Stability during rough cutting.
- Surface quality during finishing.

Roughing

■ Use the largest possible corner radius to ensure the greatest degree of stability for the cutting edge.

■ A large corner radius permits a greater feed rate.

■ Use a smaller corner radius if there is a risk of vibration.

When selecting the feed rate for rough turning work, the maximum feed rates given above must not be exceeded in any circumstances. The basic rule is:

$$f_n \text{ Roughing} = 0,5 \times \text{Corner radius}$$

Maximum feed rate for various corner radii

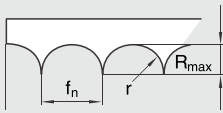
The most frequently used radii for rough machining are between 1.2 - 1.6 mm.

The table is based on the max. recommended feed rate of $\frac{2}{3}$ of the corner radius.

Greater feed rates are possible in the following cases:

- Indexable inserts have a stable cutting edge and a point angle of at least 60°.
- Single-sided indexable inserts.
- Indexable inserts which are used with a setting angle less than 90°.
- Working easily machineable workpiece materials at moderate cutting speeds.

Theoretical maximum roughness height (R_{max})



R_{max} = Roughness height

r = Corner radius (mm)

f_n = Feed (mm/revolution)

$$R_{max} = \frac{f_n^2}{8r} \cdot 1000 \text{ (}\mu\text{m)}$$

Feed :

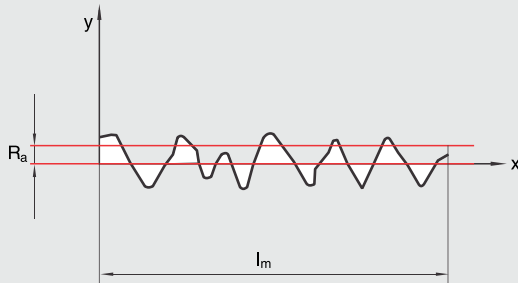
$$f_n = \sqrt{\frac{R_{max} \times 8r}{1000}}$$

The surface quality and accuracy of the tolerance is greatly influenced by the interaction of the feed rate and corner radius. The stability of the clamping system and the machine are other decisive factors.

General recommendation

- The surface quality can be improved by using higher cutting speeds and positive rake angles.
- Use a smaller corner radius if there is a risk of vibration.
- Especially high quality surfaces can be achieved using uncoated hard metals (sharper cutting edges than coated grades).

Mean roughness figure (R_a)



R _{max}	R _a = CLA = AA		RMS		Value for roughness
	µm	µinch	µm	µinch	
1,6	0,30	11,8	0,33	13,1	
1,8	0,35	13,8	0,39	15,3	
Ø,0	0,40	15,7	0,44	17,4	N5
2,2	0,44	17,5	0,49	19,4	
2,4	0,49	19,2	0,54	21,3	
2,6	0,53	20,8	0,59	23,1	
2,8	0,58	22,7	0,64	25,2	
3,0	0,63	24,6	0,70	27,3	
3,5	0,71	27,8	0,79	30,9	
Ø,0	0,80	31,4	0,89	34,8	N6
4,5	0,90	35,2	1,00	39,1	
5,0	0,99	38,8	1,10	43,1	
6,0	1,20	47,2	1,30	52,4	
7,0	1,40	55,1	1,50	61,2	
Ø,0	1,60	63,0	1,80	70,0	N7
9,0	1,80	71,0	2,00	78,8	
10,0	2,00	97,0	2,20	87,7	
Ø5,0	3,20	126,0	3,10	140,0	N8
20,0	4,40	173,0	4,90	192,0	
25,0	5,80	238,0	6,40	264,0	
Ø7,0	6,30	247,0	7,00	274,0	N9
30,0	7,40	292,0	8,20	324,0	
35,0	8,80	346,0	9,80	384,0	
40,0	10,70	422,0	11,90	468,0	
45,0	12,50	485,0	13,90	538,0	N10

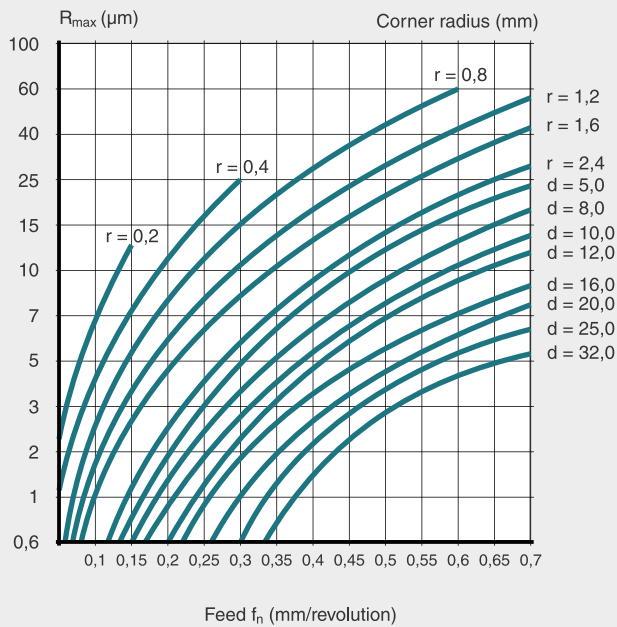
Procedure:

Conversion table for various measurement systems.

This cannot be used to calculate a mathematical relationship between the R_{max} roughness height and the figure for R_a.

Look up the appropriate R_{max} value in the conversion table. Then read off the correct combination of corner radius and feed rate.

The diagram shows theoretical R_{max} values for specific feed/corner radius combinations.



Units		
Code	Description	Unit
D_m	Machining diameter	mm
v_c	Cutting speed	m/min
n	No. of spindle revolutions	min^{-1} r.p.m.
T_c	Working time	min
Q	Metal removal volume	cm^3/min
l_m	Working length	mm
P_c	Net power consumption	kW
$k_{c\ 0,4}$	Specific cutting force for chip thickness of 0.4 mm	N/mm^2
f_n	Feed per revolution	mm/rev
r	Approach angle	degrees
R_{\max}	Profile depth	μm
r	Indexable insert corner radius	mm
a_p	Cutting depth	mm

Formulas		
	Cutting speed (m/min)	$v_c = \frac{D_m \cdot n}{1000}$
	No. of spindle revolutions r.p.m.	$n = \frac{v_c \cdot 1000}{D_m}$
	Metal removal volume (cm^3/min)	$Q = v_c \cdot a_p \cdot f_n$
	Power consumption (kW)	$P_c = \frac{Q \cdot k_{c\ 0,4}}{60 \cdot 1000} \left[\frac{0,4}{f_n \cdot \sin r} \right]^{0,29}$
	Working time (min)	$T_c = \frac{l_m}{f_n \cdot n}$
	Profile depth (μm)	$R_{\max} = \frac{f_n^2}{r} \cdot 125$

Option	Problem											
	Wear of free areas	Extreme crater wear	Formation of built-up edge	Chips in cutting edge	Notch sensibility	Broken indexable insert	Heat cracks	Plastic deformation	Interrupted cut	Poor workpiece surface	Band/snarl chips (not coloured)	Chip shape too narrow (blueing)
T/C wear resistance	↑				↑			↑				
T/C roughness				↑		↑	↑		↑			
Cutting speed	↓	↓	↑		↓			↓	↑	↑		
Feed	↔	↓	↓					↓	↓	↓	↑	↓
Depth of cut					↔				↑		↔	↔
Chip angle		↑	↑	↓		↓			↔			
Chip breaker geometry				↔		↔					↔	↔
Condition of cutting edge				↔					↔			
Corner radius						↑			↑	↑		
Approach angle				↓								
Stability				↑								
Cooling		↑	↑				↑	↑		↑		

↑ increase
↓ reduce
↔ optimize

Material group	Material		Brinell hardness HB	Cutting speed v_c (m/min)		
				SCP15T		
				$f = \text{mm/U rev}$		
				0,4–0,8	0,25–0,4	0,05–0,25
P	Unalloyed steel ¹⁾	≈ 0,15 %C annealed	125	140 – 200	230 – 300	290 – 360
		≈ 0,45 %C annealed	190	110 – 180	180 – 260	250 – 320
		≈ 0,45 %C hardened and temp.	250	90 – 180	110 – 180	140 – 210
		≈ 0,75 %C annealed	270	120 – 180	170 – 240	230 – 300
		≈ 0,75 %C hardened and temp.	300	130 – 150	80 – 150	140 – 210
	Low-alloy steel ¹⁾	annealed	180	100 – 170	150 – 220	220 – 300
		hardened and temp.	275	100 – 150	110 – 180	140 – 210
		hardened and temp.	300	100 – 140	100 – 170	130 – 200
		hardened and temp.	350	100–140	80 – 150	110 – 180
	High-alloy steel and high alloy tool steel ¹⁾	annealed	200	100 – 180	80 – 220	180 – 260
		hardened and temp.	325	100 – 160	80 – 140	100 – 170
	Stainless steel ¹⁾	ferritic/martensitic annealed	200	100–170	130 – 200	180 – 260
		martensitic hardened and temp.	240	100 – 140	80 – 150	150 – 210
	K	Grey cast iron	perlitic/ferritic	180	100 – 180	170 – 240
perlitic (martensitic)			260	90 – 120	80 – 150	110 – 180
Nodular graphite cast iron		ferritic	160	100 – 150	110 – 180	140 – 210
		perlitic	250	90 – 140	90 – 160	110 – 180
Malleable cast iron		ferritic	130	90 – 140	120 – 190	150 – 210
		perlitic	230	90 – 120	100 – 150	110 – 180







1) And cast steel



Dry machining




Wet machining

Material group	Material		Brinell hardness HB	Cutting speed v_c (m/min)					
				SCP25T					
				f = mm/U rev					
				0,4–0,8	0,25–0,4	0,05–0,25			
									
P	Unalloyed steel ¹⁾	≈ 0,15 %C annealed	125	120 – 190	170 – 250	170 – 250			
		≈ 0,45 %C annealed	190	100 – 180	150 – 200	150 – 220			
		≈ 0,45 %C hardened and temp.	250	80 – 150	100 – 170	120 – 200			
		≈ 0,75 %C annealed	270	100 – 170	80 – 140	140 – 200			
		≈ 0,75 %C hardened and temp.	300	70 – 140	100 – 160	100 – 170			
	Low-alloy steel ¹⁾	annealed	180	90 – 160	140 – 200	140 – 200			
		hardened and temp.	275	90 – 140	100 – 160	100 – 180			
		hardened and temp.	300	85 – 130	100 – 150	100 – 170			
		hardened and temp.	350	80 – 120	80 – 140	90 – 170			
	High-alloy steel and high alloy tool steel ¹⁾	annealed	200	90 – 150	80 – 170	130 – 170			
		hardened and temp.	325	50 – 110	70 – 130	80 – 130			
	Stainless steel ¹⁾	ferritic/martensitic annealed	200	90 – 140	120 – 180	140 – 180			
martensitic hardened and temp.		240	85 – 120	80 – 140	100 – 140				
M	Stainless steel ¹⁾	austenitic ²⁾ , quenched	180	90 – 110	100 – 130	100 – 130			

1) And cast steel

2) And austenitic/ferritic

 Dry machining

 Wet machining

Material group	Material	Brinell hardness HB	Cutting speed v_c (m/min)				
			SC240F				
			$f = \text{mm/Urev}$				
			0,4–0,8	0,25–0,4	0,05–0,25		
P	Unalloyed steel ¹⁾	≈ 0,15 %C annealed	125	60 – 100	70 – 110	90 – 170	
		≈ 0,45 %C annealed	190	60 – 100	70 – 110	90 – 170	
		≈ 0,45 %C hardened and temp.	250	60 – 100	70 – 110	90 – 170	
		≈ 0,75 %C annealed	270	60 – 100	70 – 110	90 – 170	
		≈ 0,75 %C hardened and temp.	300	60 – 100	70 – 110	90 – 170	
	Low-alloy steel ¹⁾	annealed	180	60 – 100	70 – 110	90 – 170	
		hardened and temp.	275	70 – 110	70 – 110	90 – 170	
			300	60 – 100	70 – 110	90 – 170	
			350	55 – 80	70 – 110	90 – 170	
	High-alloy steel and high alloy tool steel ¹⁾	annealed	200	80 – 110	70 – 110	90 – 170	
		hardened and temp.	325	60 – 90	70 – 110	90 – 170	
	Stainless steel ¹⁾	ferritic/martensitic annealed	200	90 – 130	70 – 110	90 – 170	
		martensitic hardened and temp.	240	70 – 110	70 – 110	90 – 170	
	M	Stainless steel ¹⁾	austenitic ²⁾ , quenched	180	70 – 100	90 – 140	110 – 170

1) And cast steel

2) And austenitic/ferritic

Dry machining

Wet machining

Material group	Material	Brinell hardness HB	SCM20T										
			Negative indexable inserts ISO-P-System						Positive indexable inserts ISO-S-System				
			Geometry	Corner radius	Recommended a_p (mm)	Recommended f_n (mm/rev)	Cutting speed v_c (m/min)	Geometry	Corner radius	Recommended a_p (mm)	Recommended f_n (mm/rev)	Cutting speed v_c (m/min)	
M	Ferritic 1.4000, 1.4002, 1.4003, 1.4006, 1.4016, 1.4104, 1.4113, 1.4313, 1.4742, 1.4762	180	MM	08	2	0,20	180 – 230	MM	04	1	0,15	180 – 230	
				12	3	0,30	180 – 230		08	2	0,25	180 – 230	
	Martensitic 1.4006, 1.4014, 1.4021, 1.4024, 1.4027, 1.4028, 1.4031, 1.4034, 1.4057, 1.4122, 1.4724	320	MM	08	2	0,20	180 – 230	MM	04	1	0,15	180 – 230	
				12	3	0,30	180 – 230		08	2	0,25	180 – 230	
Austenitic 1.4300, 1.4301, 1.4303, 1.4305, 1.4306, 1.4308, 1.4310, 1.4311	180	MM	08	2	0,2	150 – 200	MM	04	1	0,15	150 – 200		
			12	3	0,3	150 – 200		08	2	0,20	150 – 200		
1.4321, 1.4401, 1.4404, 1.4406, 1.4428, 1.4435, 1.4436, 1.4438, 1.4449 1.4571	180	MM	08	2	0,2	150 – 200	MM	04	1	0,15	150 – 200		
			12	3	0,3	150 – 200		08	2	0,2	150 – 200		

The above recommendations are given for wet machining. For dry machining the recommended values for the cutting speed have to be reduced by approx. 20 %.

Material group	SCM25T												
	Brinell hardness HB	Negative indexable inserts ISO-P-System						Positive indexable inserts ISO-S-System					
		Geometry	Corner radius	Recommended a_p (mm)	Recommended f_n (mm/rev)	Cutting speed v_c (m/min)	Geometry	Corner radius	Recommended a_p (mm)	Recommended f_n (mm/rev)	Cutting speed v_c (m/min)		
M	Ferritic 1.4000, 1.4002, 1.4003, 1.4006, 1.4016, 1.4104, 1.4113, 1.4313, 1.4742, 1.4762	180	MM	08	2	0,2	130 - 200	MM	04	1	0,15	130 - 200	
				12	3	0,3	130 - 200		08	2	0,25	130 - 200	
				16	3,5	0,3	130 - 200						
			SFMS	04	1	0,15	130 - 200						
				08	2,5	0,25	130 - 200						
				12	3	0,3	130 - 200						
		SMS	08	2	0,2	130 - 200							
			12	3	0,3	130 - 200							
		Martensitic 1.4006, 1.4014, 1.4021, 1.4024, 1.4027, 1.4028, 1.4031, 1.4034, 1.4057, 1.4122, 1.4724	320	MM	08	2	0,2	130 - 200	MM	04	1	0,15	130 - 200
					12	3	0,3	130 - 200		08	2	0,25	130 - 200
					16	3,5	0,3	130 - 200					
	SFMS			04	1	0,15	130 - 200						
				08	2,5	0,25	130 - 200						
				12	3	0,3	130 - 200						
	SMS		08	2	0,2	130 - 200							
			12	3	0,3	130 - 200							
	Austenitic 1.4300, 1.4301, 1.4303, 1.4305, 1.4306, 1.4308, 1.4310, 1.4311 1.4321, 1.4401, 1.4404, 1.4406, 1.4428, 1.4435, 1.4436, 1.4438, 1.4449, 1.4571		180	MM	08	2	0,2	100 - 180	MM	04	1	0,15	100 - 180
					12	3	0,3	100 - 180		08	2	0,20	100 - 180
					16	3,5	0,3	100 - 180					
		SFMS			04	1	0,15	100 - 180					
					08	2,5	0,25	100 - 180					
					12	3	0,3	100 - 180					
SMS		08		2	0,2	100 - 180							
		12		3	0,3	100 - 180							
180		MM		08	2	0,2	100 - 180	MM	04	1	0,15	100 - 180	
				12	3	0,3	100 - 180		08	2	0,2	100 - 180	
				16	3,5	0,3	100 - 180						
		SFMS	04	1	0,15	100 - 180							
			08	2,5	0,25	100 - 180							
			12	3	0,3	100 - 180							
SMS		08	2	0,2	100 - 180								
		12	3	0,3	100 - 180								




The above recommendations are given for wet machining. For dry machining the recommended values for the cutting speed have to be reduced by approx. 20 %.


