

Milling · Fräsen

Indexable Milling Tools · Wendeplattenfräser

Inserts - face milling · WSP - Planfräsen



SEET-CF



SEET-CM



SEET-CR



SEET-DF



SEET-DM



SEET-DR



SEET-EF



SEET-EM

Page
Seite

B220

B220

B220

B220

B220

B220

B220

B220



SEET-LH



SEET-W



SEKN/SEEN



SEKR



SNKN



OFKT-DF



OFKT-DM



OFKT-LH

Page
Seite

B220

B220

B222

B222

B223

B211

B211

B211



OFKR-DF / DM



OFKR-LH



ONHU-PF/PM



ONHU-GM



ONHU-W



SNEG-GM/GR/E



SNEG-W



HNEX-DF

Page
Seite

B211

B211

B212

B212

B212

B223

B223

B208



HNEX-DM



HNEX-DR



HNGX-MR



HNGX-HDR



PNEG-CF/CM/CR



PNEG-PF/PM/PR



LNKT-ZR



LNE32.534 / 32.302

Page
Seite

B208

B208

B208

B208

B213

B213

B209

B209



LNCX



SPKW



SPKT



SPAN/SPCN



SPKN



SPKR-GM



SPEX



SPMR

Page
Seite

B210

B226

B228

B224

B225

B226

B227

B228



SPGN/SPUN



TPAN/TPCN



TPKN



TPUN



TPMR



SEET*PER-PF



SEET*PER-PM



SEET*PER-PR

Page
Seite

B229

B230

B231

B232

B232

B221

B221

B221



SEET-LH



RCKT-DM



RCKT-DR



RCKT-ER



RCKT-NM



RDKW

Page
Seite

B221

B216

B216

B216

B216

B217

Inserts - square shoulder milling · WSP - Eckfräsen



APKT-PF APKT-PM APKT-PR APKT-LH APKT-APF APKT-APM APKT-ALH

Page	B205	B205	B205	B205	B205	B205	B205
Seite							



APMT**PDR APMT**PDER ANGX*PNR-GM ANGX*PNR-LH

Page	B206	B206	B204	B204
Seite				

Inserts for profile milling · WSP - Formfräsen



ZDET ZPNT SPMT ROHX XPHT-GM ZOHX-GF ZOHX-GM

Page	B234	B235	B228	B218	B233	B235	B235
Seite							

Inserts - side and face milling WSP - Seiten- und Stirnfräsen



XSEQ MPHT QC**L

Page	B234	B210	B214 / 215
Seite			

Inserts - high feed milling WSP - Hochvorschubfräsen



SDMT SDMT-DM SDMT-PM WPGT WPGT-PM

Page	B218	B219	B219	B233	B233
Seite					

Inserts - T-slot milling WSP - T-Nuten - Fräsen



MPHT

Page	B210
Seite	

Inserts - helical milling WSP - Zirkularfräsen



APKT-PM/KM SPMT-PM/KM

Page	B207	B228
Seite		

Inserts - chamfer milling WSP - Fasenfräsen



SPMT SPMT-KT SPMT-HT

Page	B228
Seite	

Inserts - face milling - square shoulder milling WSP - Planfräsen - Eckfräsen



CNE-A CNE-B

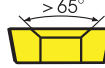
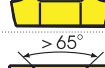
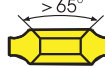
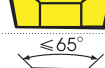
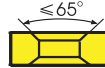
Page	B207	B207
Seite		

Milling · Fräsen

Indexable Milling Tools · Wendepplattenfräser

Indexable milling inserts code key · Wendepplattenfräser ISO Kode

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

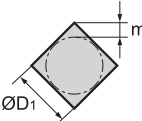
Metric System · Metrisches System							
Code	Hole Loch	Chipbreaker Spanbrecher	Section Form	Code	Hole Loch	Chipbreaker Spanbrecher	Section Form
B	✓	-		N	-	-	
H	✓	Single-side Einseitig		R	-	Single-side Einseitig	
C	✓	-		F	-	Double-side Doppelseitig	
J	✓	Double-side Doppelseitig		A	✓	-	
W	✓	-		M	✓	Single-side Einseitig	
T	✓	Single-side Einseitig		G	✓	Double-side Doppelseitig	
Q	✓	-		X	---	---	Special Spezial
U	✓	Double-side Doppelseitig					
Chipbreaker and clamping system Spanbrecher und Klemmsystem							

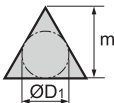
S P K N

Clearance angle of main cutting edge Freiwinkel der Hauptschneid			
Code	Clearance angle Freiwinkel	Code	Clearance angle Freiwinkel
A		B	
C		D	
E		F	
G		N	
P		O	Other clearance angle Andere Freiwinkel

Tolerance · Toleranz







Code	Nose height Toleranzhöhe (mm)	M	Inscribed circle Ø D1 Tolerance Toleranzinnenkreis Ø D1 (mm)	Thickness Tolerance Toleranz Dicke S (mm)	S	(Reference) details of M-class tolerance (identified by shape and size) (Referenz) Detail Toleranz M-Klasse (definiert durch Form und Größe)						
						● Nose height tolerance(mm) / Toleranz M						
						Inscribed circle Innenkreis	Regular Dreieckig	Square Viereckig	Diamond with 80° Raute mit 80°	Diamond with 55° Raute mit 55°	Diamond with 35° Raute mit 35°	Round Rund
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	---	---	---	---
● Tolerance of Inscribed Circle ØD1(mm) / Toleranzinnenkreis ØD1												
J	±0.005		±0.05 - ±0.13	±0.025		Inscribed circle Innenkreis	Regular Dreieckig	Square Viereckig	Diamond with 80° Raute mit 80°	Diamond with 55° Raute mit 55°	Diamond with 35° Raute mit 35°	Round Rund
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	---	±0.58
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 Durchmesser von IC	Insert / WSP						
	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 · Schneidkantenlänge

