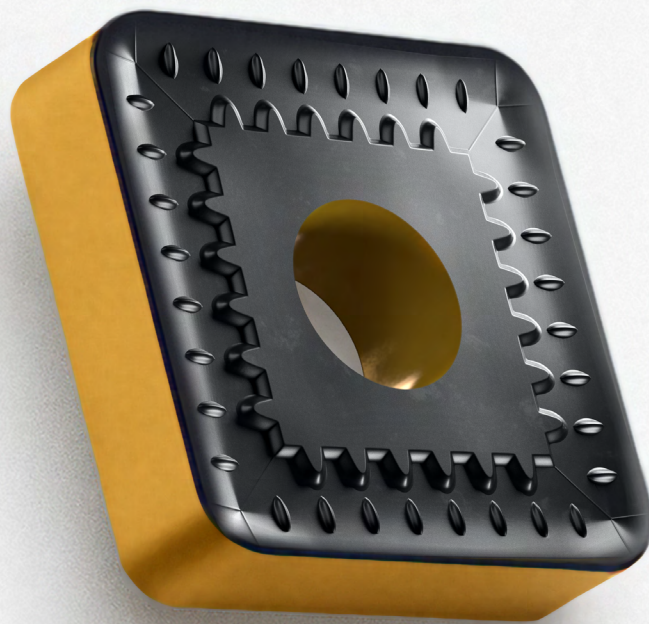




Next-Gen Tools



INDEXABLE INSERT
PRODUCT LIST
2025



At **HURMEN METAL**, we provide high-performance metal-cutting tools for diverse industries across the globe. Our commitment to manufacturing excellence and global supply chain reliability makes us a trusted partner for precision-focused businesses everywhere.

We proudly partner with companies across various sectors, including:

- 🌀 Railway
- 🌀 Automotive
- 🌀 Aerospace
- 🌀 Oil & Gas
- 🌀 Heavy Machinery
- 🌀 General Engineering
- 🌀 Shipbuilding and Marine Engineering

Our cutting tools are designed to meet the highest standards of performance, even in the most demanding environments. Whether it's for high-speed machining, hard materials, or complex geometries, we deliver tailored solutions that boost productivity and efficiency.

With a strong focus on quality, innovation, and customer satisfaction, we support our partners with reliable products, competitive pricing, and responsive technical service.

Why Choose Us:

- 🌀 Proven expertise across multiple industries
- 🌀 High quality and precision
- 🌀 Flexible production capabilities
- 🌀 Fast worldwide delivery
- 🌀 Custom solutions and engineering support

HurmenMetal Team





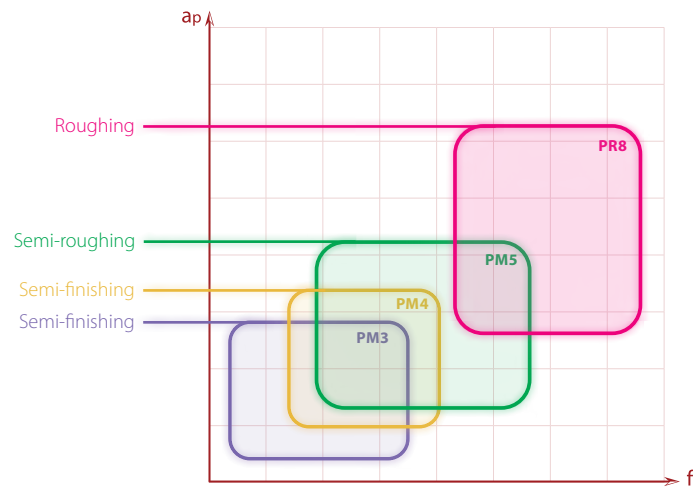
TABLE OF CONTENT

04	 Garde Application Guide
05	 ChipBreaker System for Turning
07	 Negative Turning Insert
21	 Positive Turning Insert
31	 Grooving Insert
36	 Threading Insert
41	 Milling Insert
50	 Drilling Insert
55	 Grade Comparison Chart for Turning
56	 Grade Comparison Chart for Milling

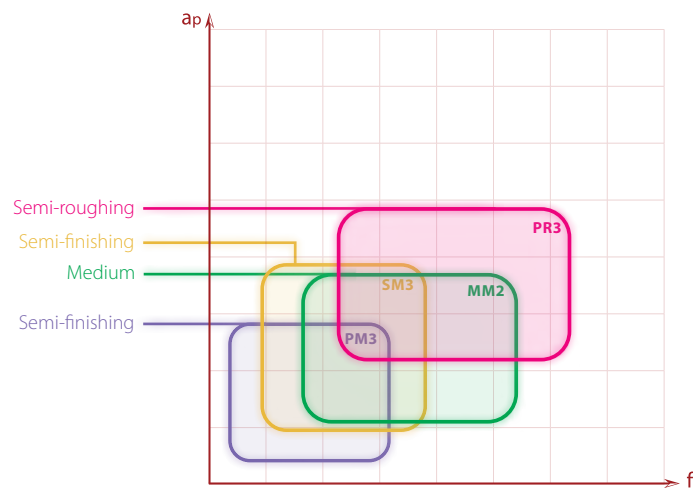
GARDE APPLICATION GUIDE														
MATERIAL GROUP	MATERIAL CLASSIFICATION	ISO	UNCOATED	PVD COATED					CVD COATED					
			UN305	PP0550	PP3050	PM1050	PM1055	PM2050	PM2055	CP1550	CP1555	CP2550	CP2555	CK1050
P	Unalloyed Steel / Alloyed Steel	P01												
		P05		PP0550			PM1055							
		P10								CP1550	CP1555			
		P15		PP0550		PM1050		PM2050	PM2055					
		P20			PP3050	PM1050						CP2550	CP2555	
		P25												
		P30												
		P35												
		P40												
		P45												
		P50												
M	Stainless Steel	M01												
		M05		PP0550			PM1055							
		M10												
		M15				PM1050		PM2050	PM2055					
		M20												
		M25			PP3050									
		M30												
		M35												
		M40												
		M45												
		M50												
K	Cast Iron	K01												
		K05												
		K10												
		K15								CP1550	CP1555			CK1050
		K20												
		K25												
		K30												
		K35												
		K40												
		K45												
		K50												
N	Aluminum / Aluminum Alloy	N01												
		N05												
		N10												
		N15												
		N20												
		N25	UN305											
		N30												
		N35												
		N40												
		N45												
		N50												
S	Heat Resistant Alloy	S01												
		S05												
		S10												
		S15												
		S20												
		S25												
		S30												
		S35												
		S40												
		S45												
		S50												
H	Hardened Steel / Chilled Cast Iron	H01												
		H05												
		H10												
		H15												
		H20												
		H25												
		H30												
		H35												
		H40												
		H45												
		H50												

ChipBreaker System for Turning
Negative Inserts

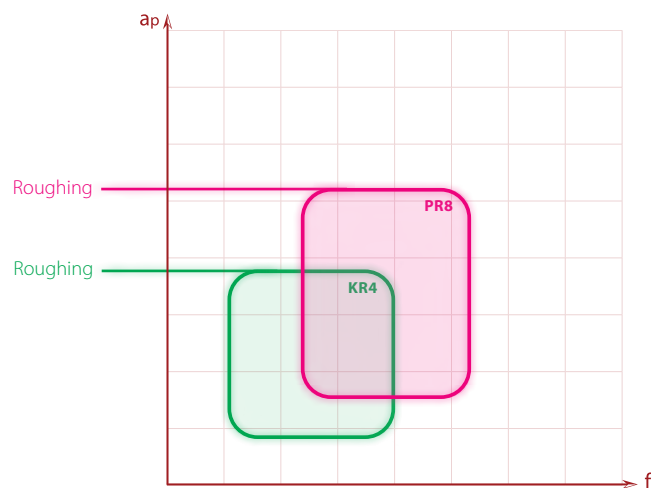
P Unalloyed Steel / Alloyed Steel



M Stainless Steel

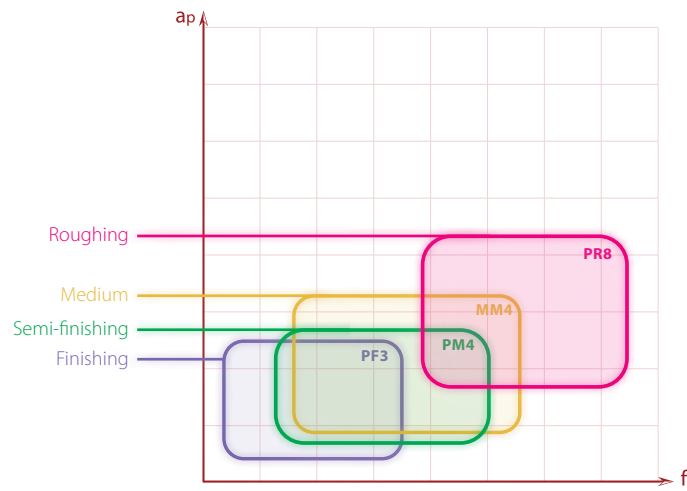


K Cast Iron

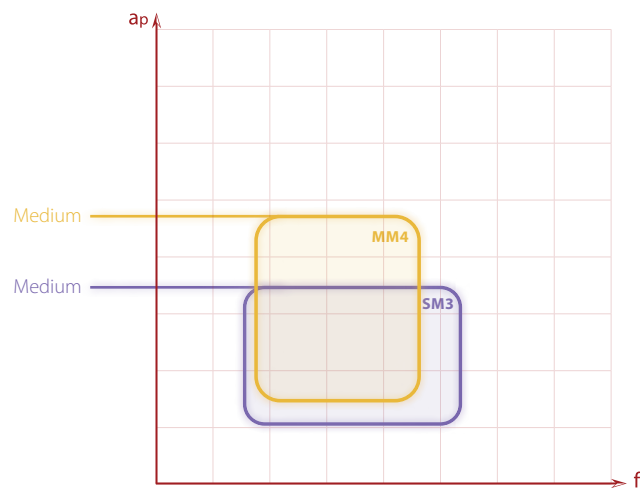


ChipBreaker System for Turning
Positive Inserts

P Unalloyed Steel / Alloyed Steel



M Stainless Steel





Insert

Negative Turning

INSERT DESIGNATION (BASED ON ISO NORMS FOR TURNING)								
C	N	M	G	12	04	08		
1	2	3	4	5	6	7	8	9

1 INSERT SHAPE

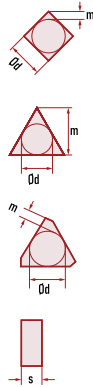
							
A	B	C	D	G	H	K	L
							
M	O	P	R	S	T	V	W

2 CLEARANCE ANGLE



3°	5°	7°	15°	20°	25°	30°	0°	11°	Special
A	B	C	D	E	F	G	N	P	O

3 TOLERANCE CLASS



Symbol	D (mm)	M (mm)	S (mm)
A	±0.025	±0.005	±0.025
C	±0.025	±0.013	±0.025
E	±0.025	±0.025	±0.025
F	±0.013	±0.005	±0.025
G	±0.025	±0.025	±0.130
H	±0.013	±0.013	±0.025
J*	±0.15-0.05	±0.005	±0.025
K*	±0.15-0.05	±0.013	±0.025
L*	±0.15-0.05	±0.025	±0.025
M*	±0.15-0.05	±0.20-0.08	±0.130
N*	±0.15-0.05	±0.20-0.08	±0.025
U*	±0.25-0.08	±0.38-0.13	±0.130

*Depending on the insert size.