Material group	SCM40T												
	Negative indexable inserts ISO-P-System							Positive indexable inserts ISO-S-System					
	Brinell hardness HB	Geometry	Corner radius	Recommended a_p (mm)	Recommended f_n (mm/rev)	Cutting speed v_c (m/min)	Geometry	Corner radius	Recommended a_p (mm)	Recommended f_n (mm/rev)	Cutting speed v_c (m/min)		
M	Ferritic 1.4000, 1.4002, 1.4003, 1.4006, 1.4016, 1.4104, 1.4113, 1.4313, 1.4742, 1.4762	180	MM	08	2	0,2	100 - 180						
				12	3	0,3	100 - 180						
				16	3,5	0,3	100 - 180						
		SMRS	12	4	0,45	100 - 180							
				16	5	0,5	100 - 180						
		Martensitic 1.4006, 1.4014, 1.4021, 1.4024, 1.4027, 1.4028, 1.4031, 1.4034, 1.4057, 1.4122, 1.4724	320	MM	08	2	0,2	100 - 180					
					12	3	0,3	100 - 180					
					16	3,5	0,3	100 - 180					
	SMRS		12	4	0,45	100 - 180							
				16	5	0,5	100 - 180						
	Austenitic 1.4300, 1.4301, 1.4303, 1.4305, 1.4306, 1.4308, 1.4310, 1.4311		180	MM	08	2	0,2	90 - 160					
					12	3	0,3	90 - 160					
					16	3,5	0,3	90 - 160					
		SMRS	12	4	0,45	80 - 160							
				16	5	0,5	80 - 160						
		1.4321, 1.4401, 1.4404, 1.4406, 1.4428, 1.4435, 1.4436, 1.4438, 1.4449 1.4571	180	MM	08	2	0,2	90 - 160					
					12	3	0,3	90 - 160					
					16	3,5	0,3	90 - 160					
SMRS	12		4	0,45	80 - 160								
			16	5	0,5	80 - 160							

The above recommendations are given for wet machining. For dry machining the recommended values for the cutting speed have to be reduced by approx. 20 %.

Material group	Material	Brinell hardness HB	SC435D										
			Negative indexable inserts ISO-P-System					Positive indexable inserts ISO-S-System					
			Geometry	Corner radius	Recommended a_p (mm)	Recommended f_n (mm/rev)	Cutting speed v_c (m/min)	Geometry	Corner radius	Recommended a_p (mm)	Recommended f_n (mm/rev)	Cutting speed v_c (m/min)	
M	Ferritic 1.4000, 1.4002, 1.4003, 1.4006, 1.4016, 1.4104, 1.4113, 1.4313, 1.4742, 1.4762	180	SFMS	04	0,5	0,15	150 – 180						
				08	1	0,20	150 – 180						
				12	2	0,25	120 – 180						
			SMS	08	2	0,25	150 – 180	SSMS	04	0,4	0,15	120 – 180	
				12	3	0,30	150 – 180		08	1	0,20	140 – 180	
				16	4	0,35	120 – 180						
		320	SFMS	04	0,5	0,15	140 – 180						
				08	1	0,20	120 – 180						
				12	2	0,25	110 – 160						
			SMS	08	2	0,25	120 – 180	SSMS	04	0,4	0,15	140 – 180	
				12	3	0,30	110 – 160		08	1	0,20	120 – 180	
				16	4	0,35	100 – 140						
	180	SFMS	04	0,5	0,15	90 – 160							
			08	1	0,20	90 – 160							
			12	2	0,25	90 – 160							
		SMS	08	2	0,25	80 – 150	SSMS	04	0,4	0,15	120 – 150		
			12	3	0,30	80 – 150		08	1	0,20	150 – 180		
			16	4	0,35	80 – 150							
	180	SFMS	04	0,5	0,15	90 – 160							
			08	1	0,20	90 – 160							
			12	2	0,25	90 – 160							
		SMS	08	2	0,25	80 – 150	SSMS	04	0,4	0,15	150 – 180		
			12	3	0,30	80 – 150		08	1	0,20	120 – 180		
			16	4	0,35	80 – 150							
180	SFMS	04	0,5	0,15	90 – 160								
		08	1	0,20	90 – 160								
		12	2	0,25	90 – 160								
	SMS	08	2	0,25	80 – 150	SSMS	04	0,4	0,15	150 – 180			
		12	3	0,30	80 – 150		08	1	0,20	120 – 180			
		16	4	0,35	80 – 150								
180	SFMS	04	0,5	0,15	90 – 160								
		08	1	0,20	90 – 160								
		12	2	0,25	90 – 160								
	SMS	08	2	0,25	80 – 150	SSMS	04	0,4	0,15	150 – 180			
		12	3	0,30	80 – 150		08	1	0,20	120 – 180			
		16	4	0,35	80 – 150								
180	SFMS	04	0,5	0,15	90 – 160								
		08	1	0,20	90 – 160								
		12	2	0,25	90 – 160								
	SMS	08	2	0,25	80 – 150	SSMS	04	0,4	0,15	150 – 180			
		12	3	0,30	80 – 150		08	1	0,20	120 – 180			
		16	4	0,35	80 – 150								
180	SFMS	04	0,5	0,15	90 – 160								
		08	1	0,20	90 – 160								
		12	2	0,25	90 – 160								
	SMS	08	2	0,25	80 – 150	SSMS	04	0,4	0,15	150 – 180			
		12	3	0,30	80 – 150		08	1	0,20	120 – 180			
		16	4	0,35	80 – 150								
180	SFMS	04	0,5	0,15	90 – 160								
		08	1	0,20	90 – 160								
		12	2	0,25	90 – 160								
	SMS	08	2	0,25	80 – 150	SSMS	04	0,4	0,15	150 – 180			
		12	3	0,30	80 – 150		08	1	0,20	120 – 180			
		16	4	0,35	80 – 150								
180	SFMS	04	0,5	0,15	90 – 160								
		08	1	0,20	90 – 160								
		12	2	0,25	90 – 160								
	SMS	08	2	0,25	80 – 150	SSMS	04	0,4	0,15	150 – 180			
		12	3	0,30	80 – 150		08	1	0,20	120 – 180			
		16	4	0,35	80 – 150								
180	SFMS	04	0,5	0,15	90 – 160								
		08	1	0,20	90 – 160								
		12	2	0,25	90 – 160								
	SMS	08	2	0,25	80 – 150	SSMS	04	0,4	0,15	150 – 180			
		12	3	0,30	80 – 150		08	1	0,20	120 – 180			
		16	4	0,35	80 – 150								
180	SFMS	04	0,5	0,15	90 – 160								
		08	1	0,20	90 – 160								
		12	2	0,25	90 – 160								
	SMS	08	2	0,25	80 – 150	SSMS	04	0,4	0,15	150 – 180			
		12	3	0,30	80 – 150		08	1	0,20	120 – 180			
		16	4	0,35	80 – 150								
180	SFMS	04	0,5	0,15	90 – 160								
		08	1	0,20	90 – 160								
		12	2	0,25	90 – 160								
	SMS	08	2	0,25	80 – 150	SSMS	04	0,4	0,15	150 – 180			
		12	3	0,30	80 – 150		08	1	0,20	120 – 180			
		16	4	0,35	80 – 150								

The above recommendations are given for wet machining. For dry machining the recommended values for the cutting speed have to be reduced by approx. 20 %.

Material group	Material	Brinell hardness HB	Cutting speed v_c (m/min)			
			SCK10T and SCK20T			
			f = mm/Urev			
			0,4–0,8	0,25–0,4	0,05–0,25	
						
K	Grey cast iron	perlitic/ferritic	180	210 – 300	300 – 450	350 – 500
		perlitic (martensitic)	260	140 – 200	170 – 240	190 – 270
	Nodular graphite cast iron	ferritic	160	150 – 210	180 – 260	210 – 300
		perlitic	250	110 – 160	130 – 190	150 – 200
	Malleable cast iron	ferritic	130	200 – 280	220 – 300	240 – 330
		perlitic	230	100 – 150	140 – 220	170 – 240

 Wet machining

Turning data recommendations for SCM45T
Turning-drilling-tool SIGMATEC

Material group	Main workpiece material groups and their characteristic letters		Brinell hardness HB	Turning and drilling v_c (m/min)
				SCM45T
P	Unalloyed steel ¹⁾	≈0,15%C annealed	125	120 - 250
		≈0,45%C annealed	190	100 - 200
		≈0,45%C hardened and temp.	250	70 - 180
		≈0,75%C annealed	270	70 - 180
		≈0,75%C hardened and temp.	300	50 - 150
	Low-alloy steel ¹⁾	annealed	180	80 - 200
		hardened and temp.	275	70 - 180
		hardened and temp.	300	100 - 185
		hardened and temp.	350	70 - 150
	High-alloy steel and high-alloy tool steel ¹⁾	annealed	200	70 - 180
		hardened and temp.	325	50 - 120
		ferritic / martensitic annealed	200	70 - 150
		martensitic hardened and temp.	240	70 - 120
	M	Stainless steel ¹⁾	austenitic ²⁾ , quenched	180

¹⁾ and cast steel

²⁾ and austenitic / ferritic



Material group	Material		Brinell hardness HB	Cutting speed		
				v_c (m/min)		
				SC610T		
				$f = \text{mm/U rev}$		
				0,4–0,8	0,25–0,4	0,05–0,25
M	Stainless steel ¹⁾	austenitic ²⁾ , quenched				120 – 300
K	Grey cast iron	perlitic/ferritic	180			80 – 250
		perlitic (martensitic)	180			
	Nodular graphite cast iron	ferritic	260			70 – 200
		perlitic	160			
	Malleable cast iron	ferritic	250			80 – 220
		perlitic	130			
N	Aluminium wrought alloys	unhardenable	230	500 – 2000	600 – 2500	700 – 3000
		hardenable, hardened	60	200 – 1000	300 – 1500	400 – 2000
	Aluminium cast alloys	ca. 12 % Si, unhardenable	100	400 – 800	500 – 1200	600 – 1500
		ca. 12 % Si, hardenable, hardened	75	300 – 600	400 – 900	500 – 1200
		> 12 % Si, unhardenable	90	200 – 600	300 – 800	400 – 1000
	Copper and copper alloys (Bronze/Brass)	Free cutting alloys Pb > 1 %	130	250 – 400	250 – 500	450 – 650
		Brass, Red bronze	110	250 – 600	250 – 800	450 – 1000
		Bronze, non leaded copper and electrolytic copper	90 100	150 – 250	180 – 300	200 – 400
	Nonmetallic materials	Duroplastics		60 – 70	80 – 100	90 – 120
		Fibre reinforced plastics				
		Hard rubber				


¹⁾ and cast steel

²⁾ and austenitic/ferritic



Wet machining

Material group	Material	Material	Brinell hardness HB	Cutting speed v_c (m/min)	
				SW610 and SW611	$f = \text{mm/Urev}$
				0,1–0,4	
					
K	Grey cast iron	perlitic/ferritic	180	150 – 250	
		perlitic (martensitic)	260	100 – 150	
	Nodular graphite cast iron	ferritic	160	130 – 180	
		perlitic	250	100 – 150	
	Malleable cast iron	ferritic	130	120 – 180	
		perlitic	230	100 – 160	
N	Aluminium wrought alloys	unhardenable	60	400 – 2400	
		hardenable, hardened	100	160 – 1600	
	Aluminium cast alloys	ca. 12 % Si. unhardenable	75	320 – 1200	
		ca. 12 % Si. hardenable, hardened	90	240 – 950	
		> 12 % Si. unhardenable	130	160 – 800	
	Copper and copper alloys (Bronze/Brass)	Free cutting alloys Pb > 1 %	110	200 – 520	
		Brass, Red bronze	90	200 – 800	
		Bronze, non leaded copper and electrolytic copper	100	120 – 320	
	Nonmetallic materials	Duroplastics			
		Fibre reinforced plastics			
Hard rubber					

 Dry machining

 Wet machining

Material group	Material	Brinell hardness HB	Cutting speed v_c (m/min)	Feed f mm/U rev
			SC415X	
P	Machining steel	125 - 300	100 – 220	0,01 – 0,15
	Steel < 600 N/mm ²	180 - 380	100 – 180	0,01 – 0,20
	Stahl Steel < 800 N/mm ²	200 - 350	60 – 130	0,01 – 0,15
M	Stainless steel	180 - 300	60 – 140	0,01 – 0,20
N	Aluminium	30 - 130	200 – 800	0,01 – 0,30
	Bronze, Brass, Copper	100 - 500	100 – 500	0,01 – 0,30
S	Titanium	180 - 400	40 – 90	0,01 – 0,15
		180 - 400	30 – 70	0,2 – 0,45

Cutting data recommendations for SC415Z and SCS20T

Material group	Material	Brinell hardness HB	Cutting speed v_c (m/min)		
			SC415Z / SCS20T		
			f = mm/U rev		
			0,15 - 0,5		
M	Stainless steel ¹⁾	austenitic ²⁾ , quenched	180	80 – 180	
S	Heat resistant alloys	Fe-based	annealed	200	40 – 100
			hardened	280	30 – 70
	Ni- or Co-based	annealed	250	50 – 85	
		hardened	350	20 – 50	
		cast	320	30 – 50	

Cutting data recommendations for SCS10T

Material group	Material	Brinell hardness HB	Cutting speed v_c (m/min)	
			SCS10T	
			f = mm/U rev	
			0,2 - 0,45	
S	Heat resistant alloys	Titanium and titanium alloys	150 – 450	30 – 70

¹⁾ and cast steel

²⁾ and austenitic/ferritic



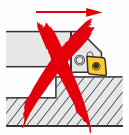


SIGMATEC

The most universal turning-drilling-tool
Cost reduction on all main materials



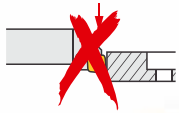
1. Face turning



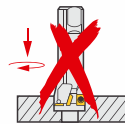
4. Internal turning



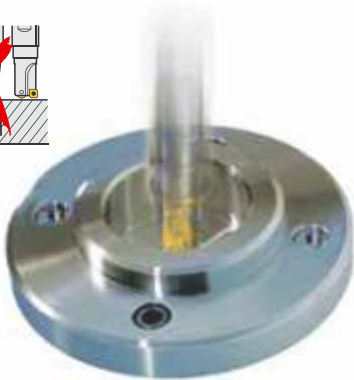
2. External turning



5. Counter bore milling (to DIN 74)

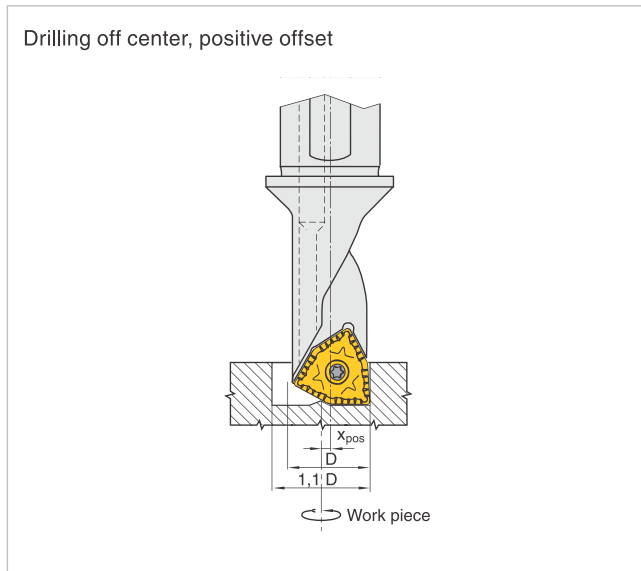


3. Drilling into solid with flat drilling base



Five machining operations, one tool
 The universal turning-drilling-tool substitutes up to 5 ISO-tools and reduces machining times up to 30 % through saving of tool changing times and unnecessary tool movements.

