






























PCD&PCBN inserts

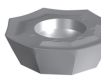
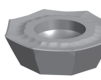
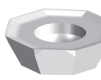


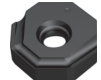
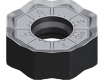
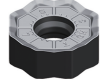
				
APHT-PCD	APHT-W	APHT-CBN	SEHT-PCD	SEHT-CBN
Page B206	B206	B206	B224	B224

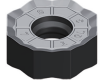
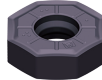
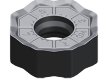
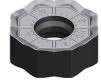


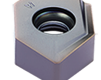

Inserts for face milling









							
SEET-CF	SEET-CM	SEET-CR	SEET-DF	SEET-DM	SEET-DR	SEET-EF	SEET-EM
Page B219	B219	B219	B219	B219	B219	B219	B219









							
SEET-LH	SEET-W	SEHT-AL	SEK(E)N	SEKR	SEMR-M	SEKR-M	SNG(M)X-GL
Page B219	B219	B224	B220	B220	B220	B220	B222







							
SNG(M)X-GM	SNG(M)X-GH	SNCU-W4	ODHT-GM	ODHT-GH	ODHT-GL	ODMT-GM	ODHT-LH
Page B222	B222	B223	B211	B211	B211	B211	B211

							
OFKT-DF	OFKT-DM	OFKT-LH	ONHU-PF	ONHU-PM	ONHU-W	ONHU-GM	ONHU-GH
Page B211	B211	B211	B212	B212	B212	B212	B212

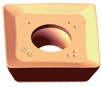
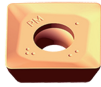
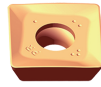
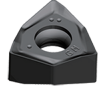
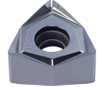


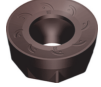
							
ONHU-GL	ONHU-W	ONMU-GM	ONMU-GH	SNEG-GM	SNEG-HGR	SNEG-W	HNEX-DF
Page B212	B212	B212	B212	B221	B221	B221	B208






							
HNEX-DM	HNEX-DR	PNEG-GL	PNEG-GM	PNEG-GH	PNEG-CF/CM/CR	PNEG-PF/PM/PR	PNEG-KL/KM/KH
Page B208	B208	B213	B213	B213	B213	B214	B214

							
LNKT-ZR	LNKT-ZR	LNKT-ZR	SPKW	SPKT	SP□N	SPKR-GM	SPEX
Page B209	B209	B209	B226	B224	B225	B226	B227









					
SPMR	SP□N	TPKN	TPGN	TPUN	TPMR
Page B227	B228	B229	B229	B230	B230



Inserts for face milling

							
SEET□PER-APF	SEET□PER-APM	SEET□PER-APR	WNHU-GM	WNHU-LH	RCKT-DM	RCKT-DR	RCKT-ER
Page B221	B221	B221	B231	B231	B216	B216	B216






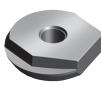
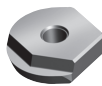
				
RCKT-NM	RCMW	RDKW□MO	RDKT□MO	RDKT□MO-NM
Page B216	B216	B217	B217	B217

Inserts for square shoulder milling

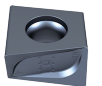



							
APHT-AL	APKT-APF	APKT-APM	APKT-ALH	ANGX□PNR-GM	ANMX□PNR-GM	ANGX□PNR-LH	LNKT-GM
Page B206	B207	B207	B207	B208	B208	B208	B210

	
LNKT-GL	LNMT-GM
Page B210	B210







Inserts for profile milling

						
ZDET	ZPNT	SDMT/SPMT	ROHX	XPHT-GM	ZOHX-GF	ZOHX-GM
Page B232	B233	B218/B224	B217	B232	B233	B233


Inserts for side and face milling

			
LNGX-GM	XSEQ	MPHT	QC□□L
Page B209	B232	B210	B215



Inserts for high feed

					
SDMT-DM	SDMT-PM	SDMT-NM	WPGT	WPGT-PM	SNGU-GM
Page B218	B218	B218	B231	B231	B223

Inserts for T-slot milling


MPHT
Page B210


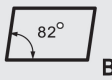
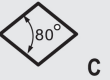


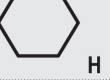
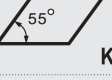



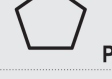





Inserts for helical milling

	
APKT-PM/KM	SPMT-PM/KM
Page B207	B224

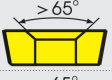

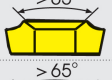
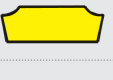
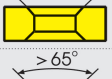


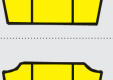


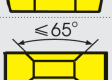
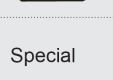
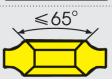

Inserts for chamfer milling


SPMT
Page B224

Indexable milling inserts code key

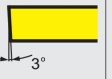
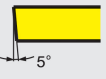

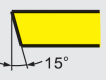
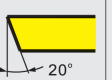
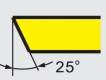
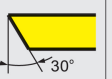
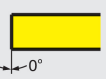

Insert Shape / Code		
 A	 B	 C
 D	 E	 H
 K	 L	 M
 O	 P	 R
 S	 T	 V
 W	Others Z	

Insert shape

Metric							
Code	With/Without hole	With/Without chipbreaker	Section plane of Insert	Code	With/Without hole	With/Without chipbreaker	Section plane of Insert
B	With	Without		N	Without	Without	
H	With	Single-side		R	Without	Single-side	
C	With	Without		F	Without	Double-side	
J	With	Double-side		A	With	Without	
W	With	Without		M	With	Single-side	
T	With	Single-side		G	With	Double-side	
Q	With	Without		X	---	---	Special
U	With	Double-side					

Chipbreaker and clamping system

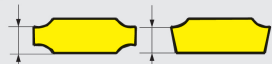
S P K N

Clearance angle of main cutting edge			
Code	Clearance angle	Code	Clearance angle
A	 3°	B	 5°
C	 7°	D	 15°
E	 20°	F	 25°
G	 30°	N	 0°
P	 11°	O	Other clearance angle

Tolerance										
Code	Nose height M Tolerance(mm)	Inscribed circle ØD ₁ Tolerance(mm)	Thickness S Tolerance(mm)	(Reference) details of M-class tolerance (identified by shape and size)						
				● Nose height tolerance(mm)						
				Inscribed circle	Regular triangle	Square	Diamond with 80°	Diamond with 55°	Diamond with 35°	Round
A	±0.005	±0.025	±0.025	6.35	±0.08	±0.08	±0.08	±0.11	±0.16	---
F	±0.005	±0.013	±0.025	9.525	±0.08	±0.08	±0.08	±0.11	±0.16	---
C	±0.013	±0.025	±0.025	12.7	±0.13	±0.13	±0.13	±0.15	---	---
H	±0.013	±0.013	±0.025	15.875	±0.15	±0.15	±0.15	±0.18	---	---
E	±0.025	±0.025	±0.025	19.05	±0.15	±0.15	±0.15	±0.18	---	---
G	±0.025	±0.025	±0.13	25.4	---	±0.18	---	---	---	---
J	±0.005	±0.05-±0.13	±0.025	● Tolerance of Inscribed Circle ØD ₁ (mm)						
				Inscribed circle	Regular triangle	Square	Diamond with 80°	Diamond with 55°	Diamond with 35°	Round
K	±0.013	±0.05-±0.13	±0.025	6.35	±0.05	±0.05	±0.05	±0.05	±0.05	---
L	±0.025	±0.05-±0.13	±0.025	9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
M	±0.08-±0.18	±0.05-±0.13	±0.13	12.7	±0.08	±0.08	±0.08	±0.08	---	±0.08
N	±0.08-±0.18	±0.05-±0.13	±0.025	15.875	±0.10	±0.10	±0.10	±0.10	---	±0.10
U	±0.13-±0.38	±0.08-±0.25	±0.13	19.05	±0.10	±0.10	±0.10	±0.10	---	±0.10
				25.4	---	±0.13	---	---	---	±0.13

Diameter of IC	Insert shape						
	C	D	R	S	T	V	W
3.97					06		
5.0			05				
5.56					09		
6.0			06				
6.35	06	07			11	11	
8.0			08				
9.525	09	11	09	09	16	16	06
10.0			10				
12.0			12				
12.7	12	15	12	12	22	22	08
15.875	16		15	15	27		
16.0		19	16				
19.05	19		19	19	33		
20.0			20				
25.0	25	25	25				
25.4			25	25			
31.75			31				
32			32				

Length of cutting edge



Thickness is defined as the height from the bottom of insert to the highest part of cutting edge

Code	Insert thickness(mm)
00	0.79
T0	0.99
01	1.59
T1	1.98
02	2.38
T2	2.58
03	3.18
T3	3.97
04	4.76
T4	4.96
05	5.96
T5	5.95
06	6.35
T6	6.75
07	7.94
09	9.52
T9	9.72
11	11.11
12	12.70

Insert thickness

12 04 ED T21 R-DM

Wiper			
A	45°	A	3°
D	60°	B	5°
E	75°	C	7°
F	85°	D	15°
P	90°	E	20°
Z	Others	F	25°
		G	30°
		N	0°
		P	11°
		Z	Others

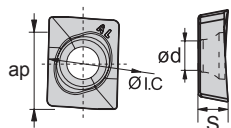
Chamfer (mm)			
F	E	T	S
	0-5°	0-0.10	
	1-10°	1-0.15	
	2-15°	2-0.20	
	3-20°	3-0.25	
	4-25°	4-0.30	
	5-30°	5-0.35	
		6-0.40	
		7-0.45	
			No mark

Chipbreaker code

Cutting direction	
R	Right hand
L	Left hand
N	Neutral

Indexable milling tools
Milling inserts

AP □ □



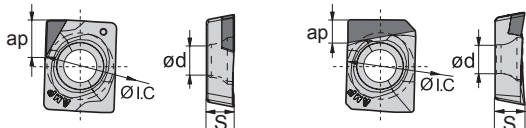
😊 Good working condition 🙄 Normal working condition 😞 Bad working condition

Workpiece material	K Cast iron	😊	😞
	N Non ferrous metal	😊	😊

Insert shape	Type	Basic dimensions(mm)				PCD	PCBN	Cemented carbide
		ØI.C	S	ød	apmax			
	APHT12T304PPFR-AL	12.7	3.97	4.4	12	DN1021	BK1021	YD201 ★

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

AP □ □



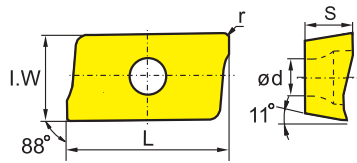
😊 Good working condition 🙄 Normal working condition 😞 Bad working condition

Workpiece material	K Cast iron	😊	😞
	N Non ferrous metal	😊	😊

Insert shape	Type	Basic dimensions(mm)				PCD	PCBN	Cemented carbide
		ØI.C	S	ød	apmax			
	APHT12T304PPFR-PCD	12.7	3.97	4.4	3	★		YD201
	APHT12T304PPFR-CBN	12.7	3.97	4.4	2		○	
	APHT12T304-W	12.7	3.97	4.4	1	★	★	