4 FIXING AND CHIP BREAKER TYPES

							
A	B	F	G	H	M	N	P
			Special				
R	T	W	X				

INSERT DESIGNATION (BASED ON ISO NORMS FOR TURNING)								
C	N	M	G	12	04	08		
1	2	3	4	5	6	7	8	9

5 CUTTING EDGE LENGTH

							
A,B,K	C,D,E,M,V	H,O,P	L	R	S	T	W

Disregarding any decimals e.g. 12,7 = 12

6 INSERT THICKNESS

	Symbol	01	T1	02	03	T3	04	05	06	07	09
	mm	1.59	1.98	2.38	3.18	3.97	4.76	5.56	6.35	7.94	9.53
											

7 INSERT CORNER RADIUS

OO = Sharp corner
 or round insert
 (insert version)
 MO = Round insert
 (metal version)



Symbol	01	02	04	08	12	16	...			
mm	0.1	0.2	0.4	0.8	1.2	1.6				

8 EDGE PREPARATION

							
F	E	T	S				

Optional information

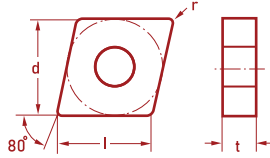
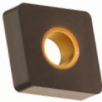
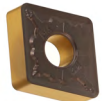
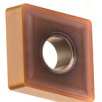
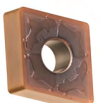
9 CUTTING DIRECTION

							
R	L	N					

Optional information

Insert

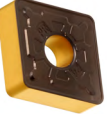
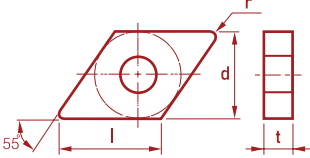
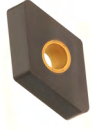
Negative Turning

Indexable inserts			Dimensions (mm)					P					M				K	N	
Designation			Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
							C N . .												
flat	roughing	CNMA120408	12.0	12.7	12.9	4.76	0.8											●	
		CNMA120412	12.0	12.7	12.9	4.76	1.2											●	
PM3	semi-finishing	CNMG120404-PM3	12.0	12.7	12.9	4.76	0.4			◊	●								
		CNMG120408-PM3	12.0	12.7	12.9	4.76	0.8			◊	●								
		CNMG120412-PM3	12.0	12.7	12.9	4.76	1.2			◊	●								
PM4	semi-finishing	CNMG120404-PM4	12.0	12.7	12.9	4.76	0.4			●	◊	●							
		CNMG120408-PM4	12.0	12.7	12.9	4.76	0.8			●	◊	●							
		CNMG120412-PM4	12.0	12.7	12.9	4.76	1.2			●	◊	●							
PR3	semi-roughing	CNMG120404-PR3	12.0	12.7	12.9	4.76	0.4							●			●		
		CNMG120408-PR3	12.0	12.7	12.9	4.76	0.8							●			●		
		CNMG120412-PR3	12.0	12.7	12.9	4.76	1.2							●			●		
MM2	medium	CNMG120404-MM2	12.0	12.7	12.9	4.76	0.4							●			●		
		CNMG120408-MM2	12.0	12.7	12.9	4.76	0.8							●			●		
SM3	semi-finishing	CNMG120404-SM3	12.0	12.7	12.9	4.76	0.4							●			●		
		CNMG120408-SM3	12.0	12.7	12.9	4.76	0.8							●			●		

 on - stock
  off - stock

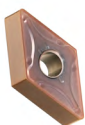
Insert

Negative Turning

Indexable inserts		Dimensions (mm)						P						M				K	N
Designation		Size	d	l	t	r		PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
	KR4	roughing	CNMG120408-KR4	12.0	12.7	12.9	4.76	0.8										●	
			CNMG120412-KR4	12.0	12.7	12.9	4.76	1.2										●	
	PR8	roughing	CNMG160612-PR8	16.0	15.88	16.11	6.35	1.2		●		●							
			CNMG190608-PR8	19.0	19.05	19.3	6.35	0.8		●		●							
			CNMG190612-PR8	19.0	19.05	19.3	6.35	1.2		●		●							
			CNMG190616-PR8	19.0	19.05	19.3	6.35	1.6		●		●							
			CNMG190624-PR8	19.0	19.05	19.3	6.35	2.4		●		●							
			CNMG250924-PR8	25.0	25.4	25.8	9.53	2.4		●		●							
	PR8	roughing	CNMM190608-PR8	19.0	19.05	19.3	6.35	0.8		●		●							
			CNMM190612-PR8	19.0	19.05	19.3	6.35	1.2		●		●							
			CNMM190616-PR8	19.0	19.05	19.3	6.35	1.6		●		●							
			CNMM190624-PR8	19.0	19.05	19.3	6.35	2.4		●		●							
			CNMM250924-PR8	25.0	25.4	25.8	9.53	2.4		●		●							
								D N . .											
	flat	roughing	DNMA150608	15.0	12.7	15.5	6.35	0.8										●	
			DNMA150612	15.0	12.7	15.5	6.35	1.2										●	

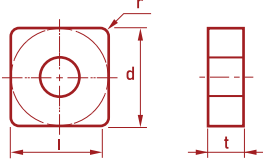
Insert

Negative Turning

Indexable inserts		Dimensions (mm)					P						M				K	N
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
	PM3 semi-finishing	DNMG150604-PM3	15.0	12.7	15.5	6.35	0.4						●			●		
		DNMG150608-PM3	15.0	12.7	15.5	6.35	0.8						●			●		
	PM4 semi-finishing	DNMG150604-PM4	15.0	12.7	15.5	6.35	0.4		●	◇	●							
		DNMG150608-PM4	15.0	12.7	15.5	6.35	0.8		●	◇	●							
		DNMG150612-PM4	15.0	12.7	15.5	6.35	1.2		●	◇	●							
	SM3 semi-finishing	DNMG150604-SM3	15.0	12.7	15.5	6.35	0.4						●			●		
		DNMG150608-SM3	15.0	12.7	15.5	6.35	0.8						●			●		
		DNMG150612-SM3	15.0	12.7	15.5	6.35	1.2						●			●		
	PR3 semi-roughing	DNMG150604-PR3	15.0	12.7	15.5	6.35	0.4						●			●		
		DNMG150608-PR3	15.0	12.7	15.5	6.35	0.8						●			●		
	PM5 semi-roughing	DNMG150608-PM5	15.0	12.7	15.5	6.35	0.8		●	◇	●							
		DNMG150612-PM5	15.0	12.7	15.5	6.35	1.2		●	◇	●							
	KR4 roughing	DNMG150608-KR4	15.0	12.7	15.5	6.35	0.8										●	
		DNMG150612-KR4	15.0	12.7	15.5	6.35	1.2										●	

Insert

Negative Turning

Indexable inserts		Dimensions (mm)						P						M				K	N
Designation		Size	d	l	t	r		PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
		S N . .																	
flat	roughing																		
		SNMA120408	12.0	12.7	12.7	4.76	0.8											●	
		SNMA120412	12.0	12.7	12.7	4.76	1.2											●	
		SNMA150608	15.0	15.88	15.88	6.35	0.8											○	
		SNMA150612	15.0	15.88	15.88	6.35	1.2											○	
MM2	medium																		
		SNMG120404-MM2	12.0	12.7	12.7	4.76	0.4							●			●		
		SNMG120408-MM2	12.0	12.7	12.7	4.76	0.8							●			●		
		SNMG120412-MM2	12.0	12.7	12.7	4.76	1.2							●			●		
SM3	semi-finishing																		
		SNMG120404-SM3	12.0	12.7	12.7	4.76	0.4							●			●		
		SNMG120408-SM3	12.0	12.7	12.7	4.76	0.8							●			●		
PM4	semi-finishing																		
		SNMG120404-PM4	12.0	12.7	12.7	4.76	0.4			●	○	●							
		SNMG120408-PM4	12.0	12.7	12.7	4.76	0.8			●	○	●							
PM5	semi-roughing																		
		SNMG120404-PM5	12.0	12.7	12.7	4.76	0.4			●	○	●							
		SNMG120408-PM5	12.0	12.7	12.7	4.76	0.8			●	○	●							
		SNMG120412-PM5	12.0	12.7	12.7	4.76	1.2			●	○	●							
PR3	semi-roughing																		
		SNMG120404-PR3	12.0	12.7	12.7	4.76	0.4							●			●		
		SNMG120408-PR3	12.0	12.7	12.7	4.76	0.8							●			●		
		SNMG120412-PR3	12.0	12.7	12.7	4.76	1.2							●			●		

 on - stock
  off - stock

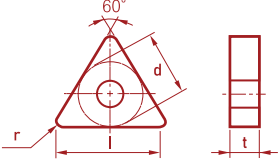
Insert

Negative Turning

Indexable inserts			Dimensions (mm)					P						M				K	N
Designation			Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
KR4 roughing 	SNMG120408-KR4		12.0	12.7	12.7	4.76	0.8											●	
	SNMG120412-KR4		12.0	12.7	12.7	4.76	1.2											●	
flat roughing 	SNMG190612		19.0	19.05	19.05	6.35	1.2			●	◇	●							
	SNMG250924		25.0	25.4	25.4	9.53	2.4			●	◇	●							
PR8 roughing 	SNMG190608-PR8		19.0	19.05	19.05	6.35	0.8			●	◇	●							
	SNMG190612-PR8		19.0	19.05	19.05	6.35	1.2			●	◇	●							
	SNMG190616-PR8		19.0	19.05	19.05	6.35	1.6			●	◇	●							
	SNMG190624-PR8		19.0	19.05	19.05	6.35	2.4			●	◇	●							
	SNMG250924-PR8		25.0	25.4	25.4	9.53	2.4			●	◇	●							
PR8 roughing 	SNMM190608-PR8		19.0	19.05	19.05	6.35	0.8			●	◇	●							
	SNMM190612-PR8		19.0	19.05	19.05	6.35	1.2			●	◇	●							
	SNMM190616-PR8		19.0	19.05	19.05	6.35	1.6			●	◇	●							
	SNMM190624-PR8		19.0	19.05	19.05	6.35	2.4			●	◇	●							
	SNMM250724-PR8		25.0	25.4	25.4	7.94	2.4			●	◇	●							
	SNMM250924-PR8		25.0	25.4	25.4	9.53	2.4			●	◇	●							