Secondary cutting edge can be used



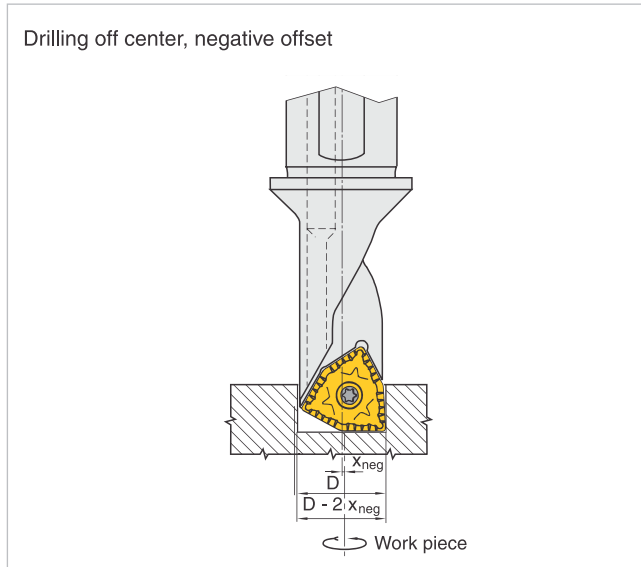
X_{pos} : Offset off center, positive

D: Nominal tool diameter

Steel $X_{pos} = \frac{(1,1 \times D) - D}{2}$

Aluminium $X_{pos} = \frac{(1,5 \times D) - D}{2}$

Tool 2,25D/1,50D	D	Steel		Aluminium	
		D_{max}	X_{pos}	D_{max}	X_{pos}
HTR/L 08 -x,xxD- 04	08H13	8,8	0,40	12,0	2,00
HTR/L 10 -x,xxD- 05	10H13	11,0	0,50	15,0	2,50
HTR/L 11 -x,xxD- 06	11H13	12,1	0,55	16,5	2,75
HTR/L 15 -x,xxD- 07	15H13	16,5	0,75	22,5	3,75
HTR/L 18 -x,xxD- 09	18H13	19,8	0,90	27,0	4,50
HTR/L 20 -x,xxD- 10	20H13	22,0	1,00	30,0	5,00
HTR/L 26 -x,xxD- 13	26H13	28,6	1,30	39,0	6,50

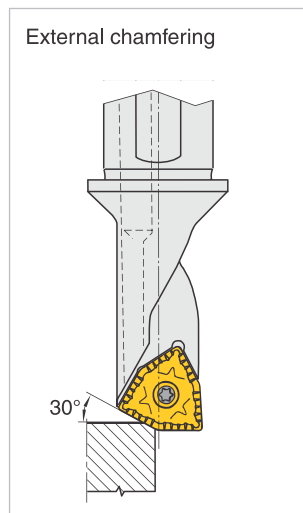
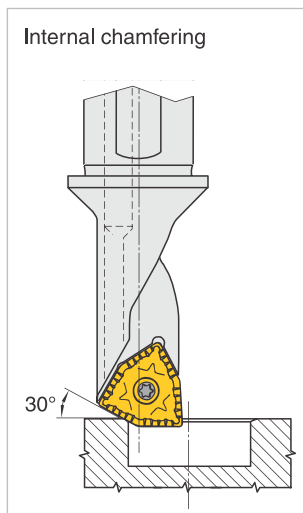


X_{neg} : Offset off center, negative

D: Nominal tool diameter

$$X_{neg} = \frac{D_{min} - D}{2}$$

Tool 2,25D/1,50D	D	D_{min}	X_{neg}
HTR/L 08 -x,xxD- 04	08H13	7,8	0,10
HTR/L 10 -x,xxD- 05	10H13	9,8	0,10
HTR/L 11 -x,xxD- 06	11H13	10,8	0,10
HTR/L 15 -x,xxD- 07	15H13	14,7	0,15
HTR/L 18 -x,xxD- 09	18H13	17,7	0,15
HTR/L 20 -x,xxD- 10	20H13	19,7	0,15
HTR/L 26 -x,xxD- 13	26H13	25,7	0,15



Core drilling with SIGMATEC-tools

The diameters of the SIGMATEC-tools are designed to produce counter-bores according to DIN 74 forms H3, J3 and K3 in one operation.

- Form H3 for: socket head cap screws according to DIN 84 and DIN 7984
cheese-head screws according to DIN 7513 form B
cheese-head screws according to DIN 7500 part 1 form A
 - Form J3 for: socket head cap screws according to DIN 6912 (low screw head, key guide)
 - Form K3 for: socket head cap screws according to DIN 912
- with lock washer according to DIN 7980

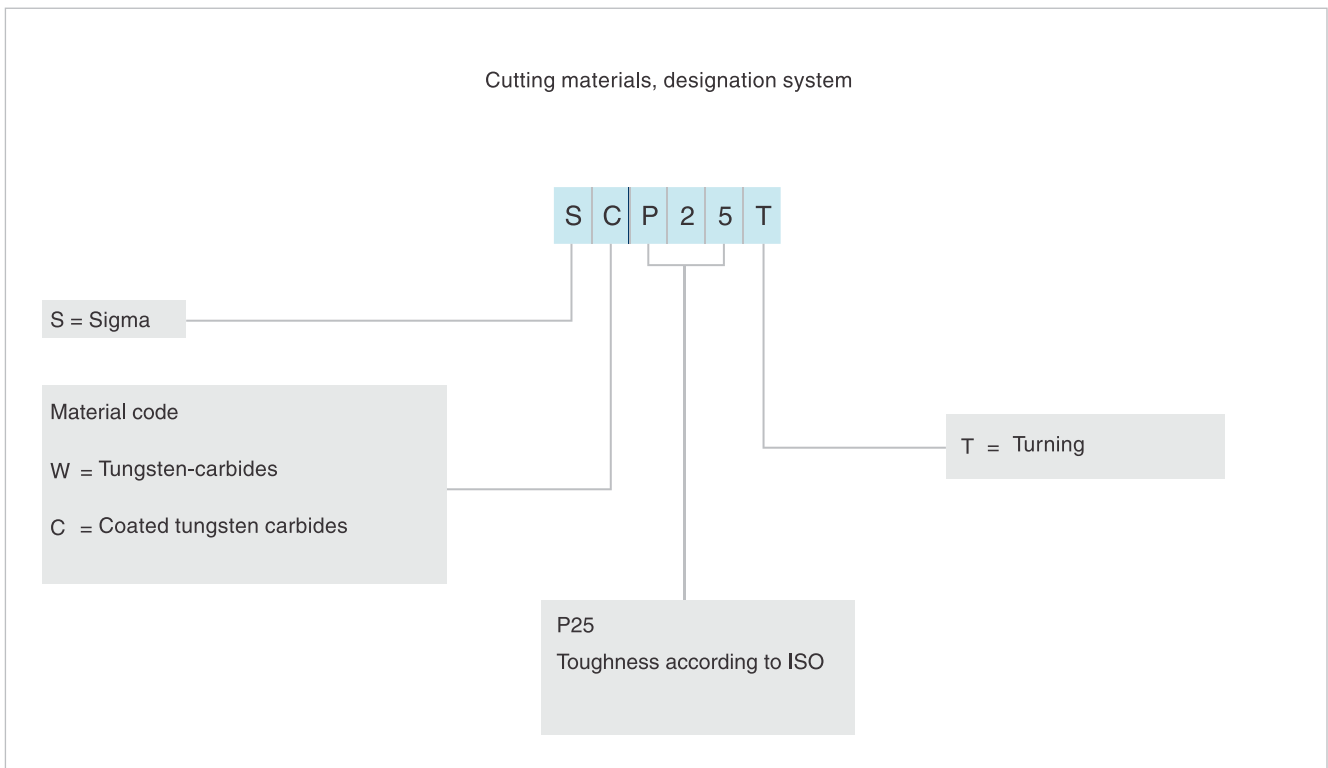
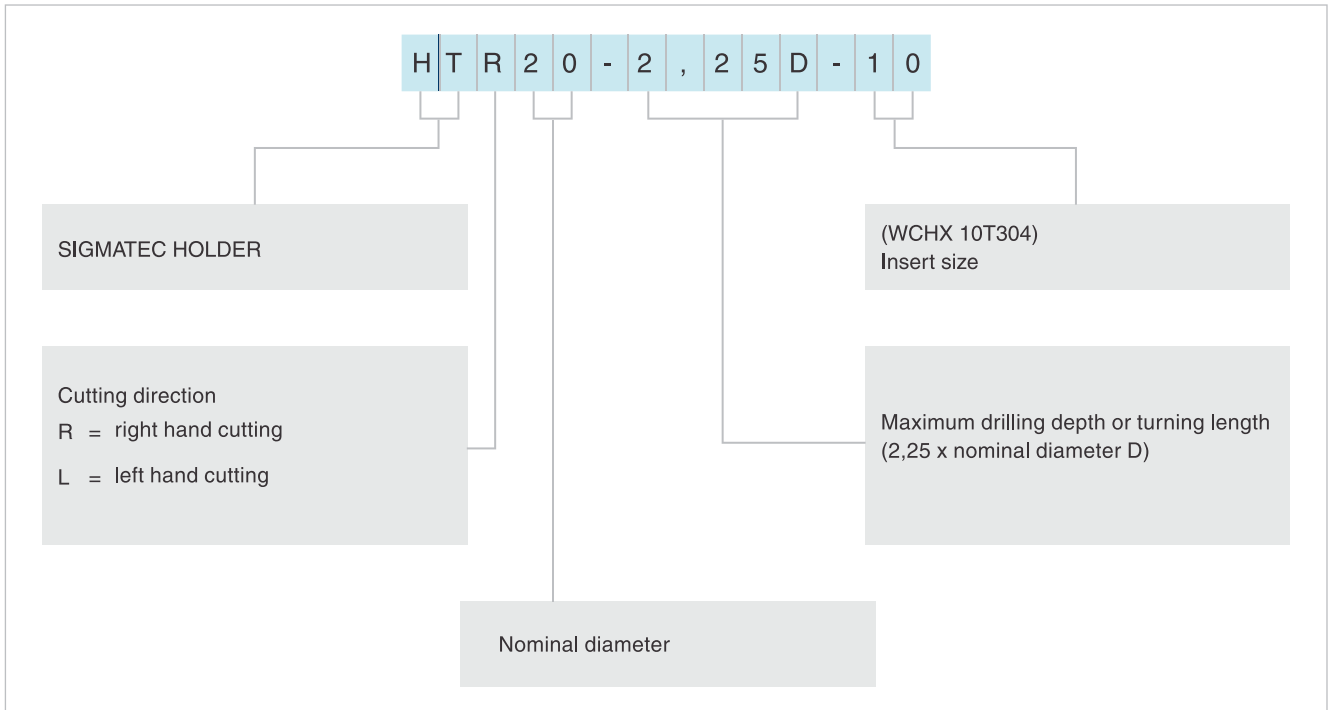
Tool 2,25D/1,50D	Thread nominal diameter	D	H13
HTR/L 08 -x,xxD- 04	M 4	8	0/+0,220
HTR/L 10 -x,xxD- 05	M 5	10	0/+0,220
HTR/L 11 -x,xxD- 06	M 6	11	0/+0,270
HTR/L 15 -x,xxD- 07	M 8	15	0/+0,270
HTR/L 18 -x,xxD- 09	M 10	18	0/+0,330
HTR/L 20 -x,xxD- 10	M 12	20	0/+0,330
HTR/L 26 -x,xxD- 13	M 16	26	0/+0,330

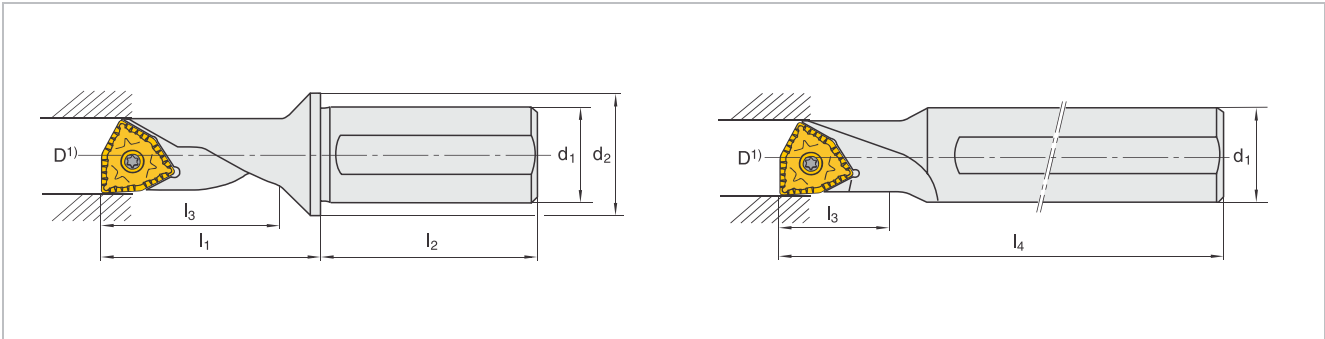
Large mounting diameter and location face

	SIGMATEC®		ISO-boring bar
	HTR20-2,25D	HTR20-1,50D	
D _{min}	20	20	21
d	25/32 ¹⁾	25	16
Shank			
Seating face	Yes	No	No

¹⁾ Diameter on the flange

SIGMATEC -benefits: More stability and less tendency to vibrate through larger locating diameters and the additional seating face for PT-2,25D





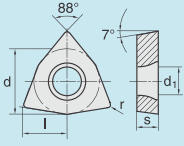
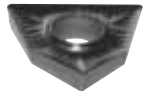


Ordering code	D ¹⁾	d ₁	d ₂	l ₁	l ₂	l ₃	l ₄	Indexable insert
HTR/L 08 - 2,25D-04	8	10	12	22,5	38	18,0	–	WCHX 04...
HTR/L 08 - 1,50D-04	8	12	–	–	–	12,0	80	
HTR/L 10 - 2,25D-05	10	12	16	28	42	22,5	–	WCHX 05...
HTR/L 10 - 1,50D-05	10	12	–	–	–	15,0	90	
HTR/L 11 - 2,25D-06	11	16	20	32	45	24,75	–	WCHX 06...
HTR/L 11 - 1,50D-06	11	16	–	–	–	16,5	100	
HTR/L 15 - 2,25D-07	15	20	25	43	50	33,75	–	WCHX 07...
HTR/L 15 - 1,50D-07	15	20	–	–	–	22,5	125	
HTR/L 18 - 2,25D-09	18	25	32	53	56	40,5	–	WCHX 09...
HTR/L 18 - 1,50D-09	18	25	–	–	–	27,0	135	
HTR/L 20 - 2,25D-10	20	25	32	56	56	45,0	–	WCHX 10...
HTR/L 20 - 1,50D-10	20	25	–	–	–	30,0	150	
HTR/L 26 - 2,25D-13	26	32	40	73	60	58,5	–	WCHX 13...
HTR/L 26 - 1,50D-13	26	32	–	–	–	39,0	180	

¹⁾ Diameter for plunge drilling according to DIN 74

On request we offer SIGMATEC tools with vibration damping Densimet (heavy duty metal).

Spare parts				
	Screw	Key	Torx	Torque [Ncm]
HTR/L 08	SC02-20033	K04-T0600	T06	62
HTR/L 10	SC13-25042	K04-T0800	T08	128
HTR/L 11	SC13-25050	K04-T0800	T08	128
HTR/L 15	SC13-30073	K04-T0800	T08	180
HTR/L 18	SC02-35082	K04-T1500	T15	345
HTR/L 20	SC06-50088	K04-T2000	T20	1020
HTR/L 26	SC02-60120	K04-T2500	T25	1750

Indexable inserts

	Ordering code	l	d	s	d1	r	Grade		
							SCP25T	SCM45T	SW610
WCHX...FN-SAL 	WCHX 040102FN-SAL	4,0	6,35	1,59	2,25	0,2			6409963
	WCHX 040104FN-SAL	4,0	6,35	1,59	2,25	0,4			6407959
	WCHX 05T102FN-SAL	5,0	7,93	1,98	2,80	0,2			6409964
	WCHX 05T104FN-SAL	5,0	7,93	1,98	2,80	0,4			6407962
	WCHX 060202FN-SAL	5,5	8,93	2,38	2,80	0,2			6409965
	WCHX 060204FN-SAL	5,5	8,93	2,38	2,80	0,4			6407965
	WCHX 070304FN-SAL	7,5	12,00	3,18	3,40	0,4			6409966
	WCHX 070308FN-SAL	7,5	12,00	3,18	3,40	0,8			6407968
	WCHX 090304FN-SAL	9,0	14,29	3,18	4,40	0,4			6409967
	WCHX 090308FN-SAL	9,0	14,29	3,18	4,40	0,8			6407971
	WCHX 10T304FN-SAL	10,0	15,87	3,97	5,90	0,4			6409968
	WCHX 10T308FN-SAL	10,0	15,87	3,97	5,90	0,8			6400540
	WCHX 130508FN-SAL	13,0	21,00	5,56	7,00	0,8			6407975
WCHX...EN-SFM 	WCHX 040102EN-SFM	4,0	6,35	1,59	2,25	0,2	5056049		
	WCHX 040104EN-SFM	4,0	6,35	1,59	2,25	0,4	5056050		
	WCHX 05T102EN-SFM	5,0	7,93	1,98	2,80	0,2	5056051		
	WCHX 05T104EN-SFM	5,0	7,93	1,98	2,80	0,4	5056052		
	WCHX 060202EN-SFM	5,5	8,37	2,38	2,80	0,2	5056053		
	WCHX 060204EN-SFM	5,5	8,37	2,38	2,80	0,4	5056054		
	WCHX 070304EN-SFM	7,5	12,00	3,18	3,40	0,4	5056055		
	WCHX 070308EN-SFM	7,5	12,00	3,18	3,40	0,8	5056056		
	WCHX 090304EN-SFM	9,0	14,29	3,18	4,40	0,4	5056057		
	WCHX 090308EN-SFM	9,0	14,29	3,18	4,40	0,8	5056058		
	WCHX 10T304EN-SFM	10,0	15,87	3,97	5,90	0,4	5056059		
	WCHX 10T308EN-SFM	10,0	15,87	3,97	5,90	0,8	5056060		
	WCHX 130508EN-SFM	13,0	21,00	5,56	7,00	0,8	5056061		
WCHX...EN-SFM 	WCHX 040102EN-SFM	4,0	6,35	1,59	2,25	0,2		5062986	
	WCHX 040104EN-SFM	4,0	6,35	1,59	2,25	0,4		5063176	
	WCHX 05T102EN-SFM	5,0	7,93	1,98	2,80	0,2		5063178	
	WCHX 05T104EN-SFM	5,0	7,93	1,98	2,80	0,4		5063180	
	WCHX 060202EN-SFM	5,5	8,37	2,38	2,80	0,2		5063184	
	WCHX 060204EN-SFM	5,5	8,37	2,38	2,80	0,4		5063186	
	WCHX 070304EN-SFM	7,5	12,00	3,18	3,40	0,4		5063315	
	WCHX 070308EN-SFM	7,5	12,00	3,18	3,40	0,8		5063316	
	WCHX 090304EN-SFM	9,0	14,29	3,18	4,40	0,4		5063317	
	WCHX 090308EN-SFM	9,0	14,29	3,18	4,40	0,8		5063318	
	WCHX 10T304EN-SFM	10,0	15,87	3,97	5,90	0,4		5063322	
	WCHX 10T308EN-SFM	10,0	15,87	3,97	5,90	0,8		5063321	
	WCHX 130508EN-SFM	13,0	21,00	5,56	7,00	0,8		5063319	