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

AP



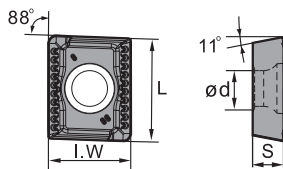
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
YBC301	😊	😊	😊	😊	😊
YBC302	😊	😊	😊	😊	😊
YBM251	😊	😊	😊	😊	😊
YBM253	😊	😊	😊	😊	😊
YBM351	😊	😊	😊	😊	😊
YBD152	😊	😊	😊	😊	😊
YBD252	😊	😊	😊	😊	😊
YBG102	😊	😊	😊	😊	😊
YBG202	😊	😊	😊	😊	😊
YBG205	😊	😊	😊	😊	😊
YB9320	😊	😊	😊	😊	😊
YBG302	😊	😊	😊	😊	😊
YBG152	😊	😊	😊	😊	😊
YBG252	😊	😊	😊	😊	😊
YBS203	😊	😊	😊	😊	😊
YBS303	😊	😊	😊	😊	😊
YNG151	😊	😊	😊	😊	😊
YNG151C	😊	😊	😊	😊	😊
YC305	😊	😊	😊	😊	😊
YD051	😊	😊	😊	😊	😊
YD101	😊	😊	😊	😊	😊
YD201	😊	😊	😊	😊	😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating				PVD Coating				Cermet	Cemented carbide														
		L	I.W	S	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102		YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC305	YD051	YD101	YD201	
	APKT070204-APF	7.32	4.34	2.38	2	0.4	●	●								★														
	APKT11T304-APF	12.24	6.6	3.6	2.8	0.4	●	●								★														
	APKT11T308-APF	12.24	6.6	3.6	2.8	0.8	●	●								★						●	●							
	APKT160408-APF	17.877	9.33	5.76	4.4	0.8	●									★						●	●							
	APKT070204-APM	7.32	4.34	2.38	2	0.4			●	●						★														
	APKT11T304-APM	12.24	6.6	3.6	2.8	0.4			●							★														
	APKT11T308-APM	12.24	6.6	3.6	2.8	0.8			●	●						★						●	●							
	APKT11T312-APM	12.24	6.6	3.6	2.8	1.2					●					★														
	APKT11T316-APM	12.24	6.6	3.6	2.8	1.6										★														
	APKT11T320-APM	12.24	6.6	3.6	2.8	2.0				●						★														
	APKT160408-APM	17.877	9.33	5.76	4.4	0.8			●	●						★						●	●							
	APKT160416-APM	17.877	9.33	5.76	4.4	1.6			●	●						★						●								
	APKT160420-APM	17.877	9.33	5.76	4.4	2.0					●					★														
	APKT160424-APM	17.877	9.33	5.76	4.4	2.4										★														
APKT160430-APM	17.877	9.33	5.76	4.4	3.0										★															
	APKT11T304-ALH	12.24	6.6	3.6	2.8	0.4																						★	★	
	APKT11T308-ALH	12.24	6.6	3.6	2.8	0.8																						★	○	
	APKT160408-ALH	17.877	9.33	5.76	4.4	0.8																						★	★	

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

AP



😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
YBC301	😊	😊	😊	😊	😊
YBC302	😊	😊	😊	😊	😊
YBM251	😊	😊	😊	😊	😊
YBM253	😊	😊	😊	😊	😊
YBM351	😊	😊	😊	😊	😊
YBD152	😊	😊	😊	😊	😊
YBD252	😊	😊	😊	😊	😊
YBG102	😊	😊	😊	😊	😊
YBG202	😊	😊	😊	😊	😊
YBG205	😊	😊	😊	😊	😊
YB9320	😊	😊	😊	😊	😊
YBG302	😊	😊	😊	😊	😊
YBG152	😊	😊	😊	😊	😊
YBG252	😊	😊	😊	😊	😊
YBS203	😊	😊	😊	😊	😊
YBS303	😊	😊	😊	😊	😊
YNG151	😊	😊	😊	😊	😊
YNG151C	😊	😊	😊	😊	😊
YC305	😊	😊	😊	😊	😊
YD051	😊	😊	😊	😊	😊
YD101	😊	😊	😊	😊	😊
YD201	😊	😊	😊	😊	😊

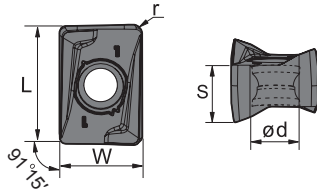
Insert shape	Type	Basic dimensions(mm)					CVD Coating				PVD Coating				Cermet	Cemented carbide														
		L	I.W	S	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102		YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC305	YD051	YD101	YD201	
	APKT150412-PM	16.33	12.7	4.76	5.4	1.2				★											●									
	APKT150412-KM	16.33	12.7	4.76	5.4	1.2																●	○							

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable milling tools

Milling inserts

AN



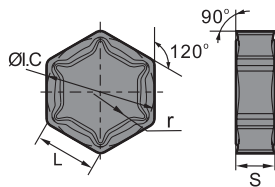
😊 Good working condition 🙄 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating						PVD Coating						Cermet		Cemented carbide								
		L	W	S	Ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201	
	ANGX110504PNR-GM	11.85	8.4	5.7	3.5	0.4			★	★					★	★													
	ANGX110508PNR-GM	11.85	8.4	5.7	3.5	0.8			★	★					★	★					●								
	ANGX110520PNR-GM	11.85	8.4	5.7	3.5	2.0			★	★	★				★														
	ANGX150608PNR-GM	15.43	11.0	7.3	4.4	0.8			★	★					★	★						●							
	ANGX150616PNR-GM	15.43	11.0	7.3	4.4	1.6			★	★					★	★													
	ANGX150620PNR-GM	15.43	11.0	7.3	4.4	2.0					★	★			★														
	ANMX110508PNR-GM	11.85	8.4	5.7	3.5	0.8			★	★					★							★							
	ANMX150608PNR-GM	15.43	11.0	7.3	4.4	0.8			★	★					★	★													
	ANGX110502PNR-LH	11.85	8.4	5.7	3.5	0.2																							★
	ANGX110504PNR-LH	11.85	8.4	5.7	3.5	0.4																							★
	ANGX150608PNR-LH	15.43	11.0	7.3	4.4	0.8																							★

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

HN



😊 Good working condition 🙄 Normal working condition 😞 Bad working condition

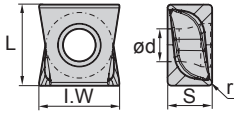
Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)				CVD Coating						PVD Coating						Cermet		Cemented carbide									
		L	ØI.C	S	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201		
	HNEX090512-DF	9.16	15.875	5.56	1.2						★																		
	HNEX090512-DM	9.16	15.875	5.56	1.2						★																		
	HNEX090512-DR	9.16	15.875	5.56	1.2						○	★																	

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Indexable milling tools
Milling inserts

LN □ □



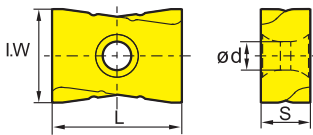
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	Good working condition (😊)											Normal working condition (😐)				Bad working condition (😞)												
	P	M	K	N	S	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201	
P Steel	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
M Stainless steel	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
K Cast iron	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
N Non-ferrous metal	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
S Heat resistant alloy, Ti alloy	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating						PVD Coating						Cermets		Cemented carbide							
		I.W	L	S	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	LNGX100504-GM	9.9	10	5.5	4.1	0.4				●							●											
	LNGX100508-GM	9.9	10	5.5	4.1	0.8				●							●											
	LNGX100512-GM	9.9	10	5.5	4.1	1.2				●							●											
	LNGX100516-GM	9.9	10	5.5	4.1	1.6				●							●											
	LNGX100520-GM	9.9	10	5.5	4.1	2.0				●							●											
	LNGX100524-GM	9.9	10	5.5	4.1	2.4				●							●											
	LNGX100530-GM	9.9	10	5.5	4.1	3.0				●							●											
	LNGX100540-GM	9.9	10	5.5	4.1	4.0				●							●											
	LNGX140704-GM	13.4	14	7.5	4.4	0.4				●							●											
	LNGX140708-GM	13.4	14	7.5	4.4	0.8				●							●											
	LNGX140712-GM	13.4	14	7.5	4.4	1.2				●							●											
	LNGX140716-GM	13.4	14	7.5	4.4	1.6				●							●											
	LNGX140720-GM	13.4	14	7.5	4.4	2.0				●							●											
	LNGX140724-GM	13.4	14	7.5	4.4	2.4				●							●											
	LNGX140730-GM	13.4	14	7.5	4.4	3.0				●							●											
	LNGX140740-GM	13.4	14	7.5	4.4	4.0				●							●											
LNGX140750-GM	13.4	14	7.5	4.4	5.0				●							●												

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

LN □ □



😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	Good working condition (😊)											Normal working condition (😐)				Bad working condition (😞)												
	P	M	K	N	S	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201	
P Steel	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
M Stainless steel	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
K Cast iron	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
N Non-ferrous metal	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
S Heat resistant alloy, Ti alloy	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊

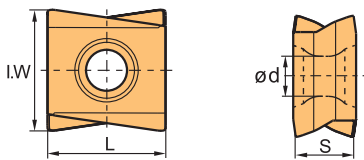
Insert shape	Type	Basic dimensions(mm)				CVD Coating						PVD Coating						Cermets		Cemented carbide									
		L	I.W	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201		
	LNKT1506EN-ZR	15.875	14	6.35	4.6					○	○					★													
	LNKT2007DN-ZR	20	17	7.94	4.6					○	○					★													
	LNKT2510-ZR	25	18	9.525	5.5					○	○					★													

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable milling tools

Milling inserts

LN



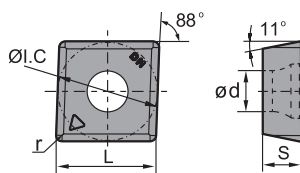
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating						PVD Coating						Cermet		Cemented carbide							
		L	I.W	S	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	LNKT080404PNR-GM	8.75	8.5	4.45	3.4	0.4			★	●	●					★					●							
	LNKT080408PNR-GM	8.75	8.5	4.45	3.4	0.8			★	●	●					★												
	LNKT080412PNR-GM	8.75	8.5	4.45	3.4	1.2			★	●	●					★												
	LNKT120608PNR-GM	12.7	13	6.75	4.4	0.8			★	●	●					★						●						
	LNKT120612PNR-GM	12.7	13	6.75	4.4	1.2			★	●	●					★												
	LNKT120616PNR-GM	12.7	13	6.75	4.4	1.6			★	●	●					★												
	LNKT120620PNR-GM	12.7	13	6.75	4.4	2.0			★	●	●					★												
	LNKT120624PNR-GM	12.7	13	6.75	4.4	2.4			★	●	●					★												
	LNKT120632PNR-GM	12.7	13	6.75	4.4	3.2			★	●	●					★												
	LNKT160708PNR-GM	16.05	15	7.35	5.5	0.8			★	●	●					★						●						
	LNKT160712PNR-GM	16.05	15	7.35	5.5	1.2			★	●	●					★												
LNKT160716PNR-GM	16.05	15	7.35	5.5	1.6			★	●	●					★													
	LNKT080404PNR-GL	8.75	8.5	4.45	3.4	0.4			★	●	●				★						●							
	LNKT120608PNR-GL	12.7	13	6.75	4.4	0.8			★	●	●				★							●						
	LNKT160708PNR-GL	16.05	15	7.35	5.5	0.8			★	●	●				★							●						
	LNMT080404PNR-GM	8.75	8.5	4.45	3.4	0.4			★	●	●				★													
	LNMT120608PNR-GM	12.7	13	6.75	4.4	0.8			★	●	●				★													
	LNMT160708PNR-GM	16.05	15	7.35	5.5	0.8			★	●	●				★													