Insert

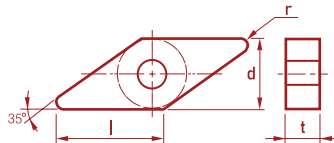
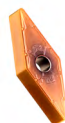
Negative Turning

Indexable inserts		Dimensions (mm)						P						M				K	N
Designation		Size	d	l	t	r		PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
		T N . .																	
flat	roughing																		
		TNMA160408	16.0	9.53	16.5	4.76	0.8											●	
		TNMA160412	16.0	9.53	16.5	4.76	1.2											●	
		TNMA220408	22.0	12.7	22	4.76	0.8											○	
		TNMA220412	22.0	12.7	22	4.76	1.2											○	
PM3	semi-finishing																		
		TNMG160404-PM3	16.0	9.53	16.5	4.76	0.4			○	●								
		TNMG160408-PM3	16.0	9.53	16.5	4.76	0.8			○	●								
		TNMG160412-PM3	16.0	9.53	16.5	4.76	1.2			○	●								
MM2	medium																		
		TNMG160404-MM2	16.0	9.53	16.5	4.76	0.4							●			●		
		TNMG160408-MM2	16.0	9.53	16.5	4.76	0.8							●			●		
SM3	semi-finishing																		
		TNMG160404-SM3	16.0	9.53	16.5	4.76	0.4							●			●		
		TNMG160408-SM3	16.0	9.53	16.5	4.76	0.8							●			●		
PM4	semi-finishing																		
		TNMG160404-PM4	16.0	9.53	16.5	4.76	0.4			●		●							
		TNMG160408-PM4	16.0	9.53	16.5	4.76	0.8			●		●							
		TNMG160412-PM4	16.0	9.53	16.5	4.76	1.2			●		●							
PM5	semi-roughing																		
		TNMG160404-PM5	16.0	9.53	16.5	4.76	0.4			●	○	●							
		TNMG160408-PM5	16.0	9.53	16.5	4.76	0.8			●	○	●							
		TNMG160412-PM5	16.0	9.53	16.5	4.76	1.2			●	○	●							

 on - stock
  off - stock

Insert

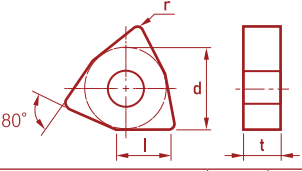
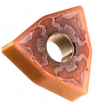
Negative Turning

Indexable inserts			Dimensions (mm)				P						M				K	N		
Designation			Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050	
PR3	semi-roughing		TNMG160404-PR3	16.0	9.53	16.5	4.76	0.4							●			●		
			TNMG160408-PR3	16.0	9.53	16.5	4.76	0.8							●			●		
			TNMG160412-PR3	16.0	9.53	16.5	4.76	1.2							●			●		
KR4	roughing		TNMG160408-KR4	16.0	9.53	16.5	4.76	0.8											●	
			TNMG160412-KR4	16.0	9.53	16.5	4.76	1.2											●	
								V N . .												
MM2	medium		VNMG160404-MM2	16.0	9.53	16.6	4.76	0.4							●			●		
			VNMG160408-MM2	16.0	9.53	16.6	4.76	0.8							●			●		
SM3	semi-finishing		VNMG160404-SM3	16.0	9.53	16.6	4.76	0.4							●			●		
			VNMG160408-SM3	16.0	9.53	16.6	4.76	0.8							●			●		
PM4	semi-finishing		VNMG160404-PM4	16.0	9.53	16.6	4.76	0.4			●	◇	●							
			VNMG160408-PM4	16.0	9.53	16.6	4.76	0.8			●	◇	●							
PM5	semi-roughing		VNMG160404-PM5	16.0	9.53	16.6	4.76	0.4			●	◇	●							
			VNMG160408-PM5	16.0	9.53	16.6	4.76	0.8			●	◇	●							
			VNMG160412-PM5	16.0	9.53	16.6	4.76	1.2			●	◇	●							

 on - stock
  off - stock

Insert

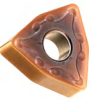
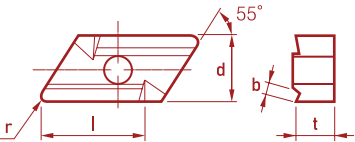
Negative Turning

Indexable inserts		Dimensions (mm)					P						M				K	N
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
	PR3	semi-roughing	VNMG160404-PR3	16.0	9.53	16.6	4.76	0.4						●			●	
			VNMG160408-PR3	16.0	9.53	16.6	4.76	0.8						●			●	
							W N . .											
	flat	roughing	WNMA080408	8.0	12.7	8.7	4.76	0.8									●	
			WNMA080412	8.0	12.7	8.7	4.76	1.2									●	
	PM3	semi-finishing	WNMG080404-PM3	8.0	12.7	8.7	4.76	0.4		○	●							
			WNMG080408-PM3	8.0	12.7	8.7	4.76	0.8		○	●							
			WNMG080412-PM3	8.0	12.7	8.7	4.76	1.2		○	●							
	MM2	medium	WNMG080404-MM2	8.0	12.7	8.7	4.76	0.4					●			●		
			WNMG080408-MM2	8.0	12.7	8.7	4.76	0.8					●			●		
			WNMG080412-MM2	8.0	12.7	8.7	4.76	1.2					●			●		
	SM3	semi-finishing	WNMG080404-SM3	8.0	12.7	8.7	4.76	0.4					●			●		
			WNMG080408-SM3	8.0	12.7	8.7	4.76	0.8					●			●		
	PM5	semi-roughing	WNMG080404-PM5	8.0	12.7	8.7	4.76	0.4		●	○	●						
			WNMG080408-PM5	8.0	12.7	8.7	4.76	0.8		●	○	●						
			WNMG080412-PM5	8.0	12.7	8.7	4.76	1.2		●	○	●						

 on - stock
  off - stock

Insert

Negative Turning

Indexable inserts			Dimensions (mm)					P						M				K	N
Designation			Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
	PM4	semi-finishing	WNNMG080404-PM4	8.0	12.7	8.7	4.76	0.4			●	◇	●						
			WNNMG080408-PM4	8.0	12.7	8.7	4.76	0.8			●	◇	●						
			WNNMG080412-PM4	8.0	12.7	8.7	4.76	1.2			●	◇	●						
	PR3	semi-roughing	WNNMG080404-PR3	8.0	12.7	8.7	4.76	0.4						●			●		
			WNNMG080408-PR3	8.0	12.7	8.7	4.76	0.8						●			●		
			WNNMG080412-PR3	8.0	12.7	8.7	4.76	1.2						●			●		
	KR4	roughing	WNNMG080408-KR4	8.0	12.7	8.7	4.76	0.8										●	
			WNNMG080412-KR4	8.0	12.7	8.7	4.76	1.2										●	
									K N . .										
	L11/R11	medium	KNUX160405-L11	16.0	9.53	16.2	4.76	0.5			●		●						
			KNUX160410-L11	16.0	9.53	16.2	4.76	1.0			●		●						
			KNUX160405-R11	16.0	9.53	16.2	4.76	0.5			●		●						
			KNUX160410-R11	16.0	9.53	16.2	4.76	1.0			●		●						

Feed Rate & Depth of Cut
ap (mm) & fn (mm/rev)

Material				Chip breaker															
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm ²)	Hardness (HB)	PM3				PM4				PM5				SM3			
				ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)	
				min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
P	Unalloyed steel	<600	<180	0.26	3.20	0.05	0.40	0.30	3.50	0.20	0.50	1.20	5.40	0.20	0.60	0.40	4.30	0.10	0.45
		<950	<280	0.26	3.20	0.05	0.40	0.30	3.50	0.20	0.50	1.20	5.40	0.20	0.60	0.40	4.30	0.10	0.45
	Alloyed steel	700-950	200-280	0.26	3.20	0.05	0.35	0.30	3.50	0.18	0.40	1.20	5.40	0.20	0.45	0.40	4.30	0.10	0.40
		950-1200	280-355	0.26	3.20	0.05	0.35	0.30	3.50	0.18	0.40	1.20	5.40	0.20	0.45	0.40	4.30	0.10	0.40
		1200-1400	355-415	0.26	3.20	0.05	0.35	0.30	3.50	0.18	0.40	1.20	5.40	0.20	0.45	0.40	4.30	0.10	0.40

M	Duplex stainless steel	778	230	0.26	3.20	0.05	0.35									0.40	4.30	0.06	0.35
	Austenitic stainless steel	675	200	0.26	3.20	0.04	0.30									0.40	4.30	0.06	0.35
	Precipitation-hardening stainless steel	1013	300	0.26	3.20	0.04	0.30									0.40	4.30	0.06	0.35

K	Grey cast iron	700	220													0.40	4.30	0.12	0.45
	Nodular cast iron	880	260													0.40	4.30	0.12	0.45
	Malleable cast iron	800	250													0.40	4.30	0.10	0.40

N	Aluminum	260	75																
	Aluminum alloy	447	130																

S	Fe-based alloy	943	280																
	Co-based alloy	1076	320																
	Ni-based alloy	1177	350																
	Ti-alloy	1262	370																