Order example :10 pieces WCHX 040102FN--SAL SW610

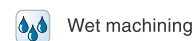
Grade	ISO	Application range	Material group						Application					
			P	M	K	N	S	H	T	M	D	S	G	P
		01 05 10 15 20 25 30 35 40 45 50	Steel	Stainless	Grey cast iron	(Al, etc.) Nonferrous metals	High tempera- ture materials	Hard materials	Turning	Milling	Drilling	Threading	Grooving	Parting
LCP25T	HC-P25		■						●		●			
	HC-M25			□					●		●			
LCM45T	HC-M40			■					●		●			
	HC-P40		■						●		●			
LW610	HW-K10					■			●		●			
Application peak		01 05 10 15 20 25 30 35 40 45 50	■ Main application □ Further applications						● Standard grade					
		Full range to ISO 513												

Material	Brinell hardness HB	Turning and drilling v_c (m/min)				
		SCP25T	SCM45T	SW610		
						
P Unalloyed steel ¹⁾	ca. 0,15 %C annealed	125	170 – 300	120 – 250		
	ca. 0,45 %C annealed	190	150 – 255	100 – 200		
	ca. 0,45 %C hardened and temp.	250	100 – 200	70 – 180		
	ca. 0,75 %C annealed	270	110 – 185	70 – 180		
	ca. 0,75 %C hardened and temp.	300	90 – 160	50 – 150		
	Low-alloy steel ¹⁾	annealed	180	120 – 240	80 – 200	
		hardened and temp.	275	100 – 210	70 – 180	
			300	100 – 185	100 – 185	
			350	90 – 145	70 – 150	
	High-alloy steel and high alloy tool steel ¹⁾	annealed	200	130 – 215	70 – 180	
		hardened and temp.	325	80 – 140	50 – 120	
	Stainless steel ¹⁾	ferritic/martensitic annealed	200	110 – 200	70 – 150	
martensitic hardened and temp.		240	100 – 160	70 – 120		
M Stainless steel ¹⁾	austenitic ²⁾ , quenched	180	90 – 160	50 – 150		
K Grey cast iron	perlitic/ferritic	180			150 – 250	
	perlitic (martensitic)	260			100 – 150	
	Nodular graphite cast iron	ferritic	160			130 – 80
		perlitic	250			100 – 150
	Malleable cast iron	ferritic	130			120 – 180
perlitic		230			100 – 160	
N Aluminium wrought alloys	unhardenable	60			400 – 2400	
	hardenable, hardened	100			160 – 1600	
	Aluminium cast alloys	ca. 12 % Si. unhardenable	75			320 – 1200
		ca. 12 % Si. hardenable, hardened	90			240 – 950
		> 12 % Si. unhardenable	130			160 – 800
	Copper and copper alloys (Bronze/Brass)	Free cutting alloys Pb > 1 %	110			200 – 520
		Brass, Red bronze	90			200 – 800
		Bronze, non leaded copper and electrolytic copper	100			120 – 320
	Nonmetallic materials	Duroplastics				
		Fibre reinforced plastics				
Hard rubber						
S Heat resistant alloys	Fe-based	annealed	200			
		hardened	280			
	Ni- or Co-based	annealed	250			
		hardened	350			
	Titanium alloys	cast	320			
		Pure titanium	400 ³⁾			
	Alpha- and Beta-alloys hardened	1050 ³⁾				

¹⁾ and cast steel

²⁾ and austenitic/ferritic

³⁾ R_m = Tensile strength in N/mm²

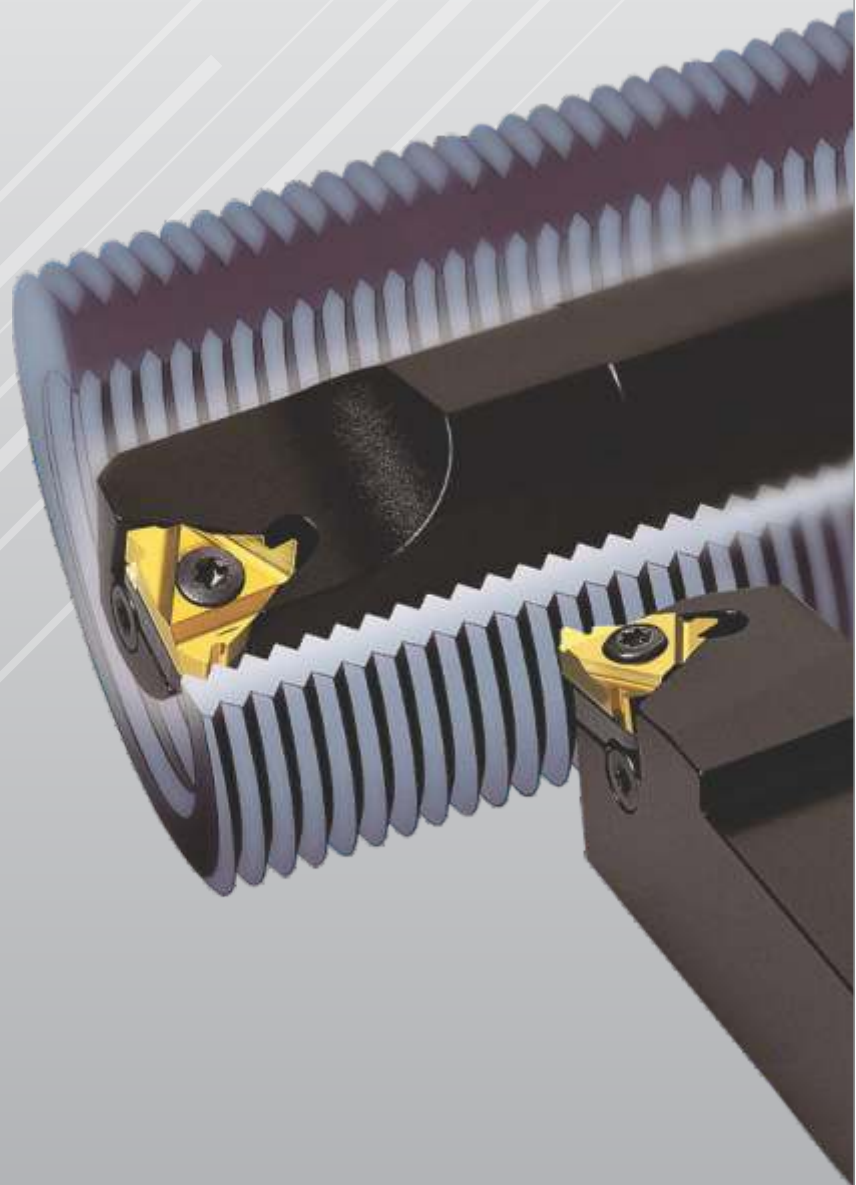


Wet machining

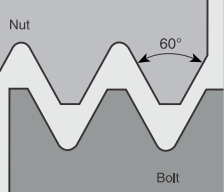


<p>Nut</p> 	<p>Tool: SIGMATEC PTL15-1,50D-07</p> <p>Insert/Grade: WCHX 070304EN-SFM/SCP25T</p> <p>Applications: Drilling Longitudinal turning</p> <p>Coolant: Emulsion</p> <p>Cutting data: v_c 150 m/min 180 m/min a_p 1 mm f 0,07 mm/U rev 0,2 mm/U rev</p> <p>Result: Reduction of machining time by 30 % Three tools replaced</p>
<p>Flange / Aluminium</p> 	<p>Tool: SIGMATEC HTR20-1,50D-10</p> <p>Insert/Grade: WCHX 10T308FN-SAL/SW610</p> <p>Applications: Face turning Drilling</p> <p>Coolant: wet</p> <p>Cutting data: v_c 300 m/min 300 m/min a_p 2 mm f 0,15 mm/U rev 0,30 mm/U rev</p> <p>Result: Reduction of machining time by 50 %</p>
<p>Bush</p> 	<p>Tool: SIGMATEC HTL20-1,50D-10</p> <p>Insert/Grade: WCHX 10T304EN-SFM/SCP25T</p> <p>Applications: Drilling Boring</p> <p>Coolant: Emulsion</p> <p>Cutting data: v_c 200 m/min 200 m/min a_p 1,5 mm f 0,03-0,05 mm/U rev 0,15 mm/U rev</p> <p>Result: Reduction of machining time by 25 %. One tool replaced. One tool place saved.</p>
<p>Forged piece</p> 	<p>Tool: SIGMATEC HTR20-1,50D-10</p> <p>Insert/Grade: WCHX 10T304EN-SFM/SCP25T</p> <p>Applications: Face turning, drilling Boring</p> <p>Cooling: Emulsion</p> <p>Cutting data: v_c 180 m/min 180 m/min a_p 1 mm 2 mm f 0,06 mm/U rev 0,15 mm/U rev</p> <p>Result: Reduction of machining time by 25 %. One drilling tool saved.</p>

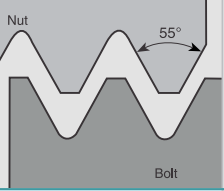


SIGMA TIZ

THREAD TURNING TOOL



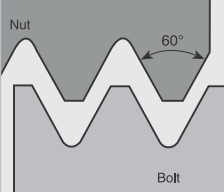


Indexable inserts - external threads

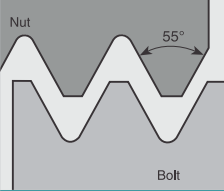


 Partial Profile 60°		Pitch		l	d	s	r	x	y	Grade			Anvil	Suitable tool holder	Page
		mm	tpi							SCP20T	SCM25T	SWN20T			
Right hand 	11ERA60	0,5-1,5	48-16	11	6,35	3,0	0,05	0,8	0,9	●	●	○	-	HNL...-11	89
	16ERA60	0,5-1,5	48-16	16	9,52	3,4	0,05	0,8	0,9	●	●	○	YE16	HAL...-16	89
	16ERAG60	0,5-3,0	48-8	16	9,52	3,4	0,06	1,2	1,7	●	●	○	YE16		
	16ERG60	1,75-3,0	14-8	16	9,52	3,4	0,25	1,2	1,7	●	●	○	YE16		
	22ERN60	3,5-5,0	7-5	22	12,70	4,6	0,51	1,7	2,5	●	●	○	YE22	HAL...-22	89
Left hand 	11ELA60	0,5-1,5	48-16	11	6,35	3,0	0,05	0,8	0,9	●	●	○	-	HNL...-11	89
	16ELA60	0,5-1,5	48-16	16	9,52	3,4	0,05	0,8	0,9	●	●	○	YI16	HAL...-16	89
	16ELAG60	0,5-3,0	48-8	16	9,52	3,4	0,06	1,2	1,7	●	●	○	YI16		
	16ELG60	1,75-3,0	14-8	16	9,52	3,4	0,25	1,2	1,7	●	●	○	YI16		
	22ELN60	3,5-5,0	7-5	22	12,70	4,6	0,51	1,7	2,5	●	●	○	YI22	HAL...-22	89

 Partial Profile 55°		Pitch		l	d	s	r	x	y	Grade			Anvil	Suitable tool holder	Page
		mm	tpi							SCP20T	SCM25T	SWN20T			
Right hand 	11ERA55	0,5-1,5	48-16	16	9,52	3,0	0,05	0,8	0,9	●	●	○	-	HNL...-11	89
	16ERA55	0,5-1,5	48-16	16	9,52	3,4	0,05	0,8	0,9	●	●	○	YE16	HAL...-16	89
	16ERG55	1,75-3,0	14-8	16	9,52	3,4	0,20	1,2	1,7	●	●	○	YE16		
	16ERAG55	0,5-3,0	48-8	16	9,52	3,4	0,07	1,2	1,7	●	●	○	YE16		
	22ERN55	3,5-5,0	7-5	22	12,70	4,6	0,43	1,7	2,5	●	●	○	YE22	HAL...-22	89
Left hand 	11ELA55	0,5-1,5	48-16	16	9,52	3,0	0,05	0,8	0,9	●	●	○	-	HNL...-11	89
	16ELA55	0,5-1,5	48-16	16	9,52	3,4	0,05	0,8	0,9	●	●	○	YI16	HAL...-16	89
	16ELG55	1,75-3,0	14-8	16	9,52	3,4	0,20	1,2	1,7	●	●	○	YI16		
	16ELAG55	0,5-3,0	48-8	16	9,52	3,4	0,07	1,2	1,7	●	●	○	YI16		
	22ELN55	3,5-5,0	7-5	22	12,70	4,6	0,43	1,7	2,5	●	●	○	YI22	HAL...-22	89

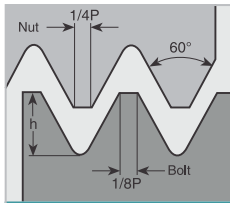
Order example: 10 pieces S11ERA60 SCP20T

Indexable inserts - internal threads

 Partial Profile 60°												Grade			Anvil	Suitable tool holder	Page
Ordering Code	Pitch		l	d	s	r	x	y	SCP20T	SCM25T	SWN20T						
	mm	tpi							●	●	○						
Right hand 	11IRA60	0,5-1,5	48-16	11	6,35	3,0	0,05	0,8	0,9	●	●	○	-	HNVR..-11	89		
	16IRA60	0,5-1,5	48-16	16	9,52	3,4	0,05	0,8	0,9	●	●	○	YI16	HAVR..-16	89		
	16IRG60	1,75-3,0	14-8	16	9,52	3,4	0,15	1,2	1,7	●	●	○	YI16	HNVR..-16	89		
	16IRAG60	0,5-3,0	48-8	16	9,52	3,4	0,05	1,2	1,7	●	●	○	YI16				
	22IRN60	3,5-5,0	7-5	22	12,70	4,6	0,28	1,7	2,5	●	●	○	YI22	HAVR..-22	89		
Left hand 	11ILA60	0,5-1,5	48-16	11	6,35	3,0	0,05	0,8	0,9	●	●	○	-	HNVR..-11	89		
	16ILA60	0,5-1,5	48-16	16	9,52	3,4	0,05	0,8	0,9	●	●	○	YE16	HAVR..-16	89		
	16ILG60	1,75-3,0	14-8	16	9,52	3,4	0,15	1,2	1,7	●	●	○	YE16	HNVR..-16	89		
	16ILAG60	0,5-3,0	48-8	16	9,52	3,4	0,05	1,2	1,7	●	●	○	YE16				
	22ILN60	3,5-5,0	7-5	22	12,70	4,6	0,28	1,7	2,5	●	●	○	YE22	HAVR..-22	89		

 Partial Profile 55°												Grade			Anvil	Suitable tool holder	Page
Ordering Code	Pitch		l	d	s	r	x	y	SCP20T	SCM25T	SWN20T						
	mm	tpi							●	●	○						
Right hand 	11IRA55	0,5-1,5	48-16	11	6,35	3,0	0,05	0,8	0,9	●	●	○	-	HNVR..-11	89		
	16IRA55	0,5-1,5	48-16	16	9,52	3,4	0,05	0,8	0,9	●	●	○	YI16	HAVR..-16	89		
	16IRG55	1,75-3,0	14-8	16	9,52	3,4	0,20	1,2	1,7	●	●	○	YI16	HNVR..-16	89		
	16IRAG55	0,5-3,0	48-8	16	9,52	3,4	0,07	1,2	1,7	●	●	○	YI16				
	22IRN55	3,5-5,0	7-5	22	12,70	4,6	0,43	1,7	2,5	●	●	○	YI22	HAVR..-22	89		
Left hand 	11ILA55	0,5-1,5	48-16	11	6,35	3,0	0,05	0,8	0,9	●	●	○	-	HNVR..-11	89		
	16ILA55	0,5-1,5	48-16	16	9,52	3,4	0,05	0,8	0,9	●	●	○	YE16	HAVR..-16	89		
	16ILG55	1,75-3,0	14-8	16	9,52	3,4	0,20	1,2	1,7	●	●	○	YE16	HNVR..-16	89		
	16ILAG55	0,5-3,0	48-8	16	9,52	3,4	0,07	1,2	1,7	●	●	○	YE16				
	22ILN55	3,5-5,0	7-5	22	12,70	4,6	0,43	1,7	2,5	●	●	○	YE22	HAVR..-22	89		