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

MP



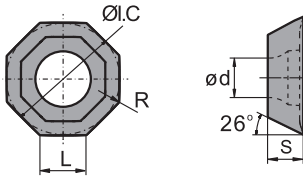
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating						PVD Coating						Cermet		Cemented carbide							
		Ø.L.C	L	s	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	MPHT060304-DM	6.35	6.35	3.18	2.8	0.4																						
	MPHT080305-DM	8.3	8.3	3.18	3.4	0.5																						
	MPHT120408-DM	12.7	12.7	4.76	5.56	0.8																						

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

OF



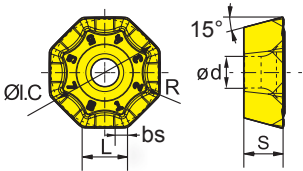
😊 Good working condition 😊 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating				PVD Coating					Cermet	Cemented carbide												
		L	ØI.C	S	ød	R	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201	
	OFKT05T3-DF	5.26	12.7	3.97	4.4	0.5							○	★	★														
	OFKT05T3-DM	5.26	12.7	3.97	4.4	0.5			○		○	○	★	★	★	★	★												
	OFKT05T3-LH	5.26	12.7	3.97	4.4	0.5																					○		

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

OD



😊 Good working condition 😊 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

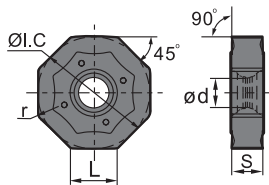
Insert shape	Type	Basic dimensions(mm)						CVD Coating				PVD Coating					Cermet	Cemented carbide											
		L	ØI.C	S	ød	R	bs	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	ODHT060508-GL	6.5	15.875	5.56	5.4	0.8	1.6					●	●				●	●											
	ODHT060508-GM	6.5	15.875	5.56	5.4	0.8	1.6					●	●				●	●				●							
	ODMT060512-GM	6.5	15.875	5.56	5.4	1.2	--					●	●				●	●				●							
	ODHT060508-GH	6.5	15.875	5.56	5.4	0.8	1.6					●	●				●	●											
	ODHT060508-LH	6.5	15.875	5.56	5.4	0.8	1.6																				●	●	

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Indexable milling tools

Milling inserts

ON



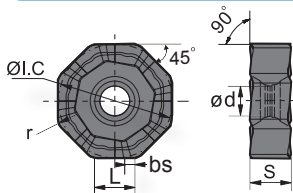
😊 Good working condition 😊 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating				PVD Coating				Cermet	Cemented carbide													
		L	ØI.C	S	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102		YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	ONHU060408-PF	6.58	15.875	4.76	4.4	0.83	★	●	★				★	★															
	ONHU08T508-PF	8.37	20.2	5.77	5.3	0.83	★	●	★				★	★	●														
	ONHU060408-PM	6.58	15.875	4.76	4.4	0.83	★		★	★			●		●														
	ONHU08T508-PM	8.37	20.2	5.79	5.3	0.83	★		★	★																			
	ONHU08T508-W	6.9	20.5	6.00	5.3	0.80	★						★																

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

ON



😊 Good working condition 😊 Normal working condition 😞 Bad working condition

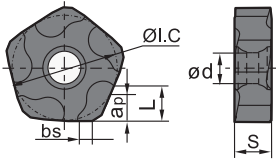
Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating				PVD Coating				Cermet	Cemented carbide													
		L	ØI.C	S	ød	r	bs	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102		YBG105	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101
	ONHU060404ANN-GL	6.15	15.875	5.54	6	0.4	1.2				●	●																		
	ONHU09T508ANN-GL	8.0	20.2	5.8	7	0.8	1.2				●	●																		
	ONHU060408ANN-GM	6.15	15.875	5.54	6	0.8	1				●	●																		
	ONMU060408-GM	6.15	15.875	5.54	6	0.8	-				●	●																		
	ONHU09T508ANN-GM	8.0	20.2	5.8	7	0.8	1.2				●	●																		
	ONMU09T512-GM	8.0	20.2	5.8	7	1.2	-				●	●																		
	ONMU060408-GH	6.15	15.875	5.54	6	0.8	-				●	●																		
	ONHU060408ANN-GH	6.15	15.875	5.54	6	0.8	1				●	●																		
	ONHU09T508ANN-GH	8.0	20.2	5.8	7	0.8	1.2				●	●																		
	ONMU09T512-GH	8.0	20.2	5.8	7	1.2	-				●	●																		
	ONMU0604AN-W	6.15	15.875	4.97	6	0.8	-								●															

● Inserts are suitable for both left and right cuts. ★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable milling tools
Milling inserts

PN



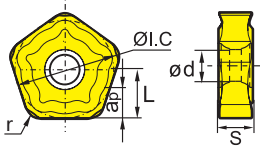
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating				PVD Coating				Cermet	Cemented carbide												
		L	ØI.C	S	ød	bs	ap	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	PNEG110512R-CF	5.4	15.875	5.56	4.64	1.6	5						●																
	PNEG110512L-CF	5.4	15.875	5.56	4.64	1.6	5						●																
	PNEG110512R-CM	5.4	15.875	5.56	4.64	1.6	5						●																
	PNEG110512L-CM	5.4	15.875	5.56	4.64	1.6	5						●																
	PNEG110512R-CR	5.4	15.875	5.56	4.64	1.6	5						●	●															
	PNEG110512L-CR	5.4	15.875	5.56	4.64	1.6	5						●	●															

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

PN



😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

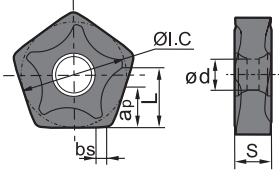
Insert shape	Type	Basic dimensions(mm)						CVD Coating				PVD Coating				Cermet	Cemented carbide													
		L	ØI.C	S	ød	r	apmax	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201	
	PNEG110512-GL	7.5	15.875	5.56	4.64	1.2	5.5										●	★												
	PNEG110530-GM	7.5	15.875	5.56	4.64	3.0	5.5											●	★											
	PNEG110530-GH	7.5	15.875	5.56	4.64	3.0	5.5											●	★											

● Inserts are suitable for both left and right cuts. ★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable milling tools

Milling inserts

PN



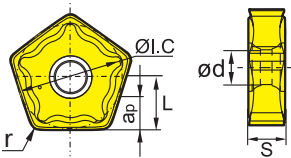
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide								
		L	ØI.C	S	ød	bs	apmax	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302		YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101
	PNEG110512R-PF	7.5	15.875	5.56	4.64	1.4	7.5	★	●																				
	PNEG110512L-PF	7.5	15.875	5.56	4.64	1.4	7.5	★	●																				
	PNEG110512R-PM	7.5	15.875	5.56	4.64	1.4	7.5	★	●																				
	PNEG110512L-PM	7.5	15.875	5.56	4.64	1.4	7.5	★	●																				
	PNEG110512R-PR	7.5	15.875	5.56	4.64	1.4	7.5	★	●																				
	PNEG110512L-PR	7.5	15.875	5.56	4.64	1.4	7.5	★	●																				

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

PN



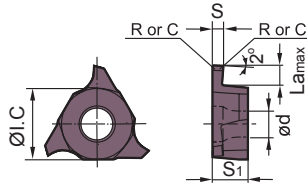
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide								
		L	ØI.C	S	ød	r	apmax	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302		YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101
	PNEG110512-KL	6.5	15.875	5.56	4.64	1.2	6.5						●	●															
	PNEG110512-KM	6.5	15.875	5.56	4.64	1.2	6.5						●	●															
	PNEG110512-KH	6.5	15.875	5.56	4.64	1.2	6.5						●	●															

● Inserts are suitable for both left and right cuts. ★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

QC



😊 Good working condition 🙄 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊

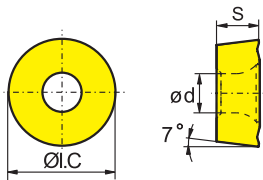
Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet		Cemented carbide							
		S±0.025	Lamax	R/C	ØI.C	S1	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	QC16L110-R01	1.10	2.00	R0.1	9.525	3.18	4.4								○	○													
	QC16L125-R02	1.25	2.00	R0.2	9.525	3.18	4.4								○	○													
	QC16L145-R02	1.45	2.00	R0.2	9.525	3.18	4.4								○	○													
	QC16L150-R02	1.50	2.00	R0.2	9.525	3.18	4.4								○	★													
	QC16L175-R02	1.75	2.00	R0.2	9.525	3.18	4.4								○	○													
	QC16L185-R02	1.85	2.50	R0.2	9.525	3.18	4.4								○	○													
	QC16L200-R02	2.00	2.50	R0.2	9.525	3.18	4.4								○	★													
	QC16L250-R02	2.50	2.50	R0.2	9.525	3.18	4.4								○	★													
	QC16L300-R02	3.00	3.00	R0.2	9.525	3.18	4.4								○	★													
	QC22L125-R02	1.25	2.00	R0.2	12.70	4.76	5.5								○	○													
	QC22L145-R02	1.45	2.00	R0.2	12.70	4.76	5.5								○	○													
	QC22L150-R02	1.50	3.50	R0.2	12.70	4.76	5.5								○	★													
	QC22L175-R02	1.75	3.50	R0.2	12.70	4.76	5.5								○	○													
	QC22L185-R02	1.85	3.50	R0.2	12.70	4.76	5.5								○	○													
	QC22L200-R02	2.00	3.50	R0.2	12.70	4.76	5.5								○	★													
	QC22L230-R02	2.30	3.50	R0.2	12.70	4.76	5.5								○	○													
	QC22L250-R03	2.50	4.00	R0.3	12.70	4.76	5.5								○	★													
	QC22L265-R03	2.65	4.00	R0.3	12.70	4.76	5.5								○	○													
	QC22L280-R03	2.80	4.00	R0.3	12.70	4.76	5.5								○	○													
	QC22L300-R03	3.00	4.00	R0.3	12.70	4.76	5.5								○	★													
	QC22L320-R03	3.20	4.00	R0.3	12.70	4.76	5.5								○	○													
	QC22L330-R03	3.30	4.00	R0.3	12.70	4.76	5.5								○	○													
	QC22L350-R03	3.50	5.00	R0.3	12.70	4.76	5.5								○	★													
	QC22L400-R04	4.00	5.00	R0.4	12.70	4.76	5.5								○	★													
	QC22L430-R04	4.30	5.00	R0.4	12.70	4.76	5.5								○	○													
	QC22L450-R04	4.50	5.00	R0.4	12.70	4.76	5.5								○	○													
	QC22L480-R04	4.80	5.00	R0.4	12.70	5.06	5.5								○	○													