H	Hardened steel	-	50-60HRC																
	Chilled cast iron	-	55HRC																

Material				Chip breaker															
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm ²)	Hardness (HB)	MM2				PR3				PR8				KR4			
				ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)	
				min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
P	Unalloyed steel	<600	<180	0.40	3.90	0.16	0.50	0.80	4.30	0.20	0.90	2.60	15.00	0.70	1.30				
		<950	<280	0.40	3.90	0.16	0.50	0.80	4.30	0.20	0.90	2.60	15.00	0.70	1.30				
	Alloyed steel	700-950	200-280	0.40	3.90	0.12	0.40	0.80	4.30	0.20	0.80	2.60	15.00	0.60	1.15				
		950-1200	280-355	0.40	3.90	0.12	0.40	0.80	4.30	0.20	0.80	2.60	15.00	0.60	1.15				
		1200-1400	355-415	0.40	3.90	0.12	0.40	0.80	4.30	0.20	0.80	2.60	15.00	0.60	1.15				

M	Duplex stainless steel	778	230	0.40	3.90	0.12	0.40	0.80	4.30	0.20	0.75								
	Austenitic stainless steel	675	200	0.40	3.90	0.12	0.35	0.80	4.30	0.20	0.75								
	Precipitation-hardening stainless steel	1013	300	0.40	3.90	0.12	0.35	0.80	4.30	0.16	0.70								

K	Grey cast iron	700	220	0.40	3.90	0.18	0.55	0.80	4.30	0.30	0.90	2.60	15.00	0.70	1.35	0.90	5.20	0.10	0.35
	Nodular cast iron	880	260	0.40	3.90	0.16	0.50	0.80	4.30	0.30	0.80	2.60	15.00	0.70	1.30	0.90	5.20	0.10	0.35
	Malleable cast iron	800	250	0.40	3.90	0.16	0.50	0.80	4.30	0.20	0.80	2.60	15.00	0.60	1.15	0.90	5.20	0.08	0.30

N	Aluminum	260	75																
	Aluminum alloy	447	130																

S	Fe-based alloy	943	280																
	Co-based alloy	1076	320																
	Ni-based alloy	1177	350																
	Ti-alloy	1262	370																

H	Hardened steel	-	50-60HRC																
	Chilled cast iron	-	55HRC																

Velocity of Cut
VC (m/min)

Material				CVD				PVD	
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm2)	Hardness (HB)	CP1550	CP1555	CP2550	CK1050	PM1050	PM2055
P	Unalloyed steel	<600	<180	120-250	150-280	120-250		130-250	130-250
		<950	<280	120-250	150-280	120-250		130-250	130-250
	Alloyed steel	700-950	200-280	108-230	135-255	108-230		115-225	115-225
		950-1200	280-355	108-230	135-255	108-230		115-225	115-225
		1200-1400	355-415	108-230	135-255	108-230		115-225	115-225
M	Duplex stainless steel	778	230					100-210	100-220
	Austenitic stainless steel	675	200					100-190	100-195
	Precipitation-hardening stainless steel	1013	300					85-180	90-185
K	Grey cast iron	700	220				155-350		
	Nodular cast iron	880	260				115-280		
	Malleable cast iron	800	250				75-110		
N	Aluminum	260	75						
	Aluminum alloy	447	130						
S	Fe-based alloy	943	280					20-88	25-80
	Co-based alloy	1076	320					18-75	20-70
	Ni-based alloy	1177	350					15-60	20-60
	Ti-alloy	1262	370					15-55	18-50
H	Hardened steel	-	50-60HRC						
	Chilled cast iron	-	55HRC						



Insert

Positive Turning

INSERT DESIGNATION (BASED ON ISO NORMS FOR TURNING)								
C	C	M	T	06	02	04		
1	2	3	4	5	6	7	8	9

1 INSERT SHAPE

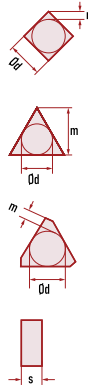
							
A	B	C	D	G	H	K	L
							
M	O	P	R	S	T	V	W

2 CLEARANCE ANGLE



3°	5°	7°	15°	20°	25°	30°	0°	11°	Special
A	B	C	D	E	F	G	N	P	O

3 TOLERANCE CLASS



Symbol	D (mm)	M (mm)	S (mm)
A	±0.025	±0.005	±0.025
C	±0.025	±0.013	±0.025
E	±0.025	±0.025	±0.025
F	±0.013	±0.005	±0.025
G	±0.025	±0.025	±0.130
H	±0.013	±0.013	±0.025
J*	±0.15-0.05	±0.005	±0.025
K*	±0.15-0.05	±0.013	±0.025
L*	±0.15-0.05	±0.025	±0.025
M*	±0.15-0.05	±0.20-0.08	±0.130
N*	±0.15-0.05	±0.20-0.08	±0.025
U*	±0.25-0.08	±0.38-0.13	±0.130

*Depending on the insert size.

4 FIXING AND CHIP BREAKER TYPES

							
A	B	F	G	H	M	N	P
			Special				
R	T	W	X				

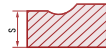
INSERT DESIGNATION (BASED ON ISO NORMS FOR TURNING)								
C	C	M	T	06	02	04		
1	2	3	4	5	6	7	8	9

5 CUTTING EDGE LENGTH

							
A,B,K	C,D,E,M,V	H,O,P	L	R	S	T	W

Disregarding any decimals e.g. 12,7 = 12

6 INSERT THICKNESS

	Symbol	01	T1	02	03	T3	04	05	06	07	09
	mm	1.59	1.98	2.38	3.18	3.97	4.76	5.56	6.35	7.94	9.53
											

7 INSERT CORNER RADIUS

00 = Sharp corner or round insert (insert version) M0 = Round insert (metric version)		Symbol	01	02	04	08	12	16	...			
		mm	0.1	0.2	0.4	0.8	1.2	1.6				

8 EDGE PREPARATION

							
F	E	T	S				

Optional information

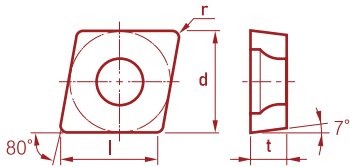
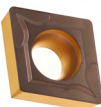
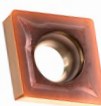
9 CUTTING DIRECTION

							
R	L	N					

Optional information

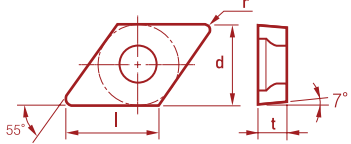
Insert

Positive Turning

Indexable inserts		Dimensions (mm)					P						M				K	N
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
																		
PF3	finishing	CCMT060204-PF3	6.0	6.35	6.4	2.38	0.4	●		○								
		CCMT09T304-PF3	9.0	9.53	9.7	3.97	0.4	●		○								
		CCMT09T308-PF3	9.0	9.53	9.7	3.97	0.8	●		○								
		CCMT120404-PF3	12.0	12.7	12.9	4.76	0.4	●		○								
		CCMT120408-PF3	12.0	12.7	12.9	4.76	0.8	●		○								
PM4	semi-finishing	CCMT060204-PM4	6.0	6.35	6.4	2.38	0.4			○		●	●	●			○	
		CCMT060208-PM4	6.0	6.35	6.4	2.38	0.8			○		●	●	●			●	
		CCMT09T304-PM4	9.0	9.53	9.7	3.97	0.4					●	●	●			●	
		CCMT09T308-PM4	9.0	9.53	9.7	3.97	0.8					●	●	●			●	
		CCMT120404-PM4	12.0	12.7	12.9	4.76	0.4					●	●	●			●	
		CCMT120408-PM4	12.0	12.7	12.9	4.76	0.8					●	●	●			●	
SM3	medium	CCMT060204-SM3	6.0	6.35	6.4	2.38	0.4						●			●		
		CCMT060208-SM3	6.0	6.35	6.4	2.38	0.8						●			●		
		CCMT09T304-SM3	9.0	9.53	9.7	3.97	0.4						●			●		
		CCMT09T308-SM3	9.0	9.53	9.7	3.97	0.8						●			●		
		CCMT120404-SM3	12.0	12.7	12.9	4.76	0.4						●			●		
		CCMT120408-SM3	12.0	12.7	12.9	4.76	0.8						●			●		

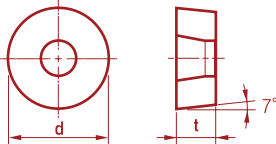
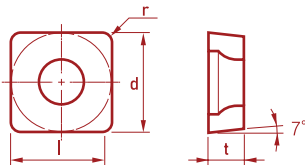
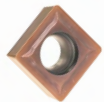
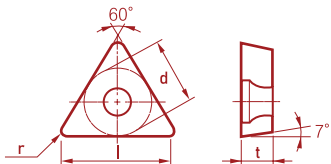
Insert

Positive Turning

Indexable inserts		Dimensions (mm)					P						M				K	N
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
		D C . .																
PF3	finishing																	
		DCMT070204-PF3	7.0	6.35	7.8	2.38	0.4	●									○	
		DCMT11T304-PF3	11.0	9.53	11.6	3.97	0.4	●									○	
		DCMT11T308-PF3	11.0	9.53	11.6	3.97	0.8	●									○	
SM3	medium																	
		DCMT070204-SM3	7.0	6.35	7.8	2.38	0.4						●				●	
		DCMT070208-SM3	7.0	6.35	7.8	2.38	0.8						●				●	
		DCMT11T304-SM3	11.0	9.53	11.6	3.97	0.4						●				●	
		DCMT11T308-SM3	11.0	9.53	11.6	3.97	0.8						●				●	
MM4	medium																	
		DCMT070204-MM4	7.0	6.35	7.8	2.38	0.4						●				●	
		DCMT070208-MM4	7.0	6.35	7.8	2.38	0.8						●				●	
PM4	semi-finishing																	
		DCMT070204-PM4	7.0	6.35	7.8	2.38	0.4					●	○					
		DCMT070208-PM4	7.0	6.35	7.8	2.38	0.8					●	●	●			●	
		DCMT11T304-PM4	11.0	9.53	11.6	3.97	0.4					●	●	●			●	
		DCMT11T308-PM4	11.0	9.53	11.6	3.97	0.8					●	●	●			●	