Order example: 10 pieces S11IRA60 SCP20T

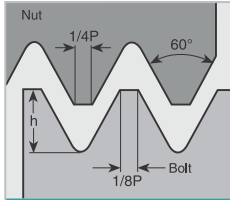


ISO-Metric Full Profile

	Ordering Code	Pitch		l	d	s	r	x	y	Grade			Anvil	Suitable tool holder	Page
		mm	tpi							SCP20T	SCM25T	SWN20T			
										●	●	○			
Right hand 	11ER0,35ISO	0,35	-	11	6,35	3,0	-	0,8	0,4	●	●	○		HNL...-11	89
	11ER0,4ISO	0,40	-	11	6,35	3,0	-	0,7	0,4	●	●	○			
	11ER0,45ISO	0,45	-	11	6,35	3,0	-	0,7	0,4	●	●	○			
	11ER0,5ISO	0,5	-	11	6,35	3,0	-	0,6	0,4	●	●	○			
	11ER0,6ISO	0,6	-	11	6,35	3,0	-	0,6	0,6	●	●	○			
	11ER0,7ISO	0,7	-	11	6,35	3,0	-	0,6	0,6	●	●	○			
	11ER0,75ISO	0,75	-	11	6,35	3,0	-	0,6	0,6	●	●	○			
	11ER0,8ISO	0,8	-	11	6,35	3,0	-	0,6	0,6	●	●	○			
	11ER1,0ISO	1,0	-	11	6,35	3,0	-	0,7	0,7	●	●	○			
	11ER1,25ISO	1,25	-	11	6,35	3,0	-	0,8	0,9	●	●	○			
	11ER1,5ISO	1,5	-	11	6,35	3,0	-	0,8	1,0	●	●	○			
	16ER0,5ISO	0,5	-	16	9,52	3,4	-	0,6	0,4	●	●	○	YE16	HAL...-16	89
	16ER0,75ISO	0,75	-	16	9,52	3,4	-	0,6	0,6	●	●	○	YE16		
	16ER1,0ISO	1,0	-	16	9,52	3,4	-	0,7	0,7	●	●	○	YE16		
	16ER1,25ISO	1,25	-	16	9,52	3,4	-	0,8	0,9	●	●	○	YE16		
	16ER1,5ISO	1,5	-	16	9,52	3,4	-	0,8	1,0	●	●	○	YE16		
	16ER1,75ISO	1,75	-	16	9,52	3,4	-	0,9	1,2	●	●	○	YE16		
	16ER2,0ISO	2,0	-	16	9,52	3,4	-	1,0	1,3	●	●	○	YE16		
	16ER2,5ISO	2,5	-	16	9,52	3,4	-	1,1	1,5	●	●	○	YE16		
	16ER3,0ISO	3,0	-	16	9,52	3,4	-	1,2	1,6	●	●	○	YE16		
	16ER3,5ISO	3,5	-	16	9,52	3,4	-	1,2	1,6	●	●	○	YE16		
	22ER3,5ISO	3,5	-	22	12,70	4,6	-	1,6	2,3	●	●	○	YE22	HAL...-22	89
	22ER4,0ISO	4,0	-	22	12,70	4,6	-	1,6	2,3	●	●	○	YE22		
	22ER4,5ISO	4,5	-	22	12,70	4,6	-	1,7	2,4	●	●	○	YE22		
	22ER5,0ISO	5,0	-	22	12,70	4,6	-	1,7	2,5	●	●	○	YE22		
	27ER6,0ISO	6,0	-	27	15,88	6,2	-	1,8	2,5	●	●	○	YE27	HAL...-27	89
	Left hand 	11EL0,35ISO	0,35	-	11	6,35	3,0	-	0,8	0,4	●	●	○		HNL...-11
11EL0,45ISO		0,45	-	11	6,35	3,0	-	0,7	0,4	●	●	○			
11EL0,5ISO		0,5	-	11	6,35	3,0	-	0,6	0,4	●	●	○			
11EL0,7ISO		0,7	-	11	6,35	3,0	-	0,6	0,6	●	●	○			
11EL0,75ISO		0,75	-	11	6,35	3,0	-	0,6	0,6	●	●	○			
11EL0,8ISO		0,8	-	11	6,35	3,0	-	0,6	0,6	●	●	○			
11EL1,0ISO		1,0	-	11	6,35	3,0	-	0,7	0,7	●	●	○			
11EL1,25ISO		1,25	-	11	6,35	3,0	-	0,8	0,9	●	●	○			
11EL1,5ISO		1,5	-	11	6,35	3,0	-	0,8	1,0	●	●	○			
16EL0,5ISO		0,5	-	16	9,52	3,4	-	0,6	0,4	●	●	○	YI16	HAL...-16	
16EL0,75ISO		0,75	-	16	9,52	3,4	-	0,6	0,6	●	●	○	YI16		
16EL1,0ISO		1,0	-	16	9,52	3,4	-	0,7	0,7	●	●	○	YI16		
16EL1,25ISO		1,25	-	16	9,52	3,4	-	0,8	0,9	●	●	○	YI16		
16EL1,5ISO		1,5	-	16	9,52	3,4	-	0,8	1,0	●	●	○	YI16		
16EL1,75ISO		1,75	-	16	9,52	3,4	-	0,9	1,2	●	●	○	YI16		
16EL2,0ISO		2,0	-	16	9,52	3,4	-	1,0	1,3	●	●	○	YI16		
16EL2,5ISO		2,5	-	16	9,52	3,4	-	1,1	1,5	●	●	○	YI16		
16EL3,0ISO		3,0	-	16	9,52	3,4	-	1,2	1,6	●	●	○	YI16		
22EL3,5ISO		3,5	-	22	12,70	4,6	-	1,6	2,3	●	●	○	YI22		HAL...-22
22EL4,0ISO		4,0	-	22	12,70	4,6	-	1,6	2,3	●	●	○	YI22		
22EL4,5ISO		4,5	-	22	12,70	4,6	-	1,7	2,4	●	●	○	YI22		
22EL5,0ISO		5,0	-	22	12,70	4,6	-	1,7	2,5	●	●	○	YI22		
27EL6,0ISO		6,0	-	27	15,88	6,2	-	1,7	2,5	●	●	○	YI27	HAL...-27	89

Order example: 10 pieces 11ER0,35ISO SCP20T

Indexable inserts - internal threads



ISO-Metric Full Profile

		Pitch		l	d	s	r	x	y	Grade			Anvil	Suitable tool holder	Page		
		mm	tpi							SCP20T	SCM25T	SWN20T					
Right hand 	11IR0,35ISO	0,35	-	11	6,35	3,0	-	0,8	0,3	●	●	○	-	HNVR..-11	89		
	11IR0,45ISO	0,45	-	11	6,35	3,0	-	0,8	0,4	●	●	○					
	11IR0,6ISO	0,6	-	11	6,35	3,0	-	0,6	0,6	●	●	○					
	S11IR0,7ISO	0,7	-	11	6,35	3,0	-	0,6	0,6	●	●	○					
	11IR0,75ISO	0,75	-	11	6,35	3,0	-	0,6	0,6	●	●	○					
	11IR0,8ISO	0,8	-	11	6,35	3,0	-	0,6	0,6	●	●	○					
	11IR1,0ISO	1,0	-	11	6,35	3,0	-	0,6	0,7	●	●	○	-				
	11IR1,25ISO	1,25	-	11	6,35	3,0	-	0,8	0,9	●	●	○					
	11IR1,5ISO	1,5	-	11	6,35	3,0	-	0,8	1,0	●	●	○	-				
	16IR1,0ISO	1,0	-	16	9,52	3,4	-	0,6	0,7	●	●	○	YI16			HAVR..-16	89
	16IR1,25ISO	1,25	-	16	9,52	3,4	-	0,8	0,9	●	●	○	YI16			HNVR..-16	89
	16IR1,50ISO	1,50	-	16	9,52	3,4	-	0,8	1,0	●	●	○	YI16				
	16IR1,75ISO	1,75	-	16	9,52	3,4	-	0,9	1,2	●	●	○	YI16				
	16IR2,0ISO	2,0	-	16	9,52	3,4	-	1,0	1,3	●	●	○	YI16				
	16IR2,5ISO	2,5	-	16	9,52	3,4	-	1,1	1,5	●	●	○	YI16				
	16IR3,0ISO	3,0	-	16	9,52	3,4	-	1,1	1,5	●	●	○	YI16				
	16IR3,5ISO	3,5	-	16	9,52	3,4	-	1,2	1,5	●	●	○	YI16				
	22IR3,5ISO	3,5	-	22	12,70	4,6	-	1,6	2,3	●	●	○	YI22			HAVR..-22	89
	22IR4,0ISO	4,0	-	22	12,70	4,6	-	1,6	2,3	●	●	○	YI22			HNVR..-22	89
	22IR4,5ISO	4,5	-	22	12,70	4,6	-	1,6	2,4	●	●	○	YI22				
22IR5,0ISO	5,0	-	27	12,70	4,6	-	1,6	2,3	●	●	○	YI22					
27IR6,0ISO	6,0	-	27	15,88	6,2	-	1,8	2,5	●	●	○	YI27	HAVR..-27	89			
													HNVR..-27	89			
Left hand 	11IL0,35ISO	0,35	-	11	6,35	3,0	-	0,8	0,3	●	●	○	-	HNVR..-11	89		
	11IL0,7ISO	0,7	-	11	6,35	3,0	-	0,6	0,6	●	●	○					
	11IL0,8ISO	0,8	-	11	6,35	3,0	-	0,6	0,6	●	●	○					
	11IL1,0ISO	1,0	-	11	6,35	3,0	-	0,6	0,7	●	●	○	-				
	16IL1,0ISO	1,0	-	16	9,52	3,4	-	0,6	0,7	●	●	○	YE16			HAVR..-16	89
	16IL1,25ISO	1,25	-	16	9,52	3,4	-	0,8	0,9	●	●	○	YE16			HNVR..-16	89
	16IL1,50ISO	1,50	-	16	9,52	3,4	-	0,8	1,0	●	●	○	YE16				
	16IL1,75ISO	1,75	-	16	9,52	3,4	-	0,9	1,2	●	●	○	YE16				
	16IL2,0ISO	2,0	-	16	9,52	3,4	-	1,0	0,6	●	●	○	YE16				
	16IL0,8ISO	0,8	-	16	9,52	3,4	-	0,6	1,3	●	●	○	YE16				
	16IL2,5ISO	2,5	-	16	9,52	3,4	-	1,1	1,5	●	●	○	YE16				
	16IL3,0ISO	3,0	-	16	9,52	3,4	-	1,2	1,5	●	●	○	YE16				
	16IL3,5ISO	3,5	-	16	9,52	3,4	-	1,1	1,5	●	●	○	YE16				
	22IL3,5ISO	3,5	-	22	12,70	4,6	-	1,6	2,3	●	●	○	YE22			HAVR..-22	89
	22IL4,0ISO	4,0	-	22	12,70	4,6	-	1,6	2,3	●	●	○	YE22			HNVR..-22	89
	22IL4,5ISO	4,5	-	22	12,70	4,6	-	1,6	2,4	●	●	○	YE22				
	22IL5,0ISO	5,0	-	22	12,70	4,6	-	1,6	2,3	●	●	○	YE22				
	27IL6,0ISO	6,0	-	27	15,88	6,2	-	1,8	2,5	●	●	○	YE27			HAVR..-27	89
																HNVR..-27	89

Order example: 10 pieces 11IR0,35ISO SCP20T

Indexable inserts - external threads

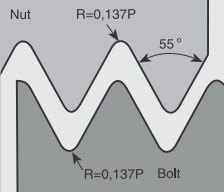

		BSP Full Profile													Anvil	Suitable tool holder	Page
		Pitch		l	d	s	r	x	y	Grade							
Right hand	Ordering Code	mm	tpi													SCP20T	SCM25T
		11ER28W	-	28	11	6,35	3,0	-	0,6	0,7	●	●	○		HNL...-11	89	
11ER19W		-	19	11	6,35	3,0	-	0,8	1,0	●	●	○					
11ER14W		-	14	11	6,35	3,0	-	1,0	1,2	●	●	○					
16ER28W		-	28	16	9,52	3,4	-	0,6	0,7	●	●	○	YE16	HAL...-16	89		
16ER19W		-	19	16	9,52	3,4	-	0,8	1,0	●	●	○	YE16				
16ER14W		-	14	16	9,52	3,4	-	1,0	1,2	●	●	○	YE16				
16ER11W		-	11	16	9,52	3,4	-	1,1	1,5	●	●	○	YE16				

Indexable inserts - internal threads

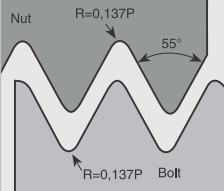

		BSP Full Profile													Anvil	Suitable tool holder	Page
		Pitch		l	d	s	r	x	y	Grade							
Right hand	Ordering Code	mm	tpi													SCP20T	SCM25T
		11IR28W	-	28	11	6,35	3,0	-	0,6	0,7	●	●	○	-	HNVR...-11	89	
11IR19W		-	19	11	6,35	3,0	-	0,8	1,0	●	●	○	-				
11IR14W		-	14	11	6,35	3,0	-	0,9	1,1	●	●	○	-				
16IR28W		-	28	16	9,52	3,4	-	0,6	0,7	●	●	○	YI16	HAVR...-16	89		
16IR19W		-	19	16	9,52	3,4	-	0,8	1,0	●	●	○	YI16				
16IR14W		-	14	16	9,52	3,4	-	1,0	1,2	●	●	○	YI16	HNVR...-16	89		
16IR11W		-	11	16	9,52	3,4	-	1,1	1,5	●	●	○	YI16				

Order example: 10 pieces 11ER28W SCP20T


Indexable inserts - external threads

		BSP Full Profile													
		Pitch		l	d	s	r	x	y	Grade			Anvil	Suitable tool holder	Page
Ordering Code	mm	tpi	SCP20T							SCM25T	SWN20T				
Left hand 	16EL28W	-	28	16	9,52	3,4	-	0,6	0,7	o	o	o	YI16	HAL...-16	89
	16EL19W	-	19	16	9,52	3,4	-	0,8	1,0	o	o	o	YI16		
	16EL14W	-	14	16	9,52	3,4	-	1,0	1,2	o	o	o	YI16		
	16EL11W	-	11	16	9,52	3,4	-	1,1	1,5	o	o	o	YI16		

Indexable inserts - internal threads

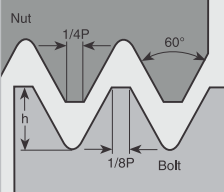
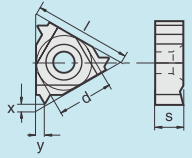

		BSP Full Profile													
		Pitch		l	d	s	r	x	y	Grade			Anvil	Suitable tool holder	Page
Ordering Code	mm	tpi	SCP20T							SCM25T	SWN20T				
Left hand 	11IL19W	-	19	11	6,35	3,0	-	0,8	1,0	o	o	o	-	HNVR...-11	89
	11IL14W	-	14	11	6,35	3,0	-	0,9	1,1	o	o	o	-		
	16IL28W	-	28	16	9,52	3,4	-	0,6	0,7	o	o	o	YE16	HAVR...-16	89
	16IL19W	-	19	16	9,52	3,4	-	0,8	1,0	o	o	o	YE16	HNVR...-16	89
	16IL14W	-	14	16	9,52	3,4	-	1,0	1,2	o	o	o	YE16		
	16IL11W	-	11	16	9,52	3,4	-	1,1	1,5	o	o	o	YE16		

Order example: 10 pieces 16EL28W SCP20T

	American UN Full Profile														Anvil	Suitable tool holder	Page
	Ordering Code	Pitch		l	d	s	r	x	y	Grade							
		mm	tpi							SCP20T	SCM25T	SWN20T					
Right hand 	16ER72UN	-	72	16	9,52	3,4	-	0,8	0,4	o	o	o	YE16	HAL..-16	89		
	16ER64UN	-	64	16	9,52	3,4	-	0,8	0,4	o	o	o	YE16				
	16ER56UN	-	56	16	9,52	3,4	-	0,7	0,4	o	o	o	YE16				
	16ER48UN	-	48	16	9,52	3,4	-	0,6	0,6	o	o	o	YE16				
	16ER44UN	-	44	16	9,52	3,4	-	0,6	0,6	o	o	o	YE16				
	16ER40UN	-	40	16	9,52	3,4	-	0,6	0,6	o	o	o	YE16				
	16ER36UN	-	36	16	9,52	3,4	-	0,6	0,6	o	o	o	YE16				
	16ER32UN	-	32	16	9,52	3,4	-	0,6	0,6	o	o	o	YE16				
	16ER28UN	-	28	16	9,52	3,4	-	0,6	0,7	o	o	o	YE16				
	16ER27UN	-	27	16	9,52	3,4	-	0,7	0,8	o	o	o	YE16				
	16ER24UN	-	24	16	9,52	3,4	-	0,7	0,8	o	o	o	YE16				
	16ER20UN	-	20	16	9,52	3,4	-	0,8	0,9	o	o	o	YE16				
	16ER18UN	-	18	16	9,52	3,4	-	0,8	1	o	o	o	YE16				
	16ER16UN	-	16	16	9,52	3,4	-	0,9	1,1	o	o	o	YE16				
	16ER14UN	-	14	16	9,52	3,4	-	1	1,2	o	o	o	YE16				
	16ER13UN	-	13	16	9,52	3,4	-	1	1,3	o	o	o	YE16				
	16ER12UN	-	12	16	9,52	3,4	-	1,1	1,4	o	o	o	YE16				
	16ER11UN	-	11	16	9,52	3,4	-	1,1	1,5	o	o	o	YE16				
	16ER10UN	-	10	16	9,52	3,4	-	1,1	1,5	o	o	o	YE16				
	16ER9UN	-	9	16	9,52	3,4	-	1,2	1,7	o	o	o	YE16				
	16ER8UN	-	8	16	9,52	3,4	-	1,2	1,6	o	o	o	YE16				
	22ER7UN	-	7	22	12,70	4,6	-	1,6	2,3	o	o	o	YE22	HAL..-22	89		
	22ER6UN	-	6	22	12,70	4,6	-	1,6	2,3	o	o	o	YE22				
	22ER5UN	-	5	22	12,70	4,6	-	1,7	2,5	o	o	o	YE22				

Order example: 10 piece 16ER72UN SCP20T

Indexable inserts - internal threads

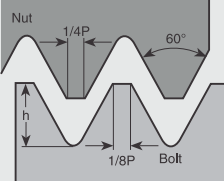
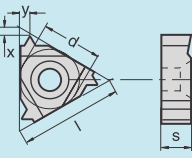