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Indexable milling tools

Milling inserts

RC □ □



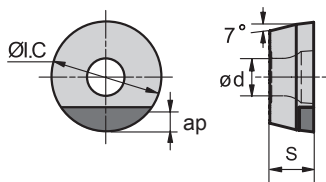
😊 Good working condition 🙄 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)			CVD Coating				PVD Coating				Cermet	Cemented carbide													
		ØI.C	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102		YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	RCKT10T3MO-DM	10.0	3.97	4.4	●							●	★														
	RCKT1204MO-DM	12.0	4.76	4.0	●	●	●	○				●	★		●												
	RCKT1606MO-DM	16.0	6.35	5.56	●										●												
	RCKT1204MO-DR	12.0	4.76	4.0	○	○	○					●	★														
	RCKT1606MO-DR	16.0	6.35	5.56	●		●	○				●	★														
	RCKT2006MO-DR	20.0	6.35	6.55	●		●	○				○	★		●												
	RCKT1204MO-ER	12.0	4.76	4.0			★																				
	RCKT1606MO-ER	16.0	6.35	5.56			★																				
	RCKT2006MO-ER	20.0	6.35	6.55			★																				
	RCKT1204MO-NM	12.0	4.76	4.0			○								○	○		○	○								
	RCKT1606MO-NM	16.0	6.35	5.56			○								○	○		○	○								

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

RC □ □



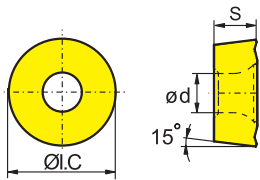
😊 Good working condition 🙄 Normal working condition 😞 Bad working condition

Workpiece material	H Super hard material	K Cast iron	N Non-ferrous metal
H Super hard material	😊		
K Cast iron	😊	😊	😊
N Non-ferrous metal			😊

Insert shape	Type	Basic dimensions(mm)				PCBN		Cemented carbide		
		ØI.C	S	ød	apmax	BK1041	BK2531	YD051	YD101	YD201
	RCMW1204MOBS01225	12.0	4.76	4.1	2.7	○	○			
	RCMW1204MOAS01225	12.0	4.76	4.1	2.7	○	○			

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

RD



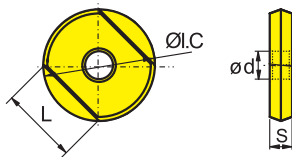
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	Steel		Stainless steel		Cast iron		Non-ferrous metal		Heat resistant alloy, Ti alloy	
	P	M	K	N	S					
Steel	😊	😊	😊	😊	😊			😊	😊	😊
Stainless steel	😊	😊	😊	😊	😊			😊	😊	😊
Cast iron			😊	😊	😊			😊	😊	😊
Non-ferrous metal				😊	😊			😊	😊	😊
Heat resistant alloy, Ti alloy								😊	😊	😊

Insert shape	Type	Basic dimensions(mm)			CVD Coating				PVD Coating				Cermet	Cemented carbide													
		ØI.C	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102		YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	RDKW0702MO	7	2.38	2.8			○		●																		
	RDKW0803MO	8	3.18	3.4	○				○				●	★		○											
	RDKW10T3MO	10	3.97	4.4	○				●				●	★													
	RDKW1204MO	12	4.76	4.4	●		●		●				●	★		●											
	RDKW1605MO	16	5.56	5.5	○				○				○	★		○											
	RDKW2006MO	20	6.35	6.5	○				○							○											
	RDKT10T3MO-NM	10	3.97	4.4										○						○	○						

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

RO



😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	Steel		Stainless steel		Cast iron		Non-ferrous metal		Heat resistant alloy, Ti alloy	
	P	M	K	N	S					
Steel	😊	😊	😊	😊	😊			😊	😊	😊
Stainless steel	😊	😊	😊	😊	😊			😊	😊	😊
Cast iron			😊	😊	😊			😊	😊	😊
Non-ferrous metal				😊	😊			😊	😊	😊
Heat resistant alloy, Ti alloy								😊	😊	😊

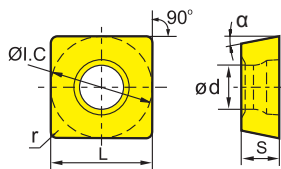
Insert shape	Type	Basic dimensions(mm)				CVD Coating				PVD Coating				Cermet	Cemented carbide												
		ØI.C	L	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102		YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101
	ROHX1203	12	8.5	3	4																						
	ROHX1604	16	11.3	4	5																						
	ROHX2005	20	14.1	5	5																						

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable milling tools

Milling inserts

SD



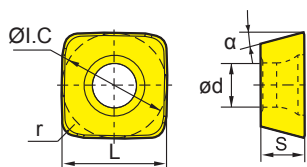
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet		Cemented carbide								
		r	L	ØI.C	S	ød	α	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201	
	SDMT090308	0.8	9.525	9.525	3.18	4.4	15°		○										○											

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

SD



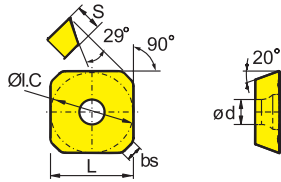
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet		Cemented carbide									
		ØI.C	L	r	S	ød	α	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201		
	SDMT06T208-DM	6.35	6.35	0.8	2.58	2.5	15°	★		★																					
	SDMT09T312-DM	9.525	9.525	1.2	3.97	4.0	15°	★		★																					
	SDMT120412-DM	12.7	12.7	2.0	4.76	4.4	15°	★		★							★	●	○												
	SDMT150520-DM	15.875	15.875	2.0	5.56	5.5	15°	★		★								●	●	○											
	SDMT06T208-PM	6.35	6.35	0.8	2.58	2.5	15°	★	○													●	●								
	SDMT09T312-PM	9.525	9.525	1.2	3.97	4.0	15°	★		●																					
	SDMT120412-PM	12.7	12.7	2.0	4.76	4.4	15°	★		●																					
	SDMT150520-PM	15.875	15.875	2.0	5.56	5.5	15°	★		●																					
	SDMT06T208-NM	6.35	6.35	0.8	2.58	2.5	15°			●													●								
	SDMT09T312-NM	9.525	9.525	1.2	3.97	4.0	15°			○													○	○							
	SDMT120412-NM	12.7	12.7	1.2	4.76	4.4	15°			○													○	○							
	SDMT150520-NM	15.875	15.875	2.0	5.56	5.5	15°			●													●								

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

SE

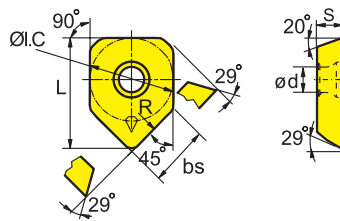


😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet		Cemented carbide							
		L	ØI.C	S	ød	bs	R	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	SEET12T3-DF	13.4	13.4	3.97	4.1	2.55	--	●	★	●						★		○											
	SEET12T3-CF	13.4	13.4	3.97	4.1	2.55	--					○		★		★													
	SEET12T3-EF	13.4	13.4	3.97	4.1	2.55	--									★		○											
	SEET12T3-DM	13.4	13.4	3.97	4.1	2.55	--	●	★	●	○					★		★											
	SEET18T6-DM	18.0	18.0	6.1	5.5	1.5	--		○		○																		
	SEET12T3-CM	13.4	13.4	3.97	4.1	2.55	--					★				★		○											
	SEET12T3-EM	13.4	13.4	3.97	4.1	2.55	--			●		●				★		★											
	SEET18T6-EM	18.0	18.0	6.1	5.5	1.5	--				○							○											
	SEET12T3-DR	13.4	13.4	3.97	4.1	2.55	--	●	★		●					★		★											
	SEET12T3-CR	13.4	13.4	3.97	4.1	2.55	--	●				★				★		★											
	SEET12T3-LH	13.4	13.4	3.97	4.1	2.55	--																			○	★		
	SEET12T3-W	17.82	13.4	3.97	4.1	9.46	500	★	●			★				★							★						
	SEET18T6-W	24.78	18.0	6.1	5.5	11.0	500										○												

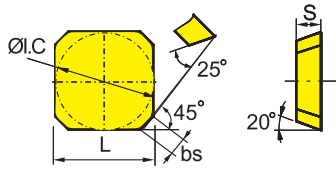
★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order



Indexable milling tools

Milling inserts

SE



😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
P Steel	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
M Stainless steel	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
K Cast iron	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
N Non-ferrous metal	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
S Heat resistant alloy, Ti alloy	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊

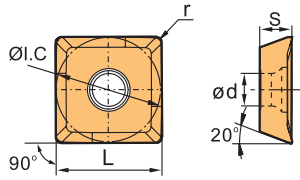
Insert shape	Type	Basic dimensions(mm)				CVD Coating				PVD Coating				Cermet	Cemented carbide												
		L	ØI.C	S	bs	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102		YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101
	SEEN1203AFTN	12.7	12.7	3.18	1.8																						
	SEKN1203AFFN	12.7	12.7	3.18	1.8																						
	SEKN1203AFN	12.7	12.7	3.18	1.8	●																			●		○
	SEKN1203AFTN	12.7	12.7	3.18	1.8	●	●	●					★		○										●		●
	SEKR1203AFN	12.7	12.7	3.18	1.8	●								○	○												
	SEMR1203AN-M	12.7	12.7	3.3	-										●												
	SEKR1203AN-M	12.7	12.7	3.3	-										●												
	SEKN1504AFN	15.875	15.875	4.76	1.6	●	●																			●	
	SEKN1504AFTN	15.875	15.875	4.76	1.6	○	●	●						○											●		●
	SEKR1504AFN	15.875	15.875	4.76	1.6																				●		
	SEMR1504AN-M	15.875	15.875	4.9	-										●												
	SEKR1504AN-M	15.875	15.875	4.9	-										●												