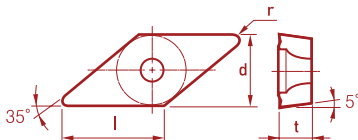
Insert

Positive Turning

Indexable inserts		Dimensions (mm)					P					M				K	N	
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
							R C . .											
PR8	roughing	RCMX160600-PR8	16.0	16	16	6.35	-			●		●						
		RCMX200600-PR8	20.0	20	20	6.35	-			●		●						
		RCMX250700-PR8	25.0	25	25	7.94	-			◇		◇	◇					
		RCMX320900-PR8	32.0	32	32	9.53	-			●		●	●					
							S C . .											
SM3	medium	SCMT120404-SM3	12.0	12.7	12.7	4.76	0.4						●			●		
		SCMT120408-SM3	12.0	12.7	12.7	4.76	0.8						●			●		
							T C . .											
PF3	finishing	TCMT16T304-PF3	16.0	9.53	16.5	3.97	0.4	●										
		TCMT16T308-PF3	16.0	9.53	16.5	3.97	0.8	●										

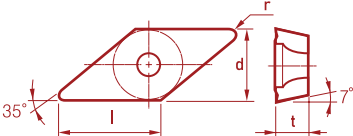
Insert

Positive Turning

Indexable inserts			Dimensions (mm)					P						M				K	N
Designation			Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
SM3	medium	TCMT110204-SM3	11.0	6.35	11	2.38	0.4							●				●	
		TCMT110208-SM3	11.0	6.35	11	2.38	0.8							●				●	
		TCMT16T304-SM3	16.0	9.53	16.5	3.97	0.4							●				●	
		TCMT16T308-SM3	16.0	9.53	16.5	3.97	0.8							●				●	
PM4	semi-finishing	TCMT110202-PM4	11.0	6.35	11	2.38	0.2					●	●	●				●	
		TCMT110204-PM4	11.0	6.35	11	2.38	0.4					●	●	●				●	
		TCMT110208-PM4	11.0	6.35	11	2.38	0.8					●	●	●				●	
		TCMT16T304-PM4	16.0	9.53	16.5	3.97	0.4					●	●	●				●	
		TCMT16T308-PM4	16.0	9.53	16.5	3.97	0.8					●	●	●				●	
								V B . .											
PF3	finishing	VBMT160404-PF3	16.0	9.53	16.5	4.76	0.4	●											
		VBMT160408-PF3	16.0	9.53	16.5	4.76	0.8	●											
MM4	medium	VBMT110304-MM4	11.0	6.35	11	3.18	0.4							●				●	
		VBMT110308-MM4	11.0	6.35	11	3.18	0.8							●				●	
		VBMT160404-MM4	16.0	9.53	16.5	4.76	0.4							●				●	
		VBMT160408-MM4	16.0	9.53	16.5	4.76	0.8							●				●	

Insert

Positive Turning

Indexable inserts			Dimensions (mm)				P						M				K	N	
Designation			Size	d	l	t	r	PP05	PP30	CP15	CP15	CP25	CP25	PM10	PM10	PM20	PM20	CK10	UN30
SM3	medium		VBMT110304-SM3	11.0	6.35	11	3.18	0.4											
			VBMT110308-SM3	11.0	6.35	11	3.18	0.8											
			VBMT160404-SM3	16.0	9.53	16.5	4.76	0.4											
			VBMT160408-SM3	16.0	9.53	16.5	4.76	0.8											
PM4	semi-finishing		VBMT160404-PM4	16.0	9.53	16.5	4.76	0.4											
			VBMT160408-PM4	16.0	9.53	16.5	4.76	0.8											
								V C . .											
PM4	semi-finishing		VCMT160404-PM4	16.0	9.53	16.5	4.76	0.4											
			VCMT160408-PM4	16.0	9.53	16.5	4.76	0.8											
SM3	medium		VCMT160404-SM3	16.0	9.53	16.5	4.76	0.4											
			VCMT160408-SM3	16.0	9.53	16.5	4.76	0.8											

Feed Rate & Depth of Cut
ap (mm) & fn (mm/rev)

Material				Chip breaker															
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm2)	Hardness (HB)	PF3				PM4				SM3				MM4			
				ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)	
				min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
P	Unalloyed steel	<600	<180	0.15	2.40	0.02	0.28	0.35	2.90	0.08	0.48	0.18	2.60	0.10	0.45	0.32	2.70	0.06	0.30
		<950	<280	0.15	2.40	0.02	0.28	0.35	2.90	0.08	0.48	0.18	2.60	0.10	0.45	0.32	2.70	0.06	0.30
	Alloyed steel	700-950	200-280	0.15	2.40	0.02	0.25	0.35	2.90	0.08	0.45	0.18	2.60	0.10	0.40	0.32	2.70	0.06	0.25
		950-1200	280-355	0.15	2.40	0.02	0.25	0.35	2.90	0.08	0.45	0.18	2.60	0.10	0.40	0.32	2.70	0.06	0.25
		1200-1400	355-415	0.15	2.40	0.02	0.25	0.35	2.90	0.08	0.45	0.18	2.60	0.10	0.40	0.32	2.70	0.06	0.25
M	Duplex stainless steel	778	230	0.15	2.40	0.02	0.25	0.35	2.90	0.08	0.45	0.18	2.60	0.06	0.35	0.32	2.70	0.06	0.25
	Austenitic stainless steel	675	200	0.15	2.40	0.02	0.20	0.35	2.90	0.08	0.40	0.18	2.60	0.06	0.35	0.32	2.70	0.06	0.20
	Precipitation-hardening stainless steel	1013	300	0.15	2.40	0.02	0.20	0.35	2.90	0.08	0.40	0.18	2.60	0.06	0.35	0.32	2.70	0.06	0.20
K	Grey cast iron	700	220											0.12	0.45	0.32	2.70	0.06	0.30
	Nodular cast iron	880	260											0.12	0.45	0.32	2.70	0.06	0.25
	Malleable cast iron	800	250											0.10	0.40	0.32	2.70	0.06	0.20
N	Aluminum	260	75																
	Aluminum alloy	447	130																
S	Fe-based alloy	943	280																
	Co-based alloy	1076	320																
	Ni-based alloy	1177	350																
	Ti-alloy	1262	370																
H	Hardened steel	-	50-60HRC																
	Chilled cast iron	-	55HRC																

Material				Chip breaker															
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm2)	Hardness (HB)	PR8															
				ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)		ap (mm)		fn (mm/rev)	
				min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
P	Unalloyed steel	<600	<180	0.40	5.80	0.70	1.30												
		<950	<280	0.40	5.80	0.70	1.30												
	Alloyed steel	700-950	200-280	0.40	5.80	0.60	1.15												
		950-1200	280-355	0.40	5.80	0.60	1.15												
		1200-1400	355-415	0.40	5.80	0.60	1.15												
M	Duplex stainless steel	778	230																
	Austenitic stainless steel	675	200																
	Precipitation-hardening stainless steel	1013	300																
K	Grey cast iron	700	220	0.40	5.80	0.75	1.45												
	Nodular cast iron	880	260	0.40	5.80	0.70	1.30												
	Malleable cast iron	800	250	0.40	5.80	0.70	1.25												
N	Aluminum	260	75																
	Aluminum alloy	447	130																
S	Fe-based alloy	943	280																
	Co-based alloy	1076	320																
	Ni-based alloy	1177	350																
	Ti-alloy	1262	370																
H	Hardened steel	-	50-60HRC																
	Chilled cast iron	-	55HRC																

Velocity of Cut
VC (m/min)

Material				CVD			PVD		
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm ²)	Hardness (HB)	CP1550	CP2550	CP2555	PP0550	PM1050	PM2055
P	Unalloyed steel	<600	<180	120-250	120-250	120-260	120-280	130-250	130-250
		<950	<280	120-250	120-250	120-260	120-280	130-250	130-250
	Alloyed steel	700-950	200-280	108-230	108-230	108-245	108-255	115-225	115-225
		950-1200	280-355	108-230	108-230	108-245	108-255	115-225	115-225
		1200-1400	355-415	108-230	108-230	108-245	108-255	115-225	115-225
M	Duplex stainless steel	778	230					100-210	100-220
	Austenitic stainless steel	675	200					100-190	100-195
	Precipitation-hardening stainless steel	1013	300					85-180	90-185
K	Grey cast iron	700	220						
	Nodular cast iron	880	260						
	Malleable cast iron	800	250						
N	Aluminum	260	75						
	Aluminum alloy	447	130						
S	Fe-based alloy	943	280				25-70	20-88	25-80
	Co-based alloy	1076	320				20-60	18-75	20-70
	Ni-based alloy	1177	350				18-55	15-60	18-60
	Ti-alloy	1262	370				18-50	15-55	18-50
H	Hardened steel	-	50-60HRC						
	Chilled cast iron	-	55HRC						



Insert

Grooving

INSERT DESIGNATION (BASED ON ISO NORMS FOR GROOVING)								
MG	M	N	200					
1	2	3	4					

1	PRODUCT CODE							
		MG	MULTI GROOVING SQUARE					
		MR	MULTI GROOVING ROUND					

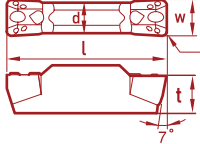
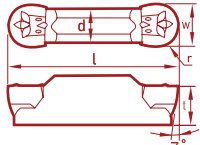
2	TOLERANCE							
		M	M-CLASS TOLERANCE					
		G	G-CLASS TOLERANCE					

3	APPLICATION							
		R	RIGHT HAND					
		L	LEFT HAND					
		N	RIGHT-LEFT HAND					

4	WIDTH OF CUTTING EDGE								
	Symbol	150	200	250	300	400	500	600	800
	mm	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0

Insert

Grooving

Indexable inserts		Dimensions (mm)					P						M				K	N
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
							M G M N											
MGMN	multi-functional grooving	MGMN150-GM3	1.5	1.2	16.0	3.5	0.15					●				●		
		MGMN200-GM3	2.0	1.6	16.0	3.5	0.2					●				●		
		MGMN250-GM3	2.5	2.0	18.5	3.85	0.2					●				●		
		MGMN300-GM4	3.0	2.35	21.0	4.83	0.4					●				●		
		MGMN400-GM4	4.0	3.3	21.0	4.83	0.2					●				●		
		MGMN500-GM4	5.0	4.1	26.0	5.82	0.8					●				●		
		MGMN600-GM4	6.0	5.0	26.0	5.82	0.8					●				●		
							M R M N											
MRMN	copy grooving	MRMN200-GM4	2.0	1.5	16.0	3.5	1.0					●				●		
		MRMN300-GM4	3.0	2.35	21.0	4.83	1.5					●				●		
		MRMN400-GM4	4.0	3.3	21.0	4.83	2.0					●				●		
		MRMN500-GM4	5.0	4.1	26.0	5.82	2.5					●				●		
		MRMN600-GM4	6.0	5.0	26.0	5.82	3.0					●				●		
		MRMN800-GM4	8.0	6.0	31.0	6.5	4.0					●				●		