		American UN Full Profile													Anvil	Suitable tool holder	Page
		Pitch		l	d	s	r	x	y	Grade							
	Ordering Code	mm	tpi										SCP20T	SCM25T	SWN20T		
	Right hand 	11IR72UN	-	72	11	6,35	3,0	-	0,8	0,3			o	-	HNVR..-11	89	
11IR64UN		-	64	11	6,35	3,0	-	0,8	0,4	o		o	-				
11IR56UN		-	56	11	6,35	3,0	-	0,7	0,4	o		o	-				
11IR48UN		-	48	11	6,35	3,0	-	0,6	0,6	o		o	-				
11IR40UN		-	40	11	6,35	3,0	-	0,6	0,6	o		o	-				
11IR36UN		-	36	11	6,35	3,0	-	0,6	0,6	o		o	-				
11IR32UN		-	32	11	6,35	3,0	-	0,6	0,6	o	o	o	-				
11IR28UN		-	28	11	6,35	3,0	-	0,6	0,7	o	o	o	-				
11IR27UN		-	27	11	6,35	3,0	-	0,7	0,8	o		o	-				
11IR24UN		-	24	11	6,35	3,0	-	0,7	0,8	o	o	o	-				
11IR20UN		-	20	11	6,35	3,0	-	0,8	0,9	o	o	o	-				
11IR18UN		-	18	11	6,35	3,0	-	0,8	1,0	o	o	o	-				
11IR16UN		-	16	11	6,35	3,0	-	0,9	1,1	o	o	o	-				
11IR14UN		-	14	11	6,35	3,0	-	0,9	1,1	o	o	o	-				
16IR56UN		-	56	16	9,52	3,4	-	0,7	0,4			o	YI16	HAVR..-16	89		
16IR48UN		-	48	16	9,52	3,4	-	0,6	0,6	o	o	o	YI16			HNVR..-16	
16IR44UN		-	44	16	9,52	3,4	-	0,6	0,6	o	o	o	YI16				
16IR40UN		-	40	16	9,52	3,4	-	0,6	0,6	o	o	o	YI16				
16IR36UN		-	36	16	9,52	3,4	-	0,6	0,6	o	o	o	YI16				
16IR32UN		-	32	16	9,52	3,4	-	0,6	0,6	o	o	o	YI16				
16IR28UN		-	28	16	9,52	3,4	-	0,6	0,7	o	o	o	YI16				
16IR27UN		-	27	16	9,52	3,4	-	0,7	0,8	o	o	o	YI16				
16IR24UN		-	24	16	9,52	3,4	-	0,7	0,8	o	o	o	YI16				
16IR20UN		-	20	16	9,52	3,4	-	0,8	0,9	o	o	o	YI16				
16IR18UN		-	18	16	9,52	3,4	-	0,8	1,0	o	o	o	YI16				
16IR16UN		-	16	16	9,52	3,4	-	0,9	1,1	o	o	o	YI16				
16IR14UN		-	14	16	9,52	3,4	-	0,9	1,2	o	o	o	YI16				
16IR13UN		-	13	16	9,52	3,4	-	1,0	1,3	o	o	o	YI16				
16IR12UN		-	12	16	9,52	3,4	-	1,1	1,4	o	o	o	YI16				
16IR11,5UN		-	11,5	16	9,52	3,4	-	1,1	1,5	o	o	o	YI16				
16IR11UN		-	11	16	9,52	3,4	-	1,1	1,5	o	o	o	YI16				
16IR10UN		-	10	16	9,52	3,4	-	1,1	1,5	o	o	o	YI16				
16IR9UN		-	9	16	9,52	3,4	-	1,2	1,7	o	o	o	YI16				
16IR8UN	-	8	16	9,52	3,4	-	1,1	1,5	o	o	o	YI16					
22IR7UN	-	7	22	12,70	4,6	-	1,6	2,3	o	o	o	YI22	HAVR..-22	89			
22IR6UN	-	6	22	12,70	4,6	-	1,6	2,3	o	o	o	YI22			HNVR..-22		
22IR5UN	-	5	22	12,70	4,6	-	1,6	2,3	o	o	o	YI22					

Order example: 10 pieces 11IR72UN SCP20T

		American UN Full Profile										Grade			Anvil	Suitable tool holder	Page	
		Pitch		l	d	s	r	x	y	SCP20T	SCM25T	SWN20T						
	Ordering Code	mm	tpi															
	Left hand 	16EL56UN	-	56	16	9,52	3,4	-	0,7	0,4			o	YI16	HAL...-16	89		
16EL48UN		-	48	16	9,52	3,4	-	0,6	0,6	o	o	o	YI16					
16EL44UN		-	44	16	9,52	3,4	-	0,6	0,6	o	o	o	YI16					
16EL40UN		-	40	16	9,52	3,4	-	0,6	0,6	o	o	o	YI16					
16EL36UN		-	36	16	9,52	3,4	-	0,6	0,6	o	o	o	YI16					
16EL32UN		-	32	16	9,52	3,4	-	0,6	0,6	o	o	o	YI16					
16EL28UN		-	28	16	9,52	3,4	-	0,6	0,7	o	o	o	YI16					
16EL27UN		-	27	16	9,52	3,4	-	0,7	0,8	o	o	o	YI16					
16EL24UN		-	24	16	9,52	3,4	-	0,7	0,8	o	o	o	YI16					
16EL20UN		-	20	16	9,52	3,4	-	0,8	0,9	o	o	o	YI16					
16EL18UN		-	18	16	9,52	3,4	-	0,8	1,0	o	o	o	YI16					
16EL16UN		-	16	16	9,52	3,4	-	0,9	1,1	o	o	o	YI16					
16EL14UN		-	14	16	9,52	3,4	-	1,0	1,2	o	o	o	YI16					
16EL13UN		-	13	16	9,52	3,4	-	1,0	1,3	o	o	o	YI16					
16EL12UN		-	12	16	9,52	3,4	-	1,1	1,4	o	o	o	YI16					
16EL11UN		-	11	16	9,52	3,4	-	1,1	1,5	o	o	o	YI16					
16EL10UN		-	10	16	9,52	3,4	-	1,1	1,5	o	o	o	YI16					
16EL9UN		-	9	16	9,52	3,4	-	1,2	1,7	o	o	o	YI16					
16EL8UN		-	8	16	9,52	3,4	-	1,2	1,6	o	o	o	YI16					
22EL7UN		-	7	22	12,70	4,6	-	1,6	2,3	o	o	o	YI22	HAL...-22			89	
22EL6UN		-	6	22	12,70	4,6	-	1,6	2,3	o	o	o	YI22					
22EL5UN		-	5	22	12,70	4,6	-	1,7	2,5	o	o	o	YI22					

Order example: 10 pieces 16EL56UN SWN20T

Indexable inserts - internal threads

		American UN Full Profile										Grade			Anvil	Suitable tool holder	Page
		Pitch		l	d	s	r	x	y	SCP20T	SCM25T	SWN20T					
	Ordering Code	mm	tpi														
	Left hand 	11IL32UN	-	32	11	6,35	3,0	-	0,6	0,6	o	o	o	-	HNVR..-11	89	
11IL28UN		-	28	11	6,35	3,0	-	0,6	0,7	o	o	o	-				
11IL24UN		-	24	11	6,35	3,0	-	0,7	0,8	o	o	o	-				
11IL20UN		-	20	11	6,35	3,0	-	0,8	0,9	o	o	o	-				
11IL18UN		-	18	11	6,35	3,0	-	0,8	1,0	o	o	o	-				
11IL16UN		-	16	11	6,35	3,0	-	0,9	1,1	o	o	o	-				
11IL14UN		-	14	11	6,35	3,0	-	0,9	1,1	o	o	o	-				
16IL48UN		-	48	16	9,52	3,4	-	0,6	0,6	o	o	o	YE16	HAVR..-16			89
16IL44UN		-	44	16	9,52	3,4	-	0,6	0,6	o	o	o	YE16	HNVR..-16			
16IL40UN		-	40	16	9,52	3,4	-	0,6	0,6	o	o	o	YE16				
16IL36UN		-	36	16	9,52	3,4	-	0,6	0,6	o	o	o	YE16				
16IL32UN		-	32	16	9,52	3,4	-	0,6	0,6	o	o	o	YE16				
16IL28UN		-	28	16	9,52	3,4	-	0,6	0,7	o	o	o	YE16				
16IL27UN		-	27	16	9,52	3,4	-	0,7	0,8	o	o	o	YE16				
16IL24UN		-	24	16	9,52	3,4	-	0,7	0,8	o	o	o	YE16				
16IL20UN		-	20	16	9,52	3,4	-	0,8	0,9	o	o	o	YE16				
16IL18UN		-	18	16	9,52	3,4	-	0,8	1,0	o	o	o	YE16				
16IL16UN		-	16	16	9,52	3,4	-	0,9	1,1	o	o	o	YE16				
16IL14UN		-	14	16	9,52	3,4	-	0,9	1,2	o	o	o	YE16				
16IL13UN		-	13	16	9,52	3,4	-	1,0	1,3	o	o	o	YE16				
16IL12UN		-	12	16	9,52	3,4	-	1,1	1,4	o	o	o	YE16				
16IL11UN		-	11	16	9,52	3,4	-	1,1	1,5	o	o	o	YE16				
16IL10UN		-	10	16	9,52	3,4	-	1,1	1,5	o	o	o	YE16				
16IL9UN		-	9	16	9,52	3,4	-	1,2	1,7	o	o	o	YE16				
16IL8UN		-	8	16	9,52	3,4	-	1,1	1,5	o	o	o	YE16				
22IL7UN		-	7	22	12,70	4,6	-	1,6	2,3	o	o	o	YE22	HAVR..-22	89		
22IL6UN		-	6	22	12,70	4,6	-	1,6	2,3	o	o	o	YE22	HNVR..-22			
22IL5UN		-	5	22	12,70	4,6	-	1,6	2,3	o	o	o	YE22				

Order example: 10 pieces 11IL32UN SCP20T

Indexable inserts - external threads



		Pitch									Grade			Anvil	Suitable tool holder	Page
		mm	tpi	l	d	s	r	x	y	SCP20T	SCM25T	SWN20T				
Right hand 	Ordering Code															
	16ER28BSPT	-	28	16	9,52	3,4	-	0,6	0,6	o	o	o	YE16	HAL..-1	89	
	16ER19BSPT	-	19	16	9,52	3,4	-	0,8	0,9	o	o	o	YE16		89	
	16ER14BSPT	-	14	16	9,52	3,4	-	1,0	1,2	o	o	o	YE16			
	16ER11BSPT	-	11	16	9,52	3,4	-	1,1	1,5	o	o	o	YE16			
Left hand 	Ordering Code															
	16EL14BSPT	-	14	16	9,52	3,4	-	1,0	1,2	o			YI16	HAL..-1	89	
	16EL11BSPT	-	11	16	9,52	3,4	-	1,1	1,5	o			YI16			



Indexable inserts - internal threads

		Pitch									Grade			Anvil	Suitable tool holder	Page
		mm	tpi	l	d	s	r	x	y	SCP20T	SCM25T	SWN20T				
Right hand 	Ordering Code															
	11IR19BSPT	-	19	11	6,35	3,0	-	0,8	0,9	o	o	o	-	H NVR..-11	89	
	11IR14BSPT	-	14	11	6,35	3,0	-	0,9	1,0	o	o	o	-			
	16IR28BSPT	-	28	16	9,52	3,4	-	0,6	0,6	o			YI16	HAVR..-16	89	
	16IR19BSPT	-	19	16	9,52	3,4	-	0,8	0,9	o			YI16	HNVR..-16	89	
	16IR14BSPT	-	14	16	9,52	3,4	-	1,0	1,2	o	o	o	YI16			
	16IR11BSPT	-	11	16	9,52	3,4	-	1,1	1,5	o	o	o	YI16			
Left hand 	Ordering Code															
	11IL14BSPT	-	14	11	6,35	3,0	-	0,9	1,0		o		-	HNVR..-11	89	
	16IL14BSPT	-	19	16	9,52	3,4	-	0,8	0,9	o			YE16	HAVR..-16	89	
	16IL11BSPT	-	28	16	9,52	3,4	-	0,6	0,6	o			YE16	HNVR..-16	89	

Order example: 10 pieces 16ER28BSPT SCP20T

Indexable inserts - external threads

		NPT - Full Profile											Grade	Anvil	Suitable tool holder	Page
		Pitch		l	d	s	r	x	y	SCP20T	SCM25T	SWN20T				
Ordering Code		mm	tpi													
 Right hand	16ER27NPT	-	27	16	9,52	3,4	-	0,7	0,8	○	○	○	YE16	HAL...-16	89	
	16ER18NPT	-	18	16	9,52	3,4	-	0,8	1,0	○	○	○	YE16			
	16ER14NPT	-	14	16	9,52	3,4	-	0,9	1,2	○	○	○	YE16			
	16ER11,5NPT	-	11,5	16	9,52	3,4	-	1,1	1,5	○	○	○	YE16			
	16ER8NPT	-	8	16	9,52	3,4	-	1,3	1,8	○	○	○	YE16			
 Left hand	16EL27NPT	-	27	16	9,52	3,4	-	0,7	0,8	○	○	○	YI16	HAL...-16	89	
	16EL18NPT	-	18	16	9,52	3,4	-	0,8	1,0	○	○	○	YI16			
	16EL14NPT	-	14	16	9,52	3,4	-	0,9	1,2	○	○	○	YI16			
	16EL11,5NPT	-	11,5	16	9,52	3,4	-	1,1	1,5	○	○	○	YI16			
	16EL8NPT	-	8	16	9,52	3,4	-	1,3	1,8	○	○	○	YI16			

		NPTF - Full Profile											Grade	Anvil	Suitable tool holder	Page
		Pitch		l	d	s	r	x	y	SCP20T	SCM25T	SWN20T				
Ordering Code		mm	tpi													
 Right hand	16ER27NPTF	-	8	16	9,52	3,4	-	1,3	1,8	○	○	○	YE16	HAL...-16	89	
	16ER18NPTF	-	11,5	16	9,52	3,4	-	1,1	1,5	○	○	○	YE16			
	16ER14NPTF	-	14	16	9,52	3,4	-	0,9	1,2	○	○	○	YE16			
	16ER11,5NPTF	-	18	16	9,52	3,4	-	0,8	1,0	○	○	○	YE16			
	16ER8NPTF	-	27	16	9,52	3,4	-	0,7	0,8	○	○	○	YE16			
 Left hand	16EL18NPTF	-	11,5	16	9,52	3,4	-	1,1	1,5	○	○	○	YI16	HAL...-16	89	

Order example: 10 pieces 16ER27NPT SCP20T

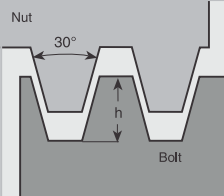
Indexable inserts - internal threads

		NPT - Full Profile										Grade			Anvil	Suitable tool holder	Page
		Pitch		l	d	s	r	x	y	SCP20T	SCM25T	SWN20T					
	Ordering Code	mm	tpi														
	Right hand 	11IR27NPT	-	14	11	6,35	3,0	-	0,8	1,0	o	o	o	-	HNVR..-11	89	
11IR18NPT		-	18	11	6,35	3,0	-	0,8	1,0	o	o	o	-				
11IR14NPT		-	27	11	6,35	3,0	-	0,7	0,8	o	o	o	-	HVR..-16	89		
16IR27NPT		-	8	16	9,52	3,4	-	1,3	1,8	o	o	o	YI16				
16IR18NPT		-	11,5	16	9,52	3,4	-	1,1	1,5	o	o	o	YI16				
16IR14NPT		-	14	16	9,52	3,4	-	0,9	1,2	o	o	o	YI16				
16IR11,5NPT		-	18	16	9,52	3,4	-	0,8	1,0	o	o	o	YI16				
16IR8NPT		-	27	16	9,52	3,4	-	0,7	0,8	o	o	o	YI16				
Left hand 	11IL27NPT	-	27	11	6,35	3,0	-	0,7	0,8	o	o	o	-	HNVR..-11	89		
	11IL18NPT	-	18	11	6,35	3,0	-	0,8	1,0	o	o	o	-	HNVR..-11	89		
	11IL14NPT	-	14	11	6,35	3,0	-	0,8	1,0	o	o	o	-				
	16IL14NPT	-	14	16	9,52	3,4	-	0,9	1,2	o	o	o	YE16	HVR..-16	89		
	16IL11,5NPT	-	11,5	16	9,52	3,4	-	1,1	1,5	o	o	o	YE16	HNVR..-16	89		
	16IL8NPT	-	8	16	9,52	3,4	-	1,3	1,8	o	o	o	YE16				

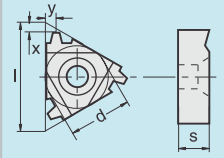
		NPTF - Full Profile										Grade			Anvil	Suitable tool holder	Page
		Pitch		l	d	s	r	x	y	SCP20T	SCM25T	SWN20T					
	Ordering Code	mm	tpi														
	Right hand 	11IR18NPTF	-	18	11	6,35	3,0	-	0,8	1,0	o	o	o	-	HNVR..-11	89	
11IR14NPTF		-	14	11	6,35	3,0	-	0,8	1,0	o	o	o	-	HVR..-16	89		
16IR18NPTF		-	27	16	9,52	3,4	-	0,7	0,8	o	o	o	YI16				
16IR14NPTF		-	18	16	9,52	3,4	-	0,8	1,0	o	o	o	YI16	HNVR..-16	89		
16IR11,5NPTF		-	14	16	9,52	3,4	-	0,9	1,2	o	o	o	YI16				
16IR8NPTF		-	11,5	16	9,52	3,4	-	1,1	1,5	o	o	o	YI16				