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable milling tools

Milling inserts

SE



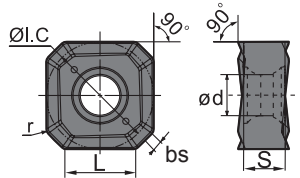
😊 Good working condition 😊 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating					PVD Coating					Cermet	Cemented carbide											
		L	ØI.C	S	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205		YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC305	YD051	YD101	YD201
	SEET09T308PER-APF	9.525	9.525	4.01	3.3	0.8					★	★		●		★													
	SEET120308PER-APF	13.308	13.308	4.04	4.1	0.8					●	★		●		★													
	SEET09T308PER-APM	9.525	9.525	4.01	3.3	0.8					●	★		●		★													
	SEET120308PER-APM	13.308	13.308	4.04	4.1	0.8					●	★		●		★													
	SEET09T308PER-APR	9.525	9.525	4.01	3.3	0.8					●	★		●		★													
	SEET120308PER-APR	13.308	13.308	4.04	4.1	0.8					●	★		●		★													

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

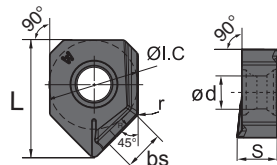
SN



😊 Good working condition 😊 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating					PVD Coating					Cermet	Cemented carbide												
		L	ØI.C	S	bs	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202		YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC305	YD051	YD101	YD201
	SNEG1205ANR-GM	7.6	12.0	4.76	1.05	4.6	0.8		★		★	★				★	★													
	SNEG1506ANR-GM	9.4	15.0	5.54	1.30	5.5	0.9		★		★	★				★	★													
	SNEG1205ANR-HGR	7.6	12.0	4.76	1.05	4.6	0.8		★		★		○			★	★													
	SNEG1506ANR-HGR	9.4	15.0	5.54	1.30	5.5	0.9		★		★		○			★	★													
	SNEG1907ANR-HGR	12.1	19.0	7.0	1.67	7.2	1.0		★		★		○			★	★													
	SNEG1205ANR-W	15.9	12.0	4.76	4.07	4.6	0.6									●														
	SNEG1506ANR-W	19.9	15.0	5.54	4.97	5.5	0.9									●														

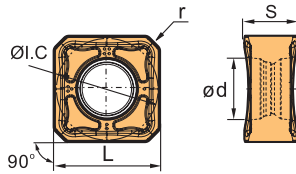


★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable milling tools

Milling inserts

SN □ □



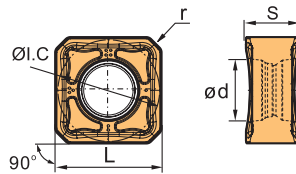
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	Steel	Stainless steel	Cast iron	Non-ferrous metal	Heat resistant alloy, Ti alloy
P	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide								
		L	ØI.C	S	ød	r	apmax	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302		YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101
	SNGX1205ANN-GL	12.7	12.7	6.5	5.9	0.8	6.5				●	●						★											
	SNMX120512-GL	12.7	12.7	6.5	5.9	1.2	6.5				●	●						★											
	SNGX1205ANN-GM	12.7	12.7	6.5	5.9	0.8	6.5				●	●						★					●						
	SNMX1205ANN-GM	12.7	12.7	6.5	5.9	0.8	6.5				●	●						★					●						
	SNMX120512-GM	12.7	12.7	6.5	5.9	1.2	6.5				●	●						★					●						
	SNGX1205ANN-GH	12.7	12.7	6.5	5.9	0.8	6.5				●	●						★											
	SNMX120512-GH	12.7	12.7	6.5	5.9	1.2	6.5				●	●						★											

● Inserts are suitable for both left and right cuts. ★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

SN □ □



😊 Good working condition 😐 Normal working condition 😞 Bad working condition

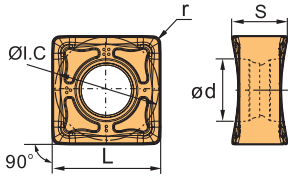
Workpiece material	Steel	Stainless steel	Cast iron	Non-ferrous metal	Heat resistant alloy, Ti alloy
P	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide								
		L	ØI.C	S	ød	r	apmax	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302		YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101
	SNGX1205ENN-GL	12.7	12.7	6.5	5.9	0.8	8.0				●	●						★											
	SNMX120512-GL	12.7	12.7	6.5	5.9	1.2	8.0				●	●						★											
	SNGX1205ENN-GM	12.7	12.7	6.5	5.9	0.8	8.0				●	●						★					●						
	SNMX120512-GM	12.7	12.7	6.5	5.9	1.2	8.0				●	●						★					●						
	SNGX1205ENN-GH	12.7	12.7	6.5	5.9	0.8	8.0				●	●						★											
	SNMX120512-GH	12.7	12.7	6.5	5.9	1.2	8.0				●	●						★											

● Inserts are suitable for both left and right cuts. ★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable milling tools
Milling inserts

SN



😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
YBC301	😊	😊	😊	😊	😊
YBC302	😊	😊	😊	😊	😊
YBM251	😊	😊	😊	😊	😊
YBM253	😊	😊	😊	😊	😊
YBM351	😊	😊	😊	😊	😊
YBD152	😊	😊	😊	😊	😊
YBD252	😊	😊	😊	😊	😊
YBG102	😊	😊	😊	😊	😊
YBG105	😊	😊	😊	😊	😊
YBG202	😊	😊	😊	😊	😊
YBG205	😊	😊	😊	😊	😊
YB9320	😊	😊	😊	😊	😊
YBG302	😊	😊	😊	😊	😊
YBG152	😊	😊	😊	😊	😊
YBG252	😊	😊	😊	😊	😊
YBS203	😊	😊	😊	😊	😊
YBS303	😊	😊	😊	😊	😊
YNG151	😊	😊	😊	😊	😊
YNG151C	😊	😊	😊	😊	😊
YC30S	😊	😊	😊	😊	😊
YD051	😊	😊	😊	😊	😊
YD101	😊	😊	😊	😊	😊
YD201	😊	😊	😊	😊	😊

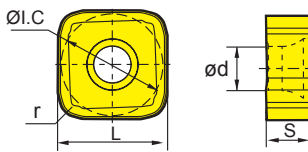
Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermets		Cemented carbide									
		L	ØI.C	S	ød	r	apmax	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG105	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201	
	SNGX1205PNN-GL	12.7	12.7	6.5	5.9	0.8	10.5			●	●								★												
	SNMX120512-GL	12.7	12.7	6.5	5.9	1.2	10.5			●	●								★												
	SNGX1205PNN-GM	12.7	12.7	6.5	5.9	0.8	10.5			●	●								★					●							
	SNMX120512-GM	12.7	12.7	6.5	5.9	1.2	10.5			●	●								★					●							
	SNGX1205PNN-GH	12.7	12.7	6.5	5.9	0.8	10.5			●	●								★												
	SNMX120512-GH	12.7	12.7	6.5	5.9	1.2	10.5			●	●								★												
	SNCU120420-W4	12.7	12.7	4.8	5.9	2	10.5							●																	

● Inserts are suitable for both left and right cuts. ★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable milling tools

Milling inserts

SN



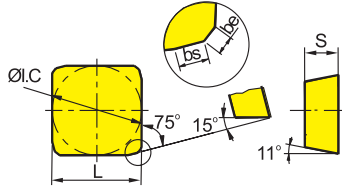
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
YBC301	😊	😊	😊	😊	😊
YBC302	😊	😊	😊	😊	😊
YBM251	😊	😊	😊	😊	😊
YBM253	😊	😊	😊	😊	😊
YBM351	😊	😊	😊	😊	😊
YBD152	😊	😊	😊	😊	😊
YBD252	😊	😊	😊	😊	😊
YBG102	😊	😊	😊	😊	😊
YBG202	😊	😊	😊	😊	😊
YBG205	😊	😊	😊	😊	😊
YB9320	😊	😊	😊	😊	😊
YBG302	😊	😊	😊	😊	😊
YBG152	😊	😊	😊	😊	😊
YBG252	😊	😊	😊	😊	😊
YBS203	😊	😊	😊	😊	😊
YBS303	😊	😊	😊	😊	😊
YNG151	😊	😊	😊	😊	😊
YNG151C	😊	😊	😊	😊	😊
YC30S	😊	😊	😊	😊	😊
YD051	😊	😊	😊	😊	😊
YD101	😊	😊	😊	😊	😊
YD201	😊	😊	😊	😊	😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermets		Cemented carbide									
		L	ØI.C	r	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201			
	SNGU120620-GM	12.7	12.7	2.0	5.6	4.4				●																					

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

SPKN



😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
YBC301	😊	😊	😊	😊	😊
YBC302	😊	😊	😊	😊	😊
YBM251	😊	😊	😊	😊	😊
YBM253	😊	😊	😊	😊	😊
YBM351	😊	😊	😊	😊	😊
YBD152	😊	😊	😊	😊	😊
YBD252	😊	😊	😊	😊	😊
YBG102	😊	😊	😊	😊	😊
YBG202	😊	😊	😊	😊	😊
YBG205	😊	😊	😊	😊	😊
YB9320	😊	😊	😊	😊	😊
YBG302	😊	😊	😊	😊	😊
YBG152	😊	😊	😊	😊	😊
YBG252	😊	😊	😊	😊	😊
YBS203	😊	😊	😊	😊	😊
YBS303	😊	😊	😊	😊	😊
YNG151	😊	😊	😊	😊	😊
YNG151C	😊	😊	😊	😊	😊
YC30S	😊	😊	😊	😊	😊
YD051	😊	😊	😊	😊	😊
YD101	😊	😊	😊	😊	😊
YD201	😊	😊	😊	😊	😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating				PVD Coating				Cermet		Cemented carbide													
		L	ØI.C	S	be	bs	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201		
	SPKN1203EDER	12.7	12.7	3.18	1	1.4									○															
	SPKN1203EDEL	12.7	12.7	3.18	1	1.4									○															
	SPKN1203EDFR	12.7	12.7	3.18	1	1.4								★	○															●
	SPKN1203EDFL	12.7	12.7	3.18	1	1.4								○	○															○
	SPKN1203EDSKR	12.7	12.7	3.18	1	1.4															○								○	
	SPKN1203EDSKL	12.7	12.7	3.18	1	1.4															○								○	
	SPKN1203EDTKR	12.7	12.7	3.18	1	1.4	●				●				○				★							●			○	
	SPKN1203EDTKL	12.7	12.7	3.18	1	1.4									○				○										○	
	SPKN1203EDS31R	12.7	12.7	3.18	1	1.4													○										○	
	SPKN1203EDS31L	12.7	12.7	3.18	1	1.4													○										○	
	SPKN1203EDT31R	12.7	12.7	3.18	1	1.4	●				●				○				★							●			○	
	SPKN1203EDT31L	12.7	12.7	3.18	1	1.4									○				○										○	
	SPKN1504EDER	15.875	15.875	4.76	1	1.4									○															
	SPKN1504EDEL	15.875	15.875	4.76	1	1.4									○															
	SPKN1504EDFR	15.875	15.875	4.76	1	1.4									○	○														○
	SPKN1504EDFL	15.875	15.875	4.76	1	1.4									○	○														○
	SPKN1504EDSKR	15.875	15.875	4.76	1	1.4													○										○	
	SPKN1504EDSKL	15.875	15.875	4.76	1	1.4													○										○	
	SPKN1504EDTKR	15.875	15.875	4.76	1	1.4	●								★			○								●			●	
	SPKN1504EDTKL	15.875	15.875	4.76	1	1.4									○			○											○	●
	SPKN1504EDS32R	15.875	15.875	4.76	1	1.4													○										○	
	SPKN1504EDS32L	15.875	15.875	4.76	1	1.4													○										○	
	SPKN1504EDT32R	15.875	15.875	4.76	1	1.4	●								★			○								●			●	
	SPKN1504EDT32L	15.875	15.875	4.76	1	1.4									○			○											○	●

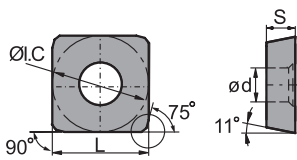
★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Ordering guide: **SPKN1203EDT31R** chamfering angle 20°, chamfering width 0.15mm. For other edge shapes, see inserts code key standard.