Feed Rate
fn (mm/rev)

Material				Chip breaker - (MGMN)															
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm2)	Hardness (HB)	MGMN150-GM3		MGMN200-GM3		MGMN250-GM3		MGMN300-GM4		MGMN400-GM4		MGMN500-GM4		MGMN600-GM4			
				fn (mm/rev)		fn (mm/rev)		fn (mm/rev)		fn (mm/rev)		fn (mm/rev)		fn (mm/rev)		fn (mm/rev)		fn (mm/rev)	
				min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
P	Unalloyed steel	<600	<180	0.04	0.12	0.04	0.15	0.05	0.15	0.05	0.15	0.05	0.15	0.1	0.2	0.12	0.25		
		<950	<280	0.04	0.12	0.04	0.15	0.05	0.15	0.05	0.15	0.05	0.15	0.1	0.2	0.12	0.25		
	Alloyed steel	700-950	200-280	0.04	0.12	0.04	0.12	0.05	0.12	0.05	0.15	0.05	0.15	0.08	0.18	0.1	0.22		
		950-1200	280-355	0.04	0.12	0.04	0.12	0.05	0.12	0.05	0.15	0.05	0.15	0.08	0.18	0.1	0.22		
		1200-1400	355-415	0.04	0.12	0.04	0.12	0.05	0.12	0.05	0.15	0.05	0.15	0.08	0.18	0.1	0.22		
M	Duplex stainless steel	778	230	0.04	0.10	0.04	0.12	0.05	0.12	0.05	0.12	0.05	0.12	0.08	0.18	0.1	0.2		
	Austenitic stainless steel	675	200	0.04	0.10	0.04	0.10	0.05	0.10	0.05	0.12	0.05	0.12	0.08	0.15	0.1	0.2		
	Precipitation-hardening stainless steel	1013	300	0.04	0.10	0.04	0.10	0.05	0.10	0.05	0.12	0.05	0.12	0.05	0.15	0.08	0.18		
K	Grey cast iron	700	220																
	Nodular cast iron	880	260																
	Malleable cast iron	800	250																
N	Aluminum	260	75																
	Aluminum alloy	447	130																
S	Fe-based alloy	943	280																
	Co-based alloy	1076	320																
	Ni-based alloy	1177	350																
	Ti-alloy	1262	370																
H	Hardened steel	-	50-60HRC																
	Chilled cast iron	-	55HRC																

Material				Chip breaker - (MRMN)															
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm2)	Hardness (HB)	MRMN200-GM4		MRMN300-GM4		MRMN400-GM4		MRMN500-GM4		MRMN600-GM4		MRMN800-GM4					
				fn (mm/rev)		fn (mm/rev)		fn (mm/rev)		fn (mm/rev)		fn (mm/rev)		fn (mm/rev)		fn (mm/rev)		fn (mm/rev)	
				min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
P	Unalloyed steel	<600	<180	0.03	0.18	0.03	0.20	0.04	0.23	0.04	0.25	0.05	0.25	0.05	0.3				
		<950	<280	0.03	0.18	0.03	0.20	0.04	0.23	0.04	0.25	0.05	0.25	0.05	0.3				
	Alloyed steel	700-950	200-280	0.03	0.18	0.03	0.18	0.04	0.20	0.04	0.22	0.05	0.25	0.05	0.27				
		950-1200	280-355	0.03	0.18	0.03	0.18	0.04	0.20	0.04	0.22	0.05	0.25	0.05	0.27				
		1200-1400	355-415	0.03	0.18	0.03	0.18	0.04	0.20	0.04	0.22	0.05	0.25	0.05	0.27				
M	Duplex stainless steel	778	230	0.03	0.15	0.03	0.18	0.04	0.20	0.04	0.20	0.05	0.22	0.05	0.25				
	Austenitic stainless steel	675	200	0.03	0.15	0.03	0.15	0.04	0.18	0.04	0.20	0.05	0.22	0.05	0.25				
	Precipitation-hardening stainless steel	1013	300	0.03	0.12	0.03	0.15	0.04	0.15	0.04	0.18	0.05	0.20	0.05	0.25				
K	Grey cast iron	700	220																
	Nodular cast iron	880	260																
	Malleable cast iron	800	250																
N	Aluminum	260	75																
	Aluminum alloy	447	130																
S	Fe-based alloy	943	280																
	Co-based alloy	1076	320																
	Ni-based alloy	1177	350																
	Ti-alloy	1262	370																
H	Hardened steel	-	50-60HRC																
	Chilled cast iron	-	55HRC																

Velocity of Cut

VC (m/min)

Material				CVD	PVD				
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm2)	Hardness (HB)	CP2555	PM2055				
P	Unalloyed steel	<600	<180	120-260	130-250				
		<950	<280	120-260	130-250				
	Alloyed steel	700-950	200-280	108-245	115-225				
		950-1200	280-355	108-245	115-225				
		1200-1400	355-415	108-245	115-225				
M	Duplex stainless steel	778	230		100-220				
	Austenitic stainless steel	675	200		100-195				
	Precipitation-hardening stainless steel	1013	300		90-185				
K	Grey cast iron	700	220						
	Nodular cast iron	880	260						
	Malleable cast iron	800	250						
N	Aluminum	260	75						
	Aluminum alloy	447	130						
S	Fe-based alloy	943	280		25-80				
	Co-based alloy	1076	320		20-70				
	Ni-based alloy	1177	350		18-60				
	Ti-alloy	1262	370		18-50				
H	Hardened steel	-	50-60HRC						
	Chilled cast iron	-	55HRC						



Insert

Threading

INSERT DESIGNATION (BASED ON ISO NORMS FOR THREADING)								
16	E	R	0.5	ISO				
1	2	3	4	5				

1	SIZE							
			L		I.C (mm)			
			11		6.3			
			16		9.5			
			22		12.7			
			27		15.8			

2	TYPE							
			E		EXTERNAL			
			I		INTERNAL			

3	APPLICATION							
			R		RIGHT HAND			
			L		LEFT HAND			

4	PITCH							
			SHAPE		mm		TPI	
			• PARTIAL PROFILE					
			A		0.5-1.5		48-16	
			G		1.75-3.0		14-8.0	
			AG		0.5-3.0		48-8.0	
			N		3.5-5.0		7.0-5.0	
			Q		5.5-6.0		4.5-4.0	
			• FULL PROFILE					
			-		3.5-6.0		72-4.0	

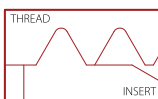
5	PROFILE							
		PARTIAL	60°	55°				
		FULL	ISO	BSW	NPTUN	TRAPEZ	UN	

PARTIAL
(A,G,AG,N,Q)



- ✓ Most economical solution
- ✓ Used for wide range of pitches
- ✓ It is partial because of the exterior major or internal minor diameter is not machined.

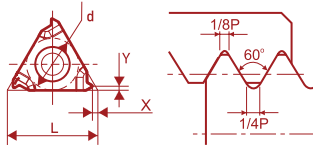
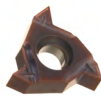
FULL



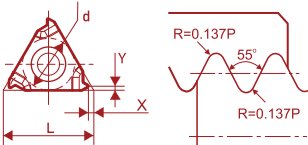
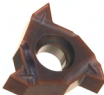
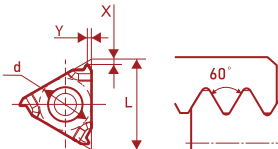
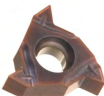
- ✓ Cuts all thread shapes according to the requirements.
- ✓ Wide range of inserts needed in order to fit each standard and range of pitches.

Insert

Threading

Indexable inserts			Dimensions (mm)						P					M				K	N	
Designation			Size	d	l	t	r		PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
									I S O											
ISO	standard	16EL-0.5 ISO	16ER-0.5 ISO	0.5	-	9.53	16.0	0.6	0.6							●				
		16EL-1.0 ISO	16ER-1.0 ISO	1.0	-	9.53	16.0	0.7	0.7							●				
		16EL-1.5 ISO	16ER-1.5 ISO	1.5	-	9.53	16.0	0.8	1.0							●				
		16EL-2.0 ISO	16ER-2.0 ISO	2.0	-	9.53	16.0	1.0	1.3							●				
		16EL-2.5 ISO	16ER-2.5 ISO	2.5	-	9.53	16.0	1.1	1.5							●				
		16EL-3.0 ISO	16ER-3.0 ISO	3.0	-	9.53	16.0	1.2	1.6							●				
		22EL-3.5 ISO	22ER-3.5 ISO	3.5	-	12.7	22.0	1.6	2.3							●				
		22EL-4.0 ISO	22ER-4.0 ISO	4.0	-	12.7	22.0	1.6	2.3							●				
ISO	standard	16IL-1.0 ISO	16IR-1.0 ISO	1.0	-	9.53	16.0	0.7	0.8							●				
		16IL-1.5 ISO	16IR-1.5 ISO	1.5	-	9.53	16.0	0.9	1.0							●				
		16IL-2.0 ISO	16IR-2.0 ISO	2.0	-	9.53	16.0	0.9	1.2							●				
		16IL-2.5 ISO	16IR-2.5 ISO	2.5	-	9.53	16.0	1.1	1.5							●				
		16IL-3.0 ISO	16IR-3.0 ISO	3.0	-	9.53	16.0	1.1	1.5							●				
		22IL-3.5 ISO	22IR-3.5 ISO	3.5	-	12.7	22.0	1.6	2.3							●				