Order example: 10 pieces 11IR27NPT SCP20T

Indexable inserts - external threads

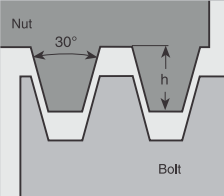


Trapezoidal DIN 103 - Full Profile

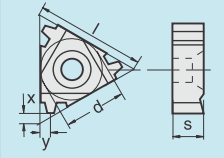




	Ordering Code	Pitch		l	d	s	r	x	y	Grade			Anvil	Suitable tool holder	Page
		mm	tpi							SCP20T	SCM25T	SWN20T			
Right hand 	11ER1,5TR	1,5	-	11	6,35	3,0	-	0,8	0,9	●	●	○		HNL..-11	89
	16ER1,5TR	1,5	-	16	9,52	3,4	-	1,0	1,1	●	●	○	YE16	HAL..-16	89
	16ER2,0TR	2,0	-	16	9,52	3,4	-	1,1	1,3	●	●	○	YE16		
	16ER3,0TR	3,0	-	16	9,52	3,4	-	1,3	1,5	●	●	○	YE16		
	22ER4,0TR	4,0	-	22	12,70	4,6	-	1,7	1,9	●	●	○	YE22	HAL..-22	89
	22ER5,0TR	5,0	-	22	12,70	4,6	-	2,1	2,5	●	●	○	YE22		
	22ER6,0TR	6,0	-	22	12,70	4,6	-	2,3	2,7	●	●	○	YE22		
Left hand 	16EL1,5TR	1,5	-	16	9,52	3,4	-	1,0	1,1	●	○	○	YI16	HAL..-16	89
	16EL2,0TR	2,0	-	16	9,52	3,4	-	1,1	1,3	●	○	○	YI16		
	16EL3,0TR	3,0	-	16	9,52	3,4	-	1,3	1,5	●	○	○	YI16		
	22EL4,0TR	4,0	-	22	12,70	4,6	-	1,7	1,9	●	○	○	YI22	HAL..-22	89
	22EL5,0TR	5,0	-	22	12,70	4,6	-	2,1	2,5	●	○	○	YI22		
	22EL6,0TR	6,0	-	22	12,70	4,6	-	2,3	2,7	●	○	○	YI22		
	27EL6,0TR	6,0	-	27	15,88	6,2	-	2,3	2,7	●	○	○	YI27	HAL..-27	89

Indexable inserts - internal threads



Trapezoidal DIN 103 - Full Profile



	Ordering Code	Pitch		l	d	s	r	x	y	Grade			Anvil	Suitable tool holder	Page
		mm	tpi							SCP20T	SCM25T	SWN20T			
Right hand 	11IR1,5TR	1,5	-	11	6,35	3,0	-	0,8	0,9	●	○	○	-	HNVR..-11	89
	16IR1,5TR	1,5	-	16	9,52	3,4	-	1,0	1,1	●	○	○	YI16	HAVR..-16	89
	16IR2,0TR	2,0	-	16	9,52	3,4	-	1,1	1,3	●	○	○	YI16	HNVR..-16	89
	16IR3,0TR	3,0	-	16	9,52	3,4	-	1,3	1,5	●	○	○	YI16		
	22IR4,0TR	4,0	-	22	12,70	4,6	-	1,7	1,9	●	○	○	YI22	HAVR..-22	89
	22IR5,0TR	5,0	-	22	12,70	4,6	-	2,1	2,5	●	○	○	YI22	HNVR..-22	89
Left hand 	11IL1,5TR	1,5	-	11	6,35	3,0	-	0,8	0,9	●	○	○	-	HNVR..-11	89
	16IL1,5TR	1,5	-	16	9,52	3,4	-	1,0	1,1	●	○	○	YE16	HAVR..-16	89
	16IL2,0TR	2,0	-	16	9,52	3,4	-	1,1	1,3	●	○	○	YE16	HNVR..-16	89
	16IL3,0TR	3,0	-	16	9,52	3,4	-	1,3	1,5	●	○	○	YE16		
	22IL4,0TR	4,0	-	22	12,70	4,6	-	1,7	1,9	●	○	○	YE22	HAVR..-22	89
	22IL5,0TR	5,0	-	22	12,70	4,6	-	2,1	2,5	●	○	○	YE22	HNVR..-22	89

Order example: 10 pieces 11ER1,5TR SCP20T



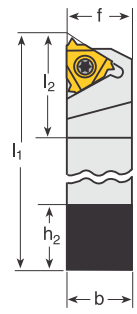
Indexable inserts - external threads

		Trapezoidal DIN 103 - Full Profile Form V										Grade			Anvil	Suitable tool holder	Page	
		Pitch		l	d	s	r	x	y	SCP20T	SCM25T	SWN20T						
	Ordering Code	mm	tpi															
	Right hand 	27VER6,0TR	6,0	-	27	15,88	6,0	-	1,0	3,3		●				HNL...-27....V	90	
27VER7,0TR		7,0	-	27	15,88	6,0	-	1,0	3,3		●							
27VER8,0TR		8,0	-	27	15,88	6,0	-	1,0	3,3		●							
27VER12,0TR		12,0	-	27	15,88	10,0	-	1,0	5,2		●							
Left hand 	27VEL6,0TR	6,0	-	27	15,88	6,0	-	1,0	3,3		●			HNL...-27....V	90			
	27VEL7,0TR	7,0	-	27	15,88	6,0	-	1,0	3,3		●							
	27VEL8,0TR	8,0	-	27	15,88	6,0	-	1,1	3,3		●							
	27VEL10,0TR	10,0	-	27	15,88	8,0	-	1,7	4,3		●							

		Trapezoidal DIN 103 - Full Profile Form U										Grade			Anvil	Suitable tool holder	Page
		Pitch		l	d	s	r	x	y	SCP20T	SCM25T	SWN20T					
	Ordering Code	tpi															
	U-Typ 	Right															
22UE6,0TR		6,0	-	22	12,70	6,0	-	1,0	11,0	●	●		YE22U	HAL...-22....U	90		
22UE7,0TR		7,0	-	22	12,70	6,0	-	1,0	11,0	●			YE22U				
22UE8,0TR		8,0	-	22	12,70	6,0	-	1,0	11,0	●			YE22U				
27UE8,0TR		8,0	-	27	15,88	8,0	-	1,0	13,7	●	●		YE27U	HAL...-27....U	90		
27UE9,0TR	9,0	-	27	15,88	8,0	-	1,0	13,7	●	●		YE27U					
usable for right and left side	Left																
	22UE6,0TR	6,0	-	22	12,70	6,0	-	1,0	11,0	●	●		YI22U	HAL...-22....U	90		
	22UE7,0TR	7,0	-	22	12,70	6,0	-	1,0	11,0	●			YI22U				
	22UE8,0TR	8,0	-	22	12,70	6,0	-	1,0	11,0	●			YI22U				
	27UE8,0TR	8,0	-	27	15,88	8,0	-	1,0	13,7	●	●		YI27U	HAL...-27....U	90		
27UE9,0TR	9,0	-	27	15,88	8,0	-	1,0	13,7	●	●		YI27U					

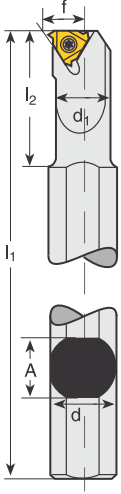

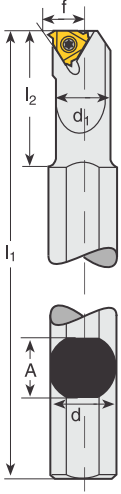
Order example: 10 pieces 27VER6,0TR SCM25T

Tool holder, external machining

		Ordering Code	$b = h_2 = h_1$	f	l_1	l_2	Insert size
		HNL12-11	12	12	80	17,5	11
		HAL16-16	16	16	100	22	16
		HAL20-16	20	20	128,6	30	16
		HAL25-16	25	25	153,6	30	16
		HAL32-16	32	32	173,6	30	16
		HAL25-22	25	25	155,7	36	22
		HAL32-22	32	32	175,7	36	22
		HAL32-27	32	32	175,9	40	27
		HAL40-27	40	40	205,9	40	27

Order example: 1 piece HNL12-11

Tool holder, internal machining

		Ordering Code	A	l_1	l_2	d	d_1	f	D_{min}	Insert size
		HNVRC10-11	18,0	180	25	20	10,0	7,3	13	11
		HNVRC13-11	18,0	180	32	20	13,0	8,9	16	11
		HNVRC13-16	18,0	180	32	20	12,7	10,3	17	16
		HNVRC16-16	18,0	180	40	20	16,0	11,5	20	16
		HNVRC16D-16	15,2	150	32	16	16,0	11,3	20	16
		HAVRC20-16	18,0	180	40	20	20,0	13,4	24	16
		HAVRC25-16	29,0	250	60	32	25,0	16,3	29	16
		HAVRC25D-16	22,6	200	45	25	24,6	16,1	29	16
		HAVRC32-16	29,0	250	60	32	32,0	19,6	36	16
		HAVRC40-16	36,0	300	60	40	40,0	23,8	44	16
		HNVRC20-22	18,0	180	50	20	20,0	15,6	27	22
		HAVRC25-22	29,0	250	60	32	25,0	17,4	32	22
		HAVRC32-22	29,0	250	60	32	32,0	21,5	39	22
		HAVRC40-22	36,0	300	60	40	40,0	25,8	47	22
		HAVRC50-27	45	350	75	50	50,0	31,4	58	27
HAVRC60-27	54	400	75	60	60,0	36,4	69	27		

Order example: 1 piece HNVRC10-11

The above holders are right hand execution.

To obtain left hand execution, please add LH to the ordering code.

All holders have a 1,5° helix angle. Using HAL.. and HAVRC..-holders helix angle can be varied by changing the anvil (please refer to page 94). NVRC holders are without anvil.

Notice: external and internal holder also with clamping finger "type C", available on demand (e.g.: HNVRC16-16C)

Tool holder, external machining

		Ordering Code	$b = h_2 = h_1$	f	l_1	l_2	Insert size	
		HNL32-27V-6	32	32	170	40	27	
		HNL32-27V-8	32	34,1	170	40	27	
		HNL32-27V-10	32	35,8	170	40	27	
		HNL40-27V-6	40	40,0	200	40	27	
		HNL40-27V-8	40	42,1	200	40	27	
		HNL40-27V-10	40	43,8	200	40	27	

Order example : 1 piece HNL32-27V-6

Insert see page 88 Form V



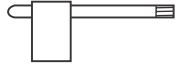
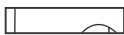
Tool holder, external machining

		Ordering Code	$b = h_2 = h_1$	f	l_1	l_2	Insert size
		HAL25-22U	25	25	178,4	38	22
		HAL32-22U	32	32	178,4	38	22
		HAL40-22U	40	40	208,4	38	22
		HAL25-27U	25	25	179,1	40	27
		HAL32-27U	32	32	179,1	40	27
		HAL40-27U	40	40	209,1	40	27
		HAL50-27U	50	50	259,1	40	27

Order example : 1 piece HAL25-22U

Insert see page 88 Form U

Tool holder, spare parts

Tool holder	Insert size	Clamp screw	Screw + Washer	Key	Anvil	
						
		Ordering Code			RH/in LH	LH/ in RH
HNVRC	11	SCN11T	-	K02-T-0800	-	-
HNVRC	16	SCN16T	-	K02-T-1000	-	-
HNVRC	22	SCN22T	-	K02-T-2000	-	-
"Standard"	16	SCA16T	WY16T	K02-T-1000	YE16	YI16
"Standard"	22	SCA22T	WY22T	K02-T-2000	YE22	YI22
(AL..., AV...)	27	SCA27T	WY27T	K02-T-2500	YE27	YI27
	16	SCA16T/C3	WY16T	K02-T-1000	YE16	YI16
	22	SCA22T/C4	WY22T	K02-T-2000	YE22	YI22
Standard with clamping finger	27	SCA27T/C5	WY27T	K02-T-2500	YE27	YI27
U - Type	22	SCA22T	WY22T	K02-T-2000	YE22U	YI22U
	27	SCA27T	WY27T	K02-T-2500	YE27U	YI27U
V - Type	27V	SCN27T	-	K02-T-3000	-	-

Anvil sets

We recommend you to buy these kits in order to have on hand the right anvil for any job at any time.

Avil	Ordering code	The set includes 1 of each
16	ABY16	YE16-2P, 1P, 1N, 2N, 3N, YI16-2P, 1P, 1N, 2N, 3N
22	ABY22	YE22-2P, 1P, 1N, 2N, 3N, YI22-2P, 1P, 1N, 2N, 3N
27	ABY27	YE27-2P, 1P, 1N, 2N, 3N, YI27-2P, 1P, 1N, 2N, 3N
22U	ABY22U	YE22U-2P, 1P, 1N, 2N, 3N, YI22-2P, 1P, 1N, 2N, 3N
27U	ABY27U	YE27U-2P, 1P, 1N, 2N, 3N, YI22-2P, 1P, 1N, 2N, 3N

Ordering example: 1 piece HAL25-16 (...right hand execution)
1 piece HAL25-16LH (... left hand execution)

Grade	ISO	Range of applications 01 05 10 15 20 25 30 35 40 45 50	Group of materials						Processing method					
			P Steel	M Stainless	K Grey cast iron	N (Al, etc.) Nonferrous metals	S High temperature materials	H Hard materials	T Turning	M Milling	D Drilling	S Threading	G Grooving	P Parting
SCP20T	HC-P20		■	□								●		
SCM25T	HC-M20		□	■								●		
	HC-K20				■							●		
SWN20T	HC-N20					■	□					●		
Application peak Full range to ISO 513		01 05 10 15 20 25 30 35 40 45 50	■ Main application □ Further applications						● Standard grade					

Main grade coated

● SCP20T (HC-P20)

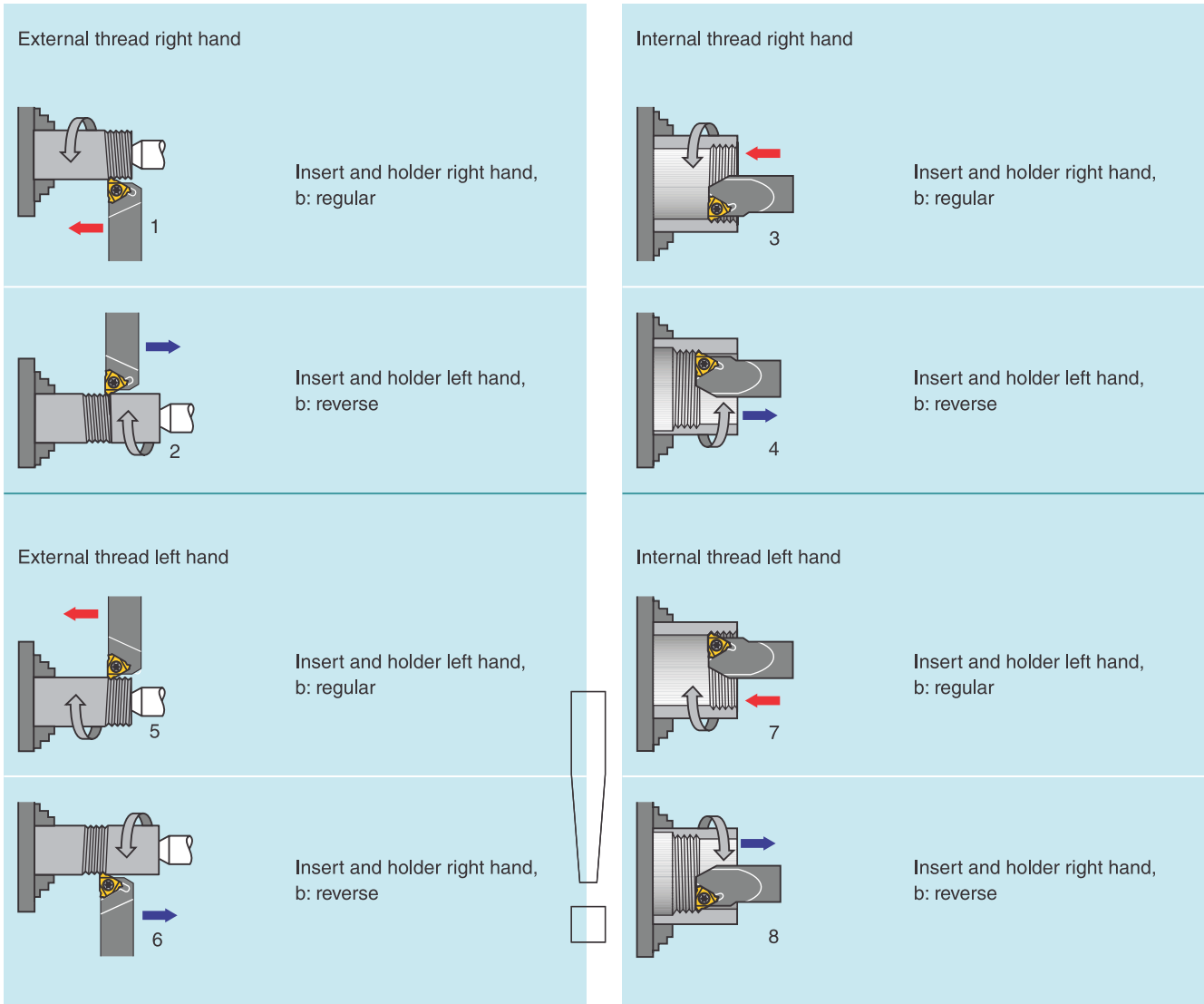
Main grade for steel machining. High breaking strength also on bad conditions.
Micro grain substrate with thin TiAlN coating.