Indexable milling tools

Milling inserts

SP□W



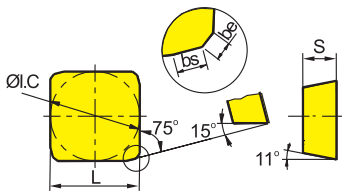
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide								
		r	L	ØI.C	S	ød	α	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	SPKW1204EDFR	---	12.7	12.7	4.76	5.56	11°								○														
	SPKW1204EDSR	---	12.7	12.7	4.76	5.56	11°								○														

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

SP□R



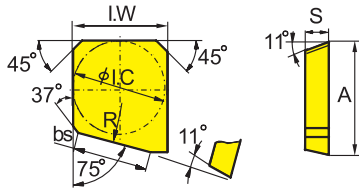
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide						
		L	ØI.C	S	be	bs	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101
	SPKR1203EDR-GM	12.7	12.7	3.18	1	1.4			●					★			★								●		●
	SPKR1203EDL-GM	12.7	12.7	3.18	1	1.4			●					★			★								●		●
	SPKR1504EDR-GM	15.875	15.875	4.76	1	1.4			●					★			★								●		●
	SPKR1504EDL-GM	15.875	15.875	4.76	1	1.4			●					★			★								●		●

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

SPEX



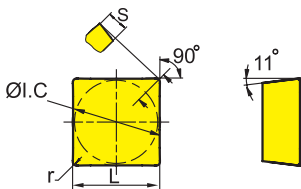
😊 Good working condition 😐 Normal working condition ☹️ Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide								
		A	ØI.C	I.W	S	bs	R	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	SPEX1203EDL-1	15	12.7	12.7	3.18	10	500																						●
	SPEX1203EDR-1	15	12.7	12.7	3.18	10	500																						●
	SPEX1504EDL-1	18.2	15.875	15.875	4.76	10	500																			○			●
	SPEX1504EDR-1	18.2	15.875	15.875	4.76	10	500																			○			●

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

SP



😊 Good working condition 😐 Normal working condition ☹️ Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

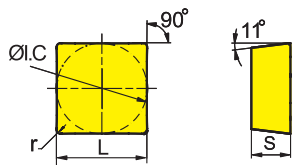
Insert shape	Type	Basic dimensions(mm)				CVD Coating						PVD Coating						Cermet	Cemented carbide										
		L	ØI.C	s	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201		
	SPMR090304	9.525	9.525	3.18	0.4			○															○						
	SPMR09T304	9.525	9.525	3.97	0.4									○															
	SPMR090308	9.525	9.525	3.18	0.8			○																					
	SPMR120304	12.7	12.7	3.18	0.4			○																○					
	SPMR120308	12.7	12.7	3.18	0.8			○																					
	SPMR120312	12.7	12.7	3.18	1.2			○	○						○														

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Indexable milling tools

Milling inserts

SP



😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
YBC301	😊	😊	😊	😊	😊
YBC302	😊	😊	😊	😊	😊
YBM251	😊	😊	😊	😊	😊
YBM253	😊	😊	😊	😊	😊
YBM351	😊	😊	😊	😊	😊
YBD152	😊	😊	😊	😊	😊
YBD252	😊	😊	😊	😊	😊
YBG102	😊	😊	😊	😊	😊
YBG202	😊	😊	😊	😊	😊
YBG205	😊	😊	😊	😊	😊
YB9320	😊	😊	😊	😊	😊
YBG302	😊	😊	😊	😊	😊
YBG152	😊	😊	😊	😊	😊
YBG252	😊	😊	😊	😊	😊
YBS203	😊	😊	😊	😊	😊
YBS303	😊	😊	😊	😊	😊
YNG151	😊	😊	😊	😊	😊
YNG151C	😊	😊	😊	😊	😊
YC30S	😊	😊	😊	😊	😊
YD051	😊	😊	😊	😊	😊
YD101	😊	😊	😊	😊	😊
YD201	😊	😊	😊	😊	😊

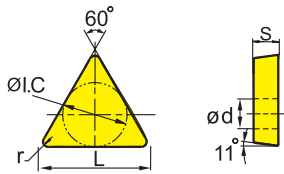
Insert shape	Type	Basic dimensions(mm)				CVD Coating				PVD Coating				Cermet	Cemented carbide														
		L	ØI.C	s	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102		YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201	
	SPUN090304	9.525	9.525	3.18	0.4																								
	SPUN090308	9.525	9.525	3.18	0.8																								
	SPUN120304	12.7	12.7	3.18	0.4																		○						
	SPUN120308	12.7	12.7	3.18	0.8			○		○															●		○	○	
	SPUN120312	12.7	12.7	3.18	1.2																					○			
	SPUN150408	15.875	15.875	4.76	0.8																					○			○
	SPUN150412	15.875	15.875	4.76	1.2																					○		○	○
	SPUN190408	19.05	19.05	4.76	0.8																					○		○	
	SPUN190412	19.05	19.05	4.76	1.2																					○			
	SPUN190416	19.05	19.05	4.76	1.6																					○			
	SPGN090304	9.525	9.525	3.18	0.4																		●				●		
	SPGN090308	9.525	9.525	3.18	0.8																					○	○	○	
	SPGN120308	12.7	12.7	3.18	0.8									○											●			●	
	SPGN120404	12.7	12.7	4.76	0.4																					○		○	
	SPGN120408	12.7	12.7	4.76	0.8									○												○			
	SPGN120412	12.7	12.7	4.76	1.2																					○		○	
	SPGN150404	15.875	15.875	4.76	0.4																					●	○		
	SPGN150408	15.875	15.875	4.76	0.8																					●			
	SPGN190408	19.05	19.05	4.76	0.8																						○		
	SPGN190416	19.05	19.05	4.76	1.6										○														

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable
milling tools

Milling inserts

TP



😊 Good working condition 😐 Normal working condition ☹️ Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201	
P Steel	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
M Stainless steel	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
K Cast iron	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
N Non-ferrous metal	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊
S Heat resistant alloy, Ti alloy	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊	😊



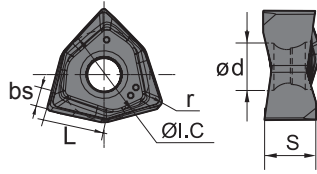
Insert shape	Type	Basic dimensions(mm)				CVD Coating						PVD Coating						Cermet		Cemented carbide									
		L	ØI.C	s	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201		
TPUN	TPUN110208	11	6.35	2.38	0.8	○																			○				
	TPUN110304	11	6.35	3.18	0.4																				○				
	TPUN110308	11	6.35	3.18	0.8	○																			●	○	○		
	TPUN160304	16.5	9.525	3.18	0.4			○																		○	○	○	
	TPUN160308	16.5	9.525	3.18	0.8			○	○																	●	●	○	
	TPUN160312	16.5	9.525	3.18	1.2			○																		●			
	TPUN160408	16.5	9.525	4.76	0.8																					○		○	
	TPUN160412	16.5	9.525	4.76	1.2																					○		○	
	TPUN220404	22	12.7	4.76	0.4																							○	
	TPUN220408	22	12.7	4.76	0.8	●	○																			●	○		
	TPUN220412	22	12.7	4.76	1.2					○																●		○	
	TPUN220416	22	12.7	4.76	1.6																							○	
TP	TPMR090204	9.6	5.56	2.38	0.4		○																						
	TPMR110304	11	6.35	3.18	0.4		●															○							
	TPMR110308	11	6.35	3.18	0.8		○															○							
	TPMR160304	16.5	9.525	3.18	0.4		●	○														○		○					
	TPMR160308	16.5	9.525	3.18	0.8		●	●																	○		○		
	TPMR160312	16.5	9.525	3.18	1.2				○																				
	TPMR220412	22	12.7	4.76	1.2				○																				
	TPMR330916	33	19.05	9.52	1.6																								★

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable milling tools

Milling inserts

WN



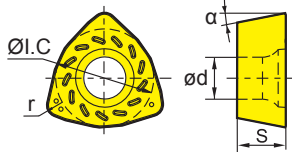
😊 Good working condition 😊 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
YBC301	😊	😊	😊	😊	😊
YBC302	😊	😊	😊	😊	😊
YBM251	😊	😊	😊	😊	😊
YBM253	😊	😊	😊	😊	😊
YBM351	😊	😊	😊	😊	😊
YBD152	😊	😊	😊	😊	😊
YBD252	😊	😊	😊	😊	😊
YBG102	😊	😊	😊	😊	😊
YBG202	😊	😊	😊	😊	😊
YBG205	😊	😊	😊	😊	😊
YB9320	😊	😊	😊	😊	😊
YBG302	😊	😊	😊	😊	😊
YBG152	😊	😊	😊	😊	😊
YBG252	😊	😊	😊	😊	😊
YBS203	😊	😊	😊	😊	😊
YBS303	😊	😊	😊	😊	😊
YNG151	😊	😊	😊	😊	😊
YNG151C	😊	😊	😊	😊	😊
YC30S	😊	😊	😊	😊	😊
YD051	😊	😊	😊	😊	😊
YD101	😊	😊	😊	😊	😊
YD201	😊	😊	😊	😊	😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide											
		L	ØI.C	S	ød	bs	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302		YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201		
	WNHU060404PNR-GM	5.7	9.525	4.0	3.5	1.35	0.4				★	★					★	★														
	WNHU060408PNR-GM	5.7	9.525	4.0	3.5	1.35	0.8				★	★					★	★														
	WNHU080608PNR-GM	7.7	12.7	5.4	4.4	1.6	0.8				★	★					★	★														
	WNHU080612PNR-GM	7.7	12.7	5.4	4.4	1.6	1.2				★	★					★	★														
	WNHU080616PNR-GM	7.7	12.7	5.4	4.4	1.6	1.6				★	★					★	★														
	WNHU080608PNR-LH	7.7	12.7	5.4	4.4	1.6	0.8																								★	