Insert
Threading

Indexable inserts				Dimensions (mm)						P					M				K	N
Designation				Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
									B S W											
BSW	standard	16EL-11W	16ER-11W	-	11.0	9.53	16.0	1.1	1.5							◆				
		16EL-14W	16ER-14W	-	14.0	9.53	16.0	1.0	1.2							◆				
BSW	standard	16IL-11W	16IR-11W	-	11.0	9.53	16.0	1.1	1.5							◆				
		16IL-14W	16IR-14W	-	14.0	9.53	16.0	1.0	1.2							◆				
									S P I											
SPI	standard	16EL-AG55	16ER-AG55	0.5-3	48-8	9.53	16.0	1.2	1.7							◆				
		16EL-AG60	16ER-AG60	0.5-3	48-8	9.53	16.0	1.2	1.7							◆				
SPI	standard	22IL-N60	22IR-N60	3.5-5	7-5	12.7	22.0	1.7	2.5							◆				
																				

Velocity of Cut
VC (m/min)

Material				PVD					
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm2)	Hardness (HB)	PM1055					
P	Unalloyed steel	<600	<180	135-265					
		<950	<280	135-265					
	Alloyed steel	700-950	200-280	120-230					
		950-1200	280-355	120-230					
		1200-1400	355-415	120-230					
M	Duplex stainless steel	778	230	110-220					
	Austenitic stainless steel	675	200	100-205					
	Precipitation-hardening stainless steel	1013	300	90-190					
K	Grey cast iron	700	220						
	Nodular cast iron	880	260						
	Malleable cast iron	800	250						
N	Aluminum	260	75						
	Aluminum alloy	447	130						
S	Fe-based alloy	943	280	25-92					
	Co-based alloy	1076	320	20-85					
	Ni-based alloy	1177	350	18-70					
	Ti-alloy	1262	370	18-60					
H	Hardened steel	-	50-60HRC						
	Chilled cast iron	-	55HRC						



Insert

Milling

INSERT DESIGNATION (BASED ON ISO NORMS FOR MILLING)								
S	N	M	X	12	05	12		
1	2	3	4	5	6	7	8	9

1 INSERT SHAPE

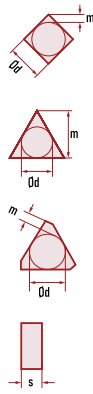
							
A	B	C	D	G	H	K	L
							
M	O	P	R	S	T	V	W

2 CLEARANCE ANGLE



3°	5°	7°	15°	20°	25°	30°	0°	11°	Special
A	B	C	D	E	F	G	N	P	O

3 TOLERANCE CLASS



Symbol	D (mm)	M (mm)	S (mm)
A	±0.025	±0.005	±0.025
C	±0.025	±0.013	±0.025
E	±0.025	±0.025	±0.025
F	±0.013	±0.005	±0.025
G	±0.025	±0.025	±0.130
H	±0.013	±0.013	±0.025
J*	±0.15-0.05	±0.005	±0.025
K*	±0.15-0.05	±0.013	±0.025
L*	±0.15-0.05	±0.025	±0.025
M*	±0.15-0.05	±0.20-0.08	±0.130
N*	±0.15-0.05	±0.20-0.08	±0.025
U*	±0.25-0.08	±0.38-0.13	±0.130

*Depending on the insert size.

4 FIXING AND CHIP BREAKER TYPES

							
A	B	F	G	H	M	N	P
			Special				
R	T	W	X				

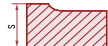
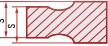
INSERT DESIGNATION (BASED ON ISO NORMS FOR MILLING)								
S	N	M	X	12	05	12		
1	2	3	4	5	6	7	8	9

5 CUTTING EDGE LENGTH

							
A,B,K	C,D,E,M,V	H,O,P	L	R	S	T	W

Disregarding any decimals e.g. 12,7 = 12

6 INSERT THICKNESS

	Symbol	01	T1	02	03	T3	04	05	06	07	09
	mm	1.59	1.98	2.38	3.18	3.97	4.76	5.56	6.35	7.94	9.53
											

7 INSERT CORNER RADIUS

00 = Sharp corner or round insert (insert version)
MO = Round insert (metric version)



Symbol	01	02	04	08	12	16	...			
mm	0.1	0.2	0.4	0.8	1.2	1.6				



MILLING

1st Letter

Symbol	45°	60°	75°	85°	90°	other				
mm	A	D	E	F	P	Z				



2nd Letter

Symbol	3°	5°	7°	15°	20°	25°	30°	0°	11°	other
mm	A	B	C	D	E	F	G	N	P	Z

8 EDGE PREPARATION

							
F	E	T	S				

Optional information

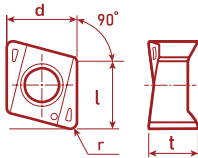
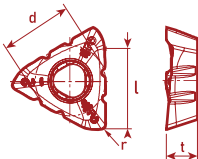
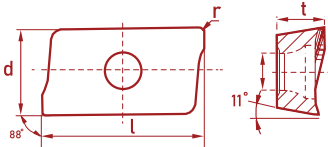
9 CUTTING DIRECTION

							
R	L	N					

Optional information

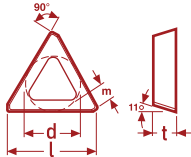
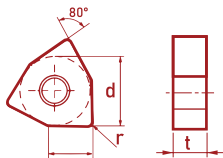
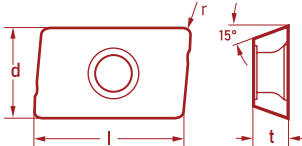
Insert

Milling

Indexable inserts		Dimensions (mm)					P					M				K	N	
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
							4 N K T											
shoulder milling	4NKT060308R-CM3	6.0	6.6	6	4.67	0.8							◆					
																		
							3 P . .											
shoulder milling	3PHT100404R-CF4	10.0	6.9	7.0	4.0	0.4												◆
	3PHT150504R-CF4	15.0	10.7	11.0	5.0	0.4												◆
shoulder milling	3PKT100408R-CM3	10.0	6.9	7.0	4.0	0.8							◆			◆		
	3PKT150508R-CM3	15.0	10.7	11.0	5.0	0.8							◆			◆		
							A P . .											
shoulder milling	APKT1003PDTR	10.0	6.7	11.0	3.47	-							◆					
	APKT1604PDR	16.0	9.45	17.3	5.3	-							◆					

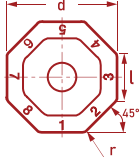
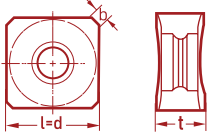
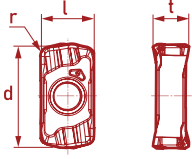
Insert

Milling

Indexable inserts		Dimensions (mm)					P					M				K	N		
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050	
shoulder milling		APMT1135PDER-CM3	11.0	6.35	11.1	3.5	-							◆		◆	◆		
	APMT160408PDER-CM3	16.0	9.25	17.25	4.76	0.8							◆		◆	◆			
							T P K N												
shoulder milling		TPKN2204PDSR	22.0	12.7	22.0	4.76	-						◆		◆	◆			
																			
							X N E X												
shoulder milling		XNEX040304TR-CM3	4.0	6.71	4.3	3.29	0.4						◆			◆			
	XNEX080608TR-CR2												◆			◆			
							X O M X												
shoulder milling		XOMX120412TR-CF4	12.0	8.2	12.7	5.05	1.2						◆			◆			
	XOMX10T308TR-CM3	10.0	6.9	10.2	3.85	0.8							◆			◆			
	XOMX120408TR-CM3	12.0	8.2	12.7	5.07	0.8							◆			◆			

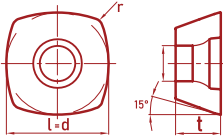
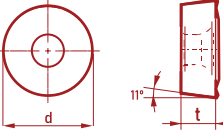
Insert

Milling

Indexable inserts		Dimensions (mm)					P						M				K	N
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
								O N M U										
face milling	ONMU050505-MM3	5.0	13.0	5.0	5.08	0.5											●	
																		
								S N M X										
face milling	SNMX120512-CM3	12.0	12.7	12.7	5.62	1.2							●				●	●
	SNMX1205ANN-CM3	12.0	12.7	12.7	5.62	-							●				●	●
								L N M U										
high-feed milling	LNMU0303ZER-CM3	3.0	6.0	3.2	4.29	-							●		○	○		
																		

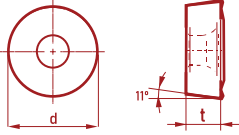
Insert

Milling

Indexable inserts		Dimensions (mm)					P					M				K	N	
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
							S D M T											
high-feed milling	SDMT070308-CF4	7.0	7.94	7.94	3.18	0.8		●					●					
	SDMT09T312-CF4	9.0	9.53	9.53	3.97	1.2		●					●					
	SDMT070308-CM3	7.0	7.94	7.94	3.18	0.8		●					●					
	SDMT09T312-CM3	9.0	9.53	9.53	3.97	1.2		●					●					
	SDMT070308-CR2	7.0	7.94	7.94	3.18	0.8		●					●					
	SDMT09T312-CR2	9.0	9.53	9.53	3.97	1.2		●					●					
							R D . .											
round milling	RDMT0802MO-CM3	8.0	8.0	8.0	2.38	-							●		○	○		
	RDMT10T3MO-CM3	10.0	10.0	10.0	3.97	-							●		○	○		
	RDMT1204MO-CM3	12.0	12.0	12.0	4.76	-							●		○	○		
round milling	RDMW10T3MO	10.0	10.0	10.0	3.97	-							●					
	RDMW1204MO	12.0	12.0	12.0	4.76	-							●					
	RDMW1204MO-CR2	12.0	12.0	12.0	4.76	-							●			●		
	RDMW1605MO-CR2	16.0	16.0	16.0	5.56	-							●			●		

Insert

Milling

Indexable inserts		Dimensions (mm)					P						M				K	N
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
							R P . .											
round milling		RPMT08T2MOE-CM3	8.0	8.0	8.0	2.78	-						●				●	
		RPMT10T3MOE-CM3	10.0	10.0	10.0	3.97	-						●				●	
		RPMT1204MO-CM3	12.0	12.0	12.0	4.76	-						●		●		●	
round milling		RPMW08T2MO	8.0	8.0	8.0	2.78	-						●				●	
		RPMW1003MO	10.0	10.0	10.0	3.18	-						●				●	
		RPMW10T3MO	10.0	10.0	10.0	3.97	-						●				●	

Velocity of Cut
VC (m/min)