● SCM25T (HC-M20, HC-K20)

Main grade for stainless machining.
Extremely good applicable for the machining of acid proofed materials.

● SWN20T (HC-N20)

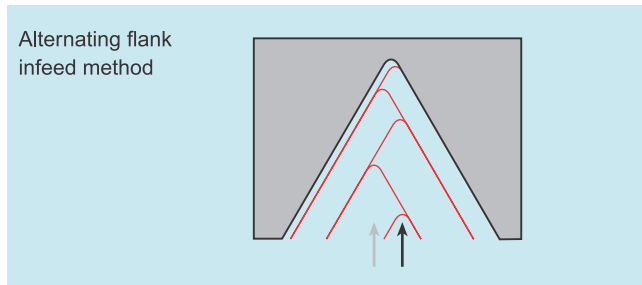
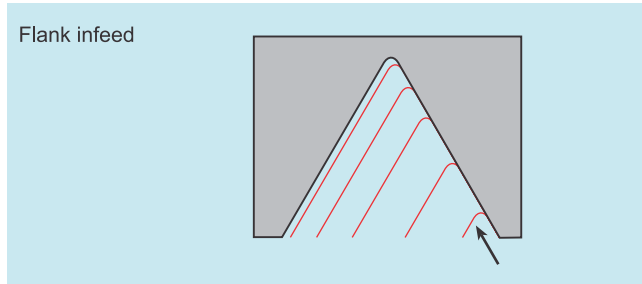
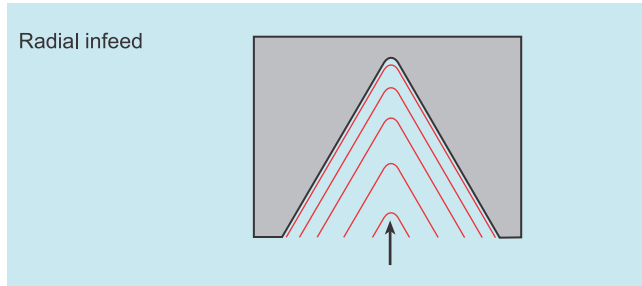
Uncoated K20 fine grain grade for the machining of non ferrous metals, aluminium, titanium and heat resistant alloys.



Flank clearance angle :

The tool holders are designed to tilt the insert when seated in the holder, (10° for external, 15° for internal tooling). As the flank clearance angle α varies depending on the enclosed flank angle, we give here a formula to calculate α and on page 96 some examples which show the importance of a correct adjustment of the helix angle by the help of anvils, especially in profiles with small enclosed flank angles to avoid rubbing of the insert cutting edge on the workpiece.

where: α =Flank clearance angle
 δ =Tilt angle
 Φ = Enclosed flank angle



Choosing the correct anvil

The Helix Angle ¹⁾
 Formula for it's calculation:

$$\beta = \arctan \frac{P}{\pi \times d_2} \text{ (simplified: } \beta = \frac{P}{d_2} \times 20 \text{)}$$
 where: β = Helix angle [°]
 P = pitch [mm] (use lead for multi-start threads)
 d₂ = pitch diameter [mm]

Radial infeed

Radial infeed is the simplest and most popular method. The feed is perpendicular to the turning axis, and both flanks on the insert perform the cutting operation.

Radial infeed is recommended:

- when the pitch is smaller than 1.0 mm
- for materials with short chips
- for materials having cold hardening tendency

Flank infeed

is recommended:

- when the thread pitch is more than 1.0 mm. Using the radial method, the effective cutting edge length is too large, resulting in chatter
- for TRAPEZOIDAL and ACME thread. The radial method result in three cutting edges, making chip flow very difficult

Alternating flank infeed method

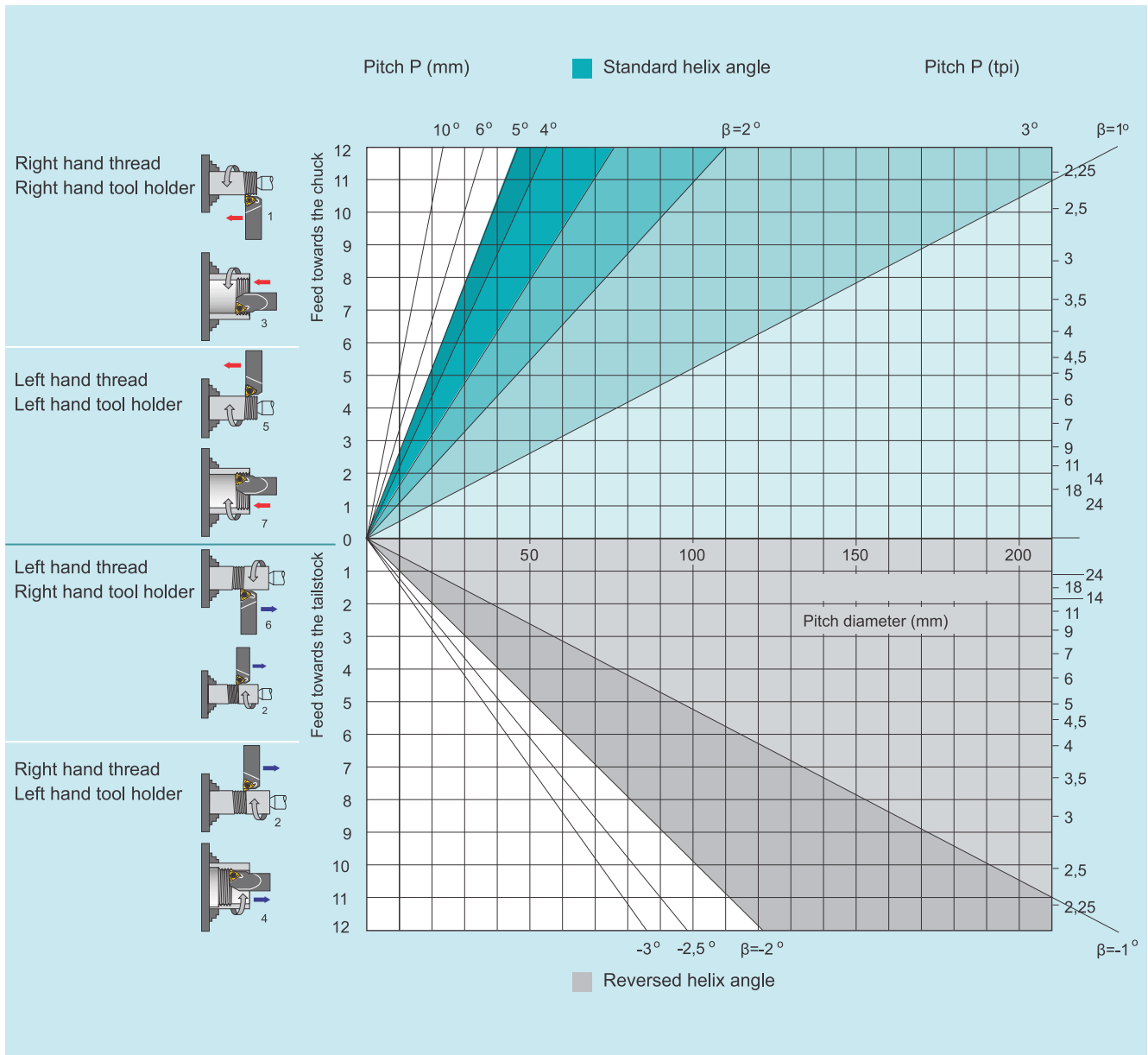
Use of the alternate flank infeed method is recommended especially in large pitches, and for materials with long chips. This method divides the work equally on both flanks, resulting in equal wear along the cutting edges. Alternate flank infeed requires more complicated programming and is not available on all lathes.

¹⁾ The helix angle can also be found from the graph on page 95.

To determine the correct anvil use the table on page 95.

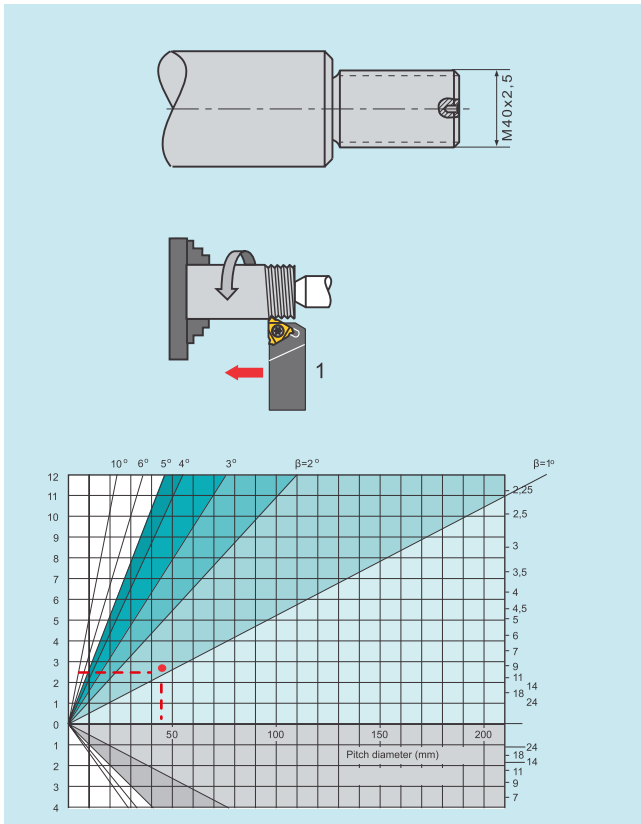
Technical hints

Helix angle



Anvils

Helix angle		4,5	3,5	2,5	1,5	0,5	0	-0,5	-1,5
Insert I =	Holder	Ordering Code							
16	ER/IL	YE16-3P	YE16-2P	YE16-1P	YE16	YE16-1N	YE16-1,5N	YE16-2N	YE16-3N
16	EL/IR	YI16-3P	YI16-2P	YI16-1P	YI16	YI16-1N	YI16-1,5N	YI16-2N	YI16-3N
22	ER/IL	YE22-3P	YE22-2P	YE22-1P	YE22	YE22-1N	YE22-1,5N	YE22-2N	YE22-3N
22	EL/IR	YI22-3P	YI22-2P	YI22-1P	YI22	YI22-1N	YI22-1,5N	YI22-2N	YI22-3N



Thread: ISO-metric M40 x 2,5 external right hand

Material: 42CrMo4

Chosen working method: No1, feed towards the chuck

Tool holder: HAL25-16

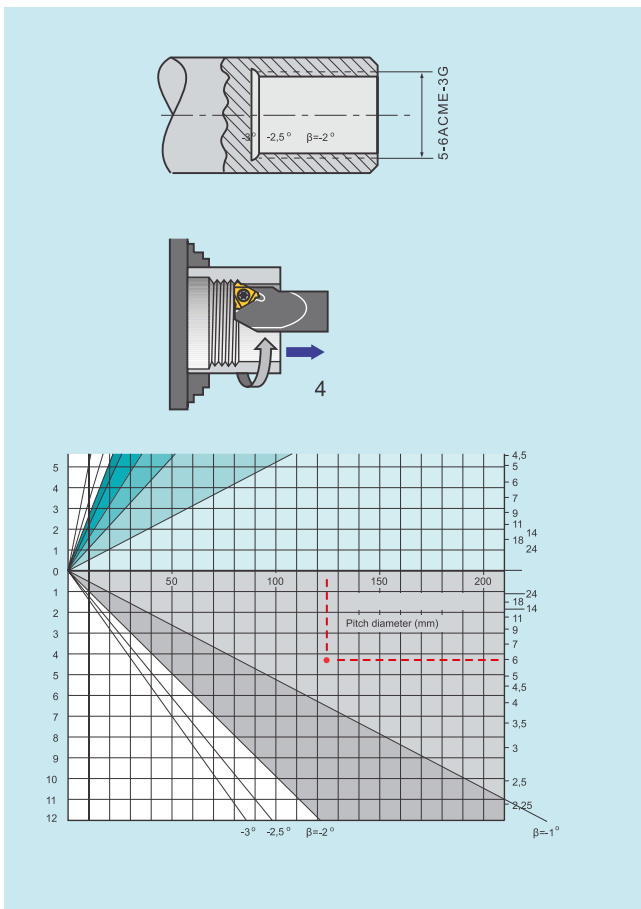
Insert: 16ER2,5ISO

Sigma grade: SCP20T

Determination of the helix angle and choice of the correct anvil:

From the diagram on page 95 a helix angle β between 1° and 2° is found. To this helix angle corresponds anvil YE16 in the table on page 95. Cutting speed and number of passes are taken from the tables on pages 97-98:

v_C : 120 m/min, Number of passes: 10



Thread: ACME internal right hand

Pitch: 6 tpi

Diameter of hole: 5"

Material: Stainless austenitic

Chosen working method: No.4, feed off the chuck
(for better evacuation of the chips)

Tool holder: HAVR40-22LH

Insert: 22IL6ACME

Sigma grade: SCM25T

Determination of the helix angle and choice of the correct anvil:

From the diagram on page 95 a helix angle β between 0° and 1° is found. To this helix angle corresponds anvil YE22-2N in the table on page 95. Cutting speed and number of passes are taken from the tables on pages 97-98:

v_C : 150 m/min, Number of passes: 18

	Problem							
	Increased insert flank wear	Uneven cutting edge wear	Extreme plastic deformation	Cutting edge breakage	Built-up edge	Thread profile is too shallow	Poor surface quality	
Option								
Carbide wear resistance	↑		↑		↑			
Carbide toughness				↑				
Cutting speed	↓		↓		↑		↓	
Feed			↓	↓				
Number of passes			↑	↑				
Flank infeed method		↔					↔	
Anvil		↔					↔	
Height of cutting edge						↔		
Fixation					↔			
Size of the blank						↔		
Cooling	↑		↑	↔				
Change of the cutting edge						↔		
↑ increase ↓ reduce ↔ optimize								

Number of passes

Pitch	mm	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,50	3,00	3,50	4,00	4,50	5,00	5,50	6,00	8,00
	tpi		48	32	24	20	16	14	12	10	8	7	6	5,5	5	4,5	4
Number of passes		4-6	4-7	4-8	5-9	6-10	7-12	7-12	8-14	9-16	10-18	11-18	11-19	12-20	12-20	12-20	15-24

Material group	Mainworkpiece material groups and their characteristics letters		Brinell hardness HB			
				SCP20T	SCM25T	SWN20T
				v _c (m/min)	v _c (m/min)	v _c (m/min)
P	Unalloyed steel ¹⁾	ca. 0,15%C annealed	125	115 – 190		
		ca. 0,45 %C annealed	150	100 – 175		
		ca. 0,75 %C heat treated	170	90 – 165		
	Low-alloy steel ¹⁾	annealed	180	100 – 180		
		heat treated	275	75 – 140		
		heat treated	350	70 – 135		
	High-alloy steel and high alloy tool steel ¹⁾	annealed	200	80 – 120		
			325	50 - 100		
		annealed	200	80 – 120		
	Steel cast ¹⁾	annealed	200	80 – 120		
hardened and temp.		325	50 - 100			
ferritic/martensitic annealed		200	70 – 130			
M	Stainless steel ¹⁾ ferritic	ferritic/martensitic annealed	200	70 – 130		
		martensitic hardened and temp.	225	60 – 120		
		unhardenable	200	70 – 130	70 - 150	
		hardened	330	60 - 115	60 - 125	
			200	70 – 130	70 - 150	
			300	60 - 115	60 - 125	
	Stainless steel ¹⁾ austenitic	austenitic	180	90 - 140	90 - 160	
		Duplex	200	40 - 110	40 - 120	
			200	90 - 120	90 - 150	
			330	65 - 110	65 - 120	
Special steel cast ¹⁾ ferritic	unhardenable	200	90 - 120	90 - 150		
	hardened	330	65 - 110	65 - 120		
		200	85 - 110	85 - 120		
		330	60 - 100	60 - 110		
Special steel cast ¹⁾ austenitic	austenitic	200	85 - 110	85 - 120		
	hardened	330	60 - 100	60 - 110		
K	Grey cast iron	perlitic/ferritic	180	70 - 130		
		perlitic (martensitic)	260	60 - 115		
	Nodular graphite cast iron	ferritic	160	125 - 160		
		perlitic	260	90 - 120		
Malleable cast iron	ferritic	130	60 - 70			
	perlitic	230	60 - 145			
N	Aluminium alloys forge ironed	rolled, not hardenable	60	100 - 365		100 – 250
			75	200 - 400		80 – 120
			130	60 - 180		50 - 120
	Aluminium alloys	casted, not hardenable	90	80 - 225		70 - 170
		cast Si 13-22%	100	80 - 255		70 - 170
	Copper and copper alloys (Bronze/Brass)	Brass				
Bronze, non leaded copper						
S	Heat resistant alloys	Fe-based heat treated	200	45 - 60		30 - 50
		aged	280	30 - 50		25 - 40
		Ni- or Co-based heat treated	250	20 - 30		20 - 30
		aged	350	15 - 25		15 - 25
	Titanium alloys	Pure titanium	400Rm	140 - 170		60 - 100
Alpha- and Beta-alloys hardened		1050Rm	50 - 70		40 - 60	
H	Hardened steel	Hardened and tempered	45-50HRC	45 - 60		
			51-55HRC	40 - 50		
			45-50HRC	45 - 60		
			51-55HRC	40 - 50		

¹⁾and cast steel



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