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

WP



😊 Good working condition 😊 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
YBC301	😊	😊	😊	😊	😊
YBC302	😊	😊	😊	😊	😊
YBM251	😊	😊	😊	😊	😊
YBM253	😊	😊	😊	😊	😊
YBM351	😊	😊	😊	😊	😊
YBD152	😊	😊	😊	😊	😊
YBD252	😊	😊	😊	😊	😊
YBG102	😊	😊	😊	😊	😊
YBG202	😊	😊	😊	😊	😊
YBG205	😊	😊	😊	😊	😊
YB9320	😊	😊	😊	😊	😊
YBG302	😊	😊	😊	😊	😊
YBG152	😊	😊	😊	😊	😊
YBG252	😊	😊	😊	😊	😊
YBS203	😊	😊	😊	😊	😊
YBS303	😊	😊	😊	😊	😊
YNG151	😊	😊	😊	😊	😊
YNG151C	😊	😊	😊	😊	😊
YC30S	😊	😊	😊	😊	😊
YD051	😊	😊	😊	😊	😊
YD101	😊	😊	😊	😊	😊
YD201	😊	😊	😊	😊	😊

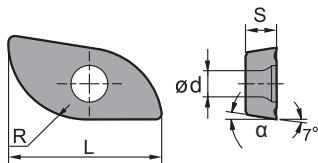
Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide												
		ØI.C	r	S	ød	α	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152		YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201				
	WPGT050315ZSR	7.94	1.5	3.5	4.0	11°	★	●	●																								
	WPGT060415ZSR	9.525	1.5	4.2	4.4	11°	★		●	●						●																	
	WPGT080615ZSR	12.85	1.5	6.35	5.5	11°	★		●	●						●																	
	WPGT090725ZSR	15.00	2.5	7.00	5.5	11°	★		●	●						●																	
	WPGT050315ZSR-PM	7.94	1.5	3.5	4.0	11°	★		●							●																	
	WPGT060415ZSR-PM	9.525	1.5	4.2	4.4	11°	★		●							●																○	
	WPGT080615ZSR-PM	12.85	1.5	6.35	5.5	11°	★		●							●																○	
	WPGT090725ZSR-PM	15.00	2.5	7.00	5.5	11°	★		●							●																	

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Indexable milling tools

Milling inserts

XP



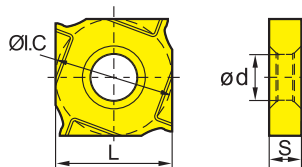
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating						PVD Coating					Cermet	Cemented carbide									
		R	ød	S	α	L	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	XPHT16R0803-GM	8	3.1	3.18	9°	16												★										
	XPHT20R10T3-GM	10	4.0	3.97	9°	20												★										
	XPHT25R1204-GM	12.5	4.7	4.76	9°	25												★										
	XPHT30R1506-GM	15	5.8	6.35	11°	30												★										
	XPHT32R1606-GM	16	5.8	6.35	9°	32												★										
	XPHT40R2007-GM	20	6.7	7.94	9°	40												★										
	XPHT50R2507-GM	25	9.2	7.94	9°	50												★										

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

XS



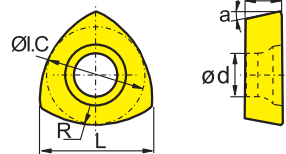
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)				CVD Coating						PVD Coating					Cermet	Cemented carbide										
		øI.C	L	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201	
	XSEQ1202	12.7	12.7	2.3	5.0													★										
	XSEQ1203	12.7	12.7	3.0	5.0													★										
	XSEQ12T3	12.7	12.7	3.5	5.0													★										
	XSEQ1204	12.7	12.7	4.0	5.0													★										
	XSEQ12T4	12.7	12.7	4.5	5.0													★										

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

ZD



😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

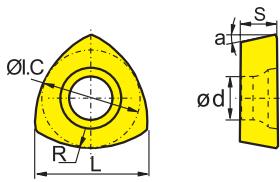
Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating					Cermet	Cemented carbide								
		øI.C	L	S	R	ød	α	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101
	ZDET08T2CYR10	6.75	8.4	2.78	10	2.8	14°													○								
	ZDET1103CYR12.5	8.5	10.6	3.18	12.5	2.8	14°														○							
	ZDET13T3CYR16	10.5	13.2	3.97	16	4.4	14°														○							

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Indexable
milling tools

Milling inserts

ZP



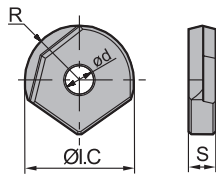
😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide								
		Ø1.C	L	S	R	ød	α	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	ZPNT2204CY(R20)	12.7	16.1	4.76	20	5.56	11°		○										○										
	ZPNT2204CY(R25)	12.7	16.9	4.76	25	5.56	11°		○											○									
	ZPNT2204CY(R31)	12.7	17.6	4.76	31.5	5.56	11°		○											○									

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

ZO



😊 Good working condition 😐 Normal working condition 😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
M Stainless steel	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
K Cast iron	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊	😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)				CVD Coating						PVD Coating						Cermet	Cemented carbide											
		R	Ø1.C	S	ød	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YB9320	YBG302	YBG152	YBG252	YBS203	YBS303	YNG151	YNG151C	YC30S	YD051	YD101	YD201			
	ZOHX1203-GF	6	12	3	4																									
	ZOHX1604-GF	8	16	4	5																									
	ZOHX2005-GF	10	20	5	5																									
	ZOHX2506-GF	12.5	25	6	6																									
	ZOHX3007-GF	15	30	7	8																									
	ZOHX3207-GF	16	32	7	8																									
	ZOHX1203-GM	6	12	3	4																									
	ZOHX1604-GM	8	16	4	5																									
	ZOHX2005-GM	10	20	5	5																									
	ZOHX2506-GM	12.5	25	6	6																									
	ZOHX3007-GM	15	30	7	8																									
	ZOHX3207-GM	16	32	7	8																									

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

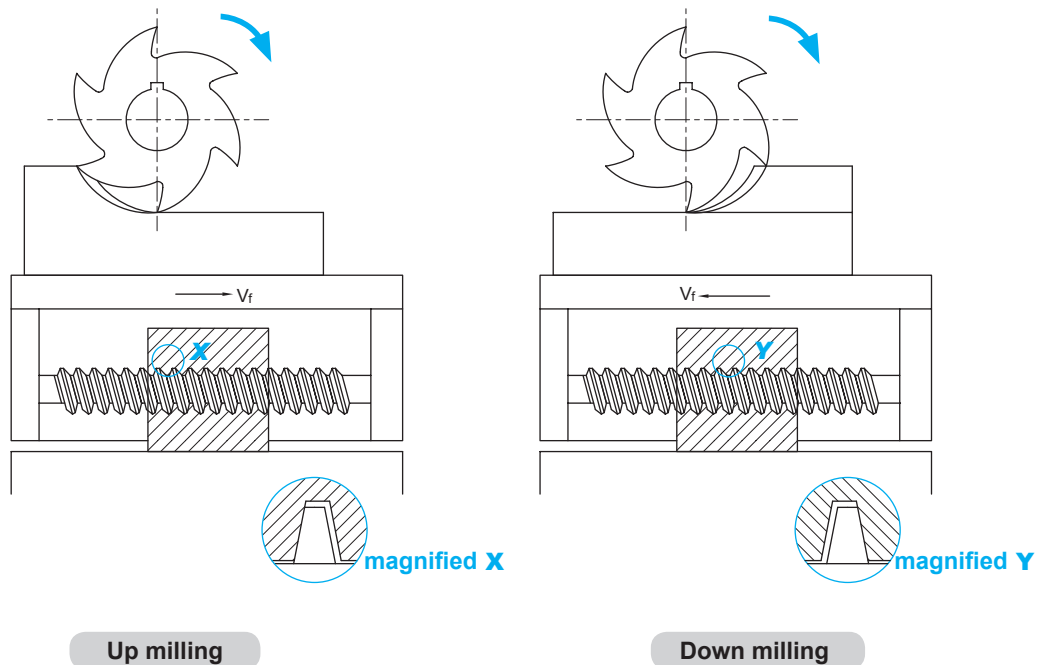
Indexable milling tools

Milling inserts

Common problems in milling and solutions

Main points of solution and inspection		Selection of tool material		Cutting condition					Tool shape						Machine clamping system				
		Material with higher hardness	Material with perfect toughness	Cutting speed	Feed rate	Cutting depth	Change the diameter and width of milling tools	Cutting liquid	Rake angle	Approach angle	Strength of cutting edge	Number of teeth	Increase the width of chip pocket	Examine the geometry shape of Minor cutting edge.	check the end face run-out	Improve the rigidity of tool	Clamping system of workpiece	Overhang of tool	Power, gap
Fracture of tool nose	severe abrasion on clearance face	Improper cutting condition			↓			✓											
		Unsuitable geometry shape of cutting edge	✓						↑		↓								
	severe abrasion on rake face	Improper cutting condition			↓	↓	↓	✓											
		Unsuitable geometry shape of cutting edge	✓						↑	↓	↓								
	Fracture of cutting edge	Improper cutting condition				↓	↓												
		Unsuitable geometry shape of cutting edge		✓						↓	↑		✓	✓	✓	✓	✓	✓	✓
	Thermal cracking	Improper cutting condition			↓	↓	↓	✓											
		Unsuitable geometry shape of cutting edge							↑		↓								
	Build-up edge	Improper cutting condition			↑	↑		✓											
		Unsuitable geometry shape of cutting edge							↑		↓								
Machining precision	Bad surface roughness	Abrasion of tool Great vibration of milling tool	✓		↑	↓	↓	✓			↓		Wiper	✓					
	Burrs occurring	Unsuitable geometry shape of cutting edge			↓	↓	↓	✓											
		Improper geometry shape of cutting edge							↑	↑	↓		✓						
	Side collapse	Unsuitable geometry shape of cutting edge				↓	↓												
		Unsuitable geometry shape of cutting edge							↑	↓	↓	↑	✓		✓				
Planeness and parallelism deterioration	Improper geometry Improper technique				↓	↓		↑	↑	↓		✓	✓	✓	✓	✓	✓	✓	
Other	Vibration	Cutting condition Improper technology			↓	↓	↓	✓	↑	↑	↓				✓	✓	✓	✓	
	Chips twisting and jamming	Improper cutting condition			↑	↑	↓	✓	✓		↓								
		Unsuitable geometry shape of cutting edge							↑		↓	✓							

Difference and selection between down milling and up milling



Climb milling (also called down milling): the feed direction of workpiece is the same as that of the milling rotation at the connecting position.

Conventional milling (also called up milling): the feed direction of workpiece is opposite to that of the milling rotation at the connecting position.

In down milling, the major force of cutting edge is the compressive stress, while in up milling is the tensile stress. The compressive strength of cemented carbide material is much larger than its tensile strength. In down milling, as chips become thin from thick gradually, cutting edge and workpiece press against each other. The friction between edge and workpiece is small, thus reducing the abrasion of edge, the hardening of workpiece surface and the surface roughness (R_a). In up milling, chips become thick from thin gradually. When the insert is cutting into the workpiece, it produces strong friction and more heat than in down milling, and make workpiece surface hardened.