Material				CVD	PVD				UNCOATED
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm2)	Hardness (HB)	CK1050	PP3050	PM1050	PM2050	PM2055	UN3050
P	Unalloyed steel	<600	<180		120-250	130-250	130-220	130-250	
		<950	<280		120-250	130-250	130-220	130-250	
	Alloyed steel	700-950	200-280		108-235	115-225	115-185	115-225	
		950-1200	280-355		108-235	115-225	115-185	115-225	
		1200-1400	355-415		108-235	115-225	115-185	115-225	
M	Duplex stainless steel	778	230			100-210	100-200	100-220	
	Austenitic stainless steel	675	200			100-190	100-185	100-195	
	Precipitation-hardening stainless steel	1013	300			85-180	90-180	90-185	
K	Grey cast iron	700	220	155-350					
	Nodular cast iron	880	260	115-280					
	Malleable cast iron	800	250	75-110					
N	Aluminum	260	75						200-280
	Aluminum alloy	447	130						130-250
S	Fe-based alloy	943	280			20-88		25-80	
	Co-based alloy	1076	320			18-75		20-70	
	Ni-based alloy	1177	350			15-60		18-60	
	Ti-alloy	1262	370			15-55		18-50	
H	Hardened steel	-	50-60HRC						
	Chilled cast iron	-	55HRC						



Insert

Drilling

INSERT DESIGNATION (BASED ON ISO NORMS FOR DRILLING)								
S	P	M	G	05	02	04		
1	2	3	4	5	6	7	8	9

1 INSERT SHAPE

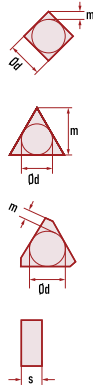
							
A	B	C	D	G	H	K	L
							
M	O	P	R	S	T	V	W

2 CLEARANCE ANGLE



3°	5°	7°	15°	20°	25°	30°	0°	11°	Special
A	B	C	D	E	F	G	N	P	O

3 TOLERANCE CLASS



Symbol	D (mm)	M (mm)	S (mm)
A	±0.025	±0.005	±0.025
C	±0.025	±0.013	±0.025
E	±0.025	±0.025	±0.025
F	±0.013	±0.005	±0.025
G	±0.025	±0.025	±0.130
H	±0.013	±0.013	±0.025
J*	±0.15-0.05	±0.005	±0.025
K*	±0.15-0.05	±0.013	±0.025
L*	±0.15-0.05	±0.025	±0.025
M*	±0.15-0.05	±0.20-0.08	±0.130
N*	±0.15-0.05	±0.20-0.08	±0.025
U*	±0.25-0.08	±0.38-0.13	±0.130

*Depending on the insert size.

4 FIXING AND CHIP BREAKER TYPES

							
A	B	F	G	H	M	N	P
			Special				
R	T	W	X				

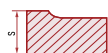
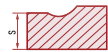
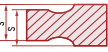
INSERT DESIGNATION (BASED ON ISO NORMS FOR DRILLING)								
S	P	M	G	05	02	04		
1	2	3	4	5	6	7	8	9

5 CUTTING EDGE LENGTH

							
A,B,K	C,D,E,M,V	H,O,P	L	R	S	T	W

Disregarding any decimals e.g. 12,7 = 12

6 INSERT THICKNESS

	Symbol	01	T1	02	03	T3	04	05	06	07	09
	mm	1.59	1.98	2.38	3.18	3.97	4.76	5.56	6.35	7.94	9.53
											

7 INSERT CORNER RADIUS

00 = Sharp corner
 or round insert
 (insert version)
 MO = Round insert
 (metric version)



Symbol	01	02	04	08	12	16	...			
mm	0.1	0.2	0.4	0.8	1.2	1.6				

8 EDGE PREPARATION

							
F	E	T	S				

Optional information

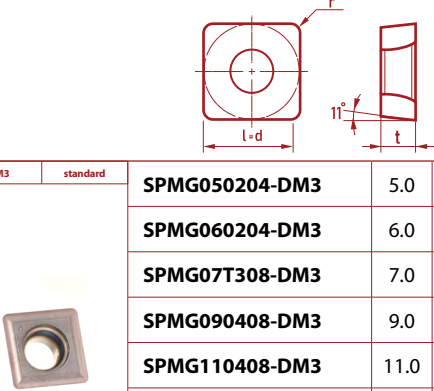
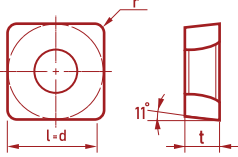
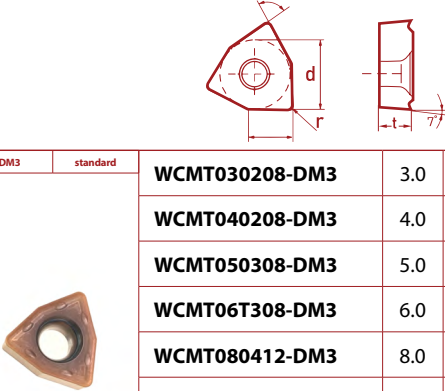
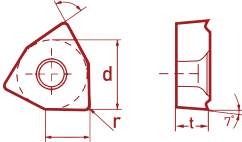
9 CUTTING DIRECTION

							
R	L	N					

Optional information

Insert

Drilling

Indexable inserts		Dimensions (mm)					P						M				K	N
Designation		Size	d	l	t	r	PP0550	PP3050	CP1550	CP1555	CP2550	CP2555	PM1050	PM1055	PM2050	PM2055	CK1050	UN3050
		 S P M G																
		SPMG050204-DM3	5.0	5.0	5.0	2.38	0.4										●	
		SPMG060204-DM3	6.0	6.0	6.0	2.38	0.4										●	
		SPMG07T308-DM3	7.0	7.94	7.94	3.97	0.8										●	
		SPMG090408-DM3	9.0	9.8	9.8	4.76	0.8										●	
		SPMG110408-DM3	11.0	11.5	11.5	4.76	0.8										●	
		SPMG140512-DM3	14.0	14.3	14.3	5.2	1.2										●	
		 W C M T																
		WCMT030208-DM3	3.0	5.56	3.8	2.38	0.8						●					
		WCMT040208-DM3	4.0	6.35	4.3	2.38	0.8						●					
		WCMT050308-DM3	5.0	7.94	5.4	3.18	0.8						●					
		WCMT06T308-DM3	6.0	9.53	6.5	3.97	0.8						●					
		WCMT080412-DM3	8.0	12.7	8.7	4.76	1.2						●					

Velocity of Cut
VC (m/min)

Material				PVD					
ISO	MATERIAL CLASSIFICATION	Tensile strength (N/mm2)	Hardness (HB)	PM1050	PM2055				
P	Unalloyed steel	<600	<180	130-250	130-250				
		<950	<280	130-250	130-250				
	Alloyed steel	700-950	200-280	115-225	115-225				
		950-1200	280-355	115-225	115-225				
		1200-1400	355-415	115-225	115-225				
M	Duplex stainless steel	778	230	100-210	100-220				
	Austenitic stainless steel	675	200	100-190	100-195				
	Precipitation-hardening stainless steel	1013	300	85-180	90-185				
K	Grey cast iron	700	220						
	Nodular cast iron	880	260						
	Malleable cast iron	800	250						
N	Aluminum	260	75						
	Aluminum alloy	447	130						
S	Fe-based alloy	943	280	20-88	25-80				
	Co-based alloy	1076	320	18-75	20-70				
	Ni-based alloy	1177	350	15-60	18-60				
	Ti-alloy	1262	370	15-55	18-50				
H	Hardened steel	-	50-60HRC						
	Chilled cast iron	-	55HRC						

GRADE COMPARISON CHART FOR TURNING												
ISO CLASSIFICATION	MATERIAL CLASSIFICATION	HURMEN-METAL	SANDVIK	ISCAR	KENNAMETAL	KYOCERA	MITSUBISHI	SECO	SUMITOMO	TAEGUTEC	TUNGALOY	WALTER
P	P10	CP1550	GC4215		KC9110	CA5515	UE6110	TP1501	AC700G		T9015	WPP10
		CP1555										
	P20	CP2550	GC4325	IC8250	KCP25	CA525	MC6025	TP2500	AC8025P	TT8125	T9125	WPP20S
		CP2555	GC4225		KC9215	CA5525	UE6020	TP2501	AC820P		T9025	WPP20
M	M10	PM1050			KCU10	PR1310	VP10RT	CP200	AC510U		AH8005	
						PR1215	MP9005					
	M20	PM2055	GC1115	IC887	KC5525	PR930	VP15TF	CP500	AC6030M	TT9080	T6020	WSM20S
			GC15		KCU25	PR1025	MP9015		AC520U		AH120	WMP20S
						RP1225					AH630	
						PR1325					AH8015	
K	K20	CK1050	GC3210	IC5010	KCK15	CA4515	MC5015	TK2001	AC415K	TT7310	T5115	WKK20S
			GC3215		KC9315	CA415	UC5115	TK2000	AC700G	TT7015	T515	WAK20
N	N10		H10	IC20	K68	KW10	HTI10	KX	H1	K10	TH10	WK1
					K313							

GRADE COMPARISON CHART FOR MILLING												
ISO CLASSIFICATION	MATERIAL CLASSIFICATION	HURMEN-METAL	SANDVIK	ISCAR	KENNAMETAL	KYOCERA	MITSUBISHI	SECO	SUMITOMO	TAEGUTEC	TUNGALOY	WALTER
P	P20	PP3050	GC1030	IC808	KC522M	PR9925	VP15TF	F30M	ACP2000	TT9080	AH120	WAM30
			GC4240	IC908	KC635M	PR830	VP20RT	MP3000		TT9030	AH725	
					KC725M						AH730	
											GH330	
											GH330	
M	M10	PM1050	GC1030	HC808	KC635M	PR730	VP15TF	MP2500	ACP2000	TT9300	T3130	WAM30
			GC2030	IC908		PR830		F30M		TT9080	AH725	WXM35
						PR925					AH120	
	M20	PM2050		IC928			F7030	MS2500	EH520Z		SH730	WSP45
		PM2055		IC928			F7030	MS2500	EH520Z		SH730	WSP45
K	K10	CK1050	GC3220	IC810	KCK15	PR905	MC5020	MK2050	ACK2000	TT6080	T1115	WKP25
			GC4220	IC910	KC520M	PR510	VP15TF	MK2000	ACK3000		AH120	WKP35
	K20											
	K30											



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