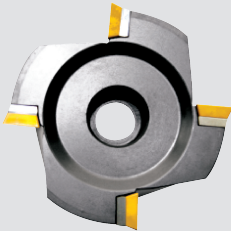
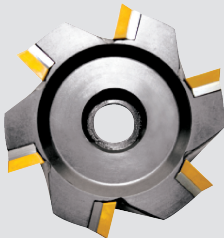
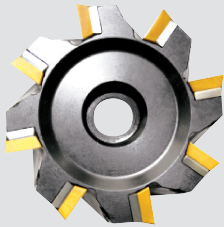
In up milling, because horizontal direction of cutting force milling cutter conducting on workpiece is opposite to the feed direction of workpiece, the lead screw of worktable joints closely with one side of the screw nut. In down milling, the direction of cutting force is the same as the feed direction. When edge's radial force on workpiece is large enough, the worktable will bounce left and right, thus make the gap fall behind. The gap will return to the front side with the continuing rotation of lead screw. At this moment the worktable stops motion, however, it will bounce left and right again when the radial cutting force is large enough again. The periodical bounce of worktable will cause poor surface quality of workpiece and tool breakage.

When using end mills for down milling, the edges always starts cutting at the workpiece surface, therefore end mills are not suitable for machining workpiece with hardened surface.

Up milling is recommended for milling thin-wall components or square milling with high requirement for precision.

Pitch selection

Pitch is the distance between one point on one cutting edge and the same point on the next edge. Milling cutters are mainly classified into coarse, close and extra close pitches.

optimized stability		
L (Low)	M (Medium)	H (High)
<p>Coarse pitch Unequal pitch design</p> 	<p>Close pitch</p> 	<p>Extra close pitch</p> 
<p>When the milling width is equal to diameter of cutter, the machining system is stable and main power of machine is sufficient, the use of coarse pitch can achieve high productive efficiency.</p>	<p>Used in general milling and multiple mixed productions.</p>	<p>When the milling width is less than diameter of cutter, cutting by maximum edges can achieve high productive efficiency.</p>

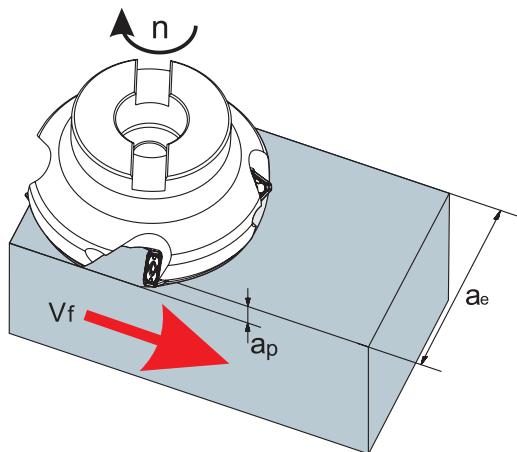
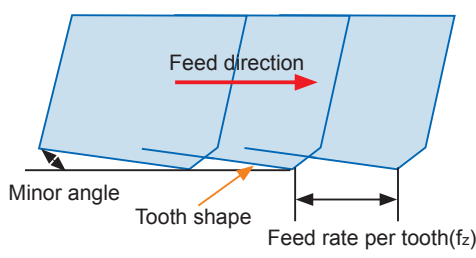
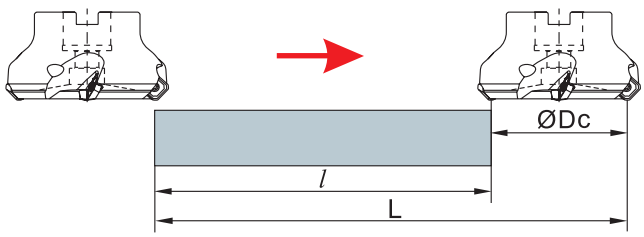
Selection of approach angle

The approach angle is formed by insert and tool body. It affects chip thickness, cutting forces and tool-life. Decreasing the approach angle reduces chip thickness and expands the cutting area between cutting edge and workpiece at a given feed rate.

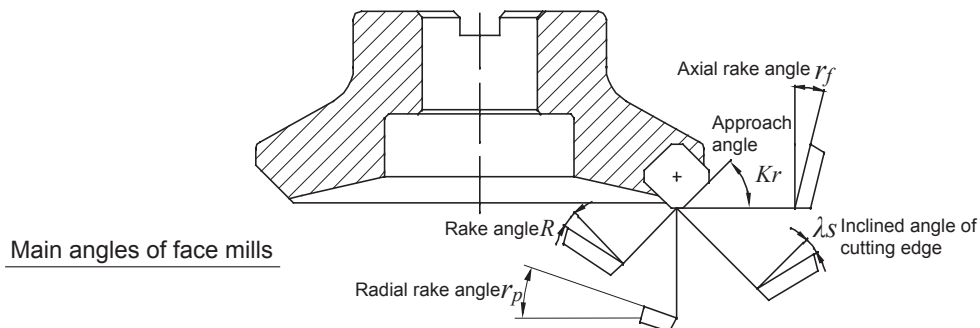
A smaller approach angle also ensures stable entry or exit, protecting the cutting edge and extending tool life. However, this will increase axial cutting forces on the workpiece, thus is not suitable for machining thin workpiece such as thin plate.

Approach angle	Feed rate per tooth	Real maximum cutting depth
90°	f_z	$h_{ex} = f_z \times \text{sinkr}$
75°	f_z	$h_{ex} = 0.96 \times f_z$
60°	f_z	$h_{ex} = 0.86 \times f_z$
45°	f_z	$h_{ex} = 0.707 \times f_z$
Round insert	f_z	$h_{ex} = \frac{\sqrt{i C^2 \times (i C - 2 a_p)^2}}{i C} \times f_z$

General formula

<p>V_c : cutting speed(m/min)</p> <p>D_c : nominal diameter of milling tool(mm)</p> <p>n : spindle speed(rev/min)</p> <p>z_n : number of teeth</p> <p>Q : metal removal rate(cm³/min)</p> <p>L : Actual working distance(mm)</p>	<p>V_f : feed rate of worktable (feed speed)(mm/min)</p> <p>f_z : feed rate per tooth(mm/z)</p> <p>π : circumference ratio≈3.14</p> <p>T_c : machining time(min)</p> <p>f_n : feed rate per revolution (mm/rev)</p>
<p>● Cutting speed</p> $V_c = \frac{\pi \times D_c \times n}{1000} \text{ (m/min)}$	  
<p>● Spindle speed</p> $n = \frac{1000 \times V_c}{\pi \times D_c} \text{ (rev/min)}$	
<p>● Feed rate of worktable (feed speed)</p> $V_f = f_z \times n \times z_n \text{ (mm/min)}$	
<p>● Feed rate per tooth</p> $f_z = \frac{V_f}{n \times Z_n} \text{ (mm/z)}$	
<p>● Feed rate per revolution</p> $f_n = \frac{V_f}{n} \text{ (mm/rev)}$	
<p>● Machining time</p> $T_c = \frac{L}{V_f} \text{ (min)}$	
<p>● Metal removal rate</p> $Q = \frac{a_p \times a_e \times V_f}{1000} \text{ (cm}^3\text{/min)}$	

Function of each part in face milling



Main angles of face mills

Main angles of face mills

Designation	Function	Effect		
Axial rake angle r_f	Determining the chip direction	Negative angle, excellent capability of chip removal		
Radial rake angle r_p	Determining whether the cutting is easy and fast or not	Positive angle: good cutting performance		
Approach angle K_r	Determining the chip thickness	$K_r \uparrow$, chip thickness \uparrow ; $K_r \downarrow$, chip thickness \downarrow ;		
Rake angle R	Determining whether easy and fast the cutting is or not	Poor cutting performance, High-strength cutting edge	(-)-0-(+)	Good cutting performance, Low-strength cutting edge
Inclined angle of cutting edge λ_s	Determining the chip flow direction	Poor capability of chip removal, High-strength cutting edge	(-)-0-(+)	Good performance of chip removal, Low-strength cutting edge

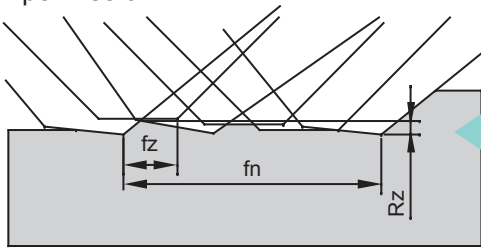
Characteristics of different rake angles combined

		Double positive rake angle	Double negative rake angle	Positive and negative rake angle
Negative rake angle				
0° rake angle				
Positive rake angle				
Axial rake angle r_f		+	-	+
Radial rake angle r_p		+	-	-
Applicable material machined	P	✓		✓
	M	✓		✓
	K		✓	✓
	N	✓		
	S	✓		✓

Cutting performances of different approach angles

Approach angle	45°	75°	90°
Schematic diagram			
Instruction	Axial force is the largest. It will bend when machining thin-wall workpiece, reducing the precision of workpiece. It can help avoid fringe breakage of workpiece when machining cast iron.	The main force is radial cutting force. It is often used in general face milling.	The axial force is zero in theory, suitable for milling thin plate workpiece.

Wiper insert

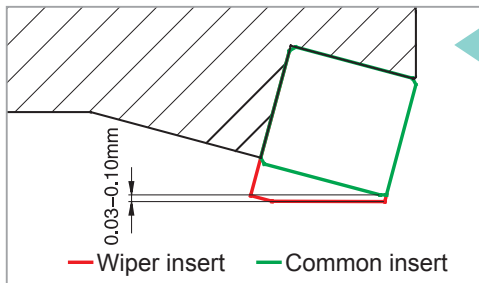


It has axial and radial run-out because tools and inserts have manufacturing tolerance. The axial run-out leads to poor surface roughness.

Solution

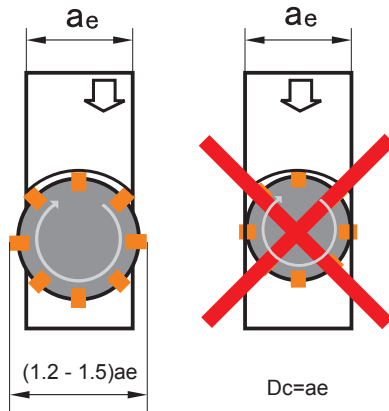
Mounting wiper inserts

usage



The wiper insert must protrude below the other inserts by 0.03-0.10 mm at axial direction, so that the wiping function can take effect. Generally speaking, a cutter just needs only one wiper insert. If the diameter of cutter is much larger or cutter's feed rate per revolution is higher than the length of wiper edge, 2 to 3 wiper inserts can be mounted.

■ Selection of cutting width and tool cutting diameter in face milling



Dc: Tool cutting diameter
ae: Cutting width

Generally speaking, the relation between cutting width and tool cutting diameter is $Dc=(1.2-1.5) ae$. In practical machining, same center line of tool center and work piece center should be avoided.