Definition thickness Definition Dicke	
Code	Insert thickness (mm) Plattendicke
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 · WSP Dicke

12 04 ED T21K R-DM

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

Chamfer · Fase (mm)			
	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

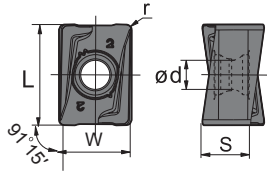
Chipbreaker code
Spanbrecher

Cutting direction Schnitttrichtung	
R	Right hand Rechts
L	Left hand Links
N	Neutral Neutral

Milling · Fräsen

Indexable Milling · Fräswendeplatten

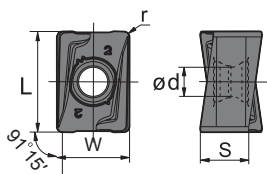
AN**



		Ideal Machining Condition Gute Bearbeitungsbedingungen					Normal Machining Condition Normale Bearbeitungsbedingungen					Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen				
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen														
	N	Non-ferrous material Nichtmetalle														
	S	Heat-resistant steel Wärmebeständiger Stahl														

Insert shape Plattenform	Type Typ	Dimension (mm) Abmessungen					CVD Coating CVD Beschicht.							PVD Coating PVD Beschicht.					Cermet Cermet		Carbide uncoat. unbe. Hartmetall						
		L	W	S	Ø d	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG305	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	ANGX110504PNR-GM	11.85	8.4	5.7	3.5	0.8				●			●			●	●										
	ANGX110508PNR-GM	11.85	8.4	5.7	3.5	0.4	○			●			●	●		●	●										
	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				●				●			●										

AN**

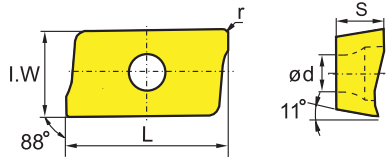


		Ideal Machining Condition Gute Bearbeitungsbedingungen					Normal Machining Condition Normale Bearbeitungsbedingungen					Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen				
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen														
	N	Non-ferrous material Nichtmetalle														
	S	Heat-resistant steel Wärmebeständiger Stahl														

Insert shape Plattenform	Type Typ	Dimension (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.				Cermet Cermet		Carbide uncoat. unbe. Hartmetall						
		L	W	S	Ø d	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	ANGX110504PNR-LH	11.85	8.4	5.7	3.5	0.8																				●	
	ANGX150608PNR-LH	15.43	11.0	7.3	4.4	0.8																				●	

● Ex Stock / ab Lager ○ On demand / auf Anfrage

AP**



		Ideal Machining Condition Gute Bearbeitungsbedingungen		Normal Machining Condition Normale Bearbeitungsbedingungen		Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen	
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●

Insert shape Plattenform	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.								Cermet Cermet	Carbide uncoat. unbe. Hartmetall			
		L	I.W	S	d	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	APKT11T304-PF	12.24	6.5	3.6	2.8	0.4		○			●			●			●	●									
	APKT11T308-PF	12.24	6.5	3.6	2.8	0.8					●						●										
	APKT11T312-PF	12.24	6.5	3.6	2.8	1.2											○										
	APKT11T316-PF	12.24	6.5	3.6	2.8	1.6												●									
	APKT160408-PF	17.877	9.33	5.76	4.4	0.8		●				●	●					●		●							
	APKT160430-PF	17.877	9.33	5.76	4.4	3.0																					
	APKT11T304-PM	12.24	6.5	3.6	2.8	0.4	●	●	●		●	●		●			●		●								
	APKT11T308-PM	12.24	6.5	3.6	2.8	0.8	●	●		●	●	●	●	●	●		●	●		●							
	APKT11T312-PM	12.24	6.5	3.6	2.8	1.2					●			●			●		●								
	APKT11T316-PM	12.24	6.5	3.6	2.8	1.6					●			●			●										
	APKT160408-PM	17.877	9.33	5.76	4.4	0.8	●	●	●	●	●	●	●	●	●		●	●		●							
	APKT160416-PM	17.877	9.33	5.76	4.4	3.0	●											●									
	APKT11T304-PR	12.24	6.5	3.6	2.8	0.4						●					●		●								
	APKT11T308-PR	12.24	6.5	3.6	2.8	0.8													○								
	APKT11T312-PR	12.24	6.5	3.6	2.8	1.2													○								
	APKT11T316-PR	12.24	6.5	3.6	2.8	1.6													○								
	APKT160408-PR	17.877	9.33	5.76	4.4	0.8													○								
	APKT11T304-LH	12.24	6.5	3.6	2.8	0.4																				●	●
	APKT11T308-LH	12.24	6.5	3.6	2.8	0.8																				●	●
	APKT160408-LH	17.877	9.33	5.76	4.4	0.8																				●	●
	APKT11T304-APF	12.24	6.5	3.6	2.8	0.4									●												
	APKT11T308-APF	12.24	6.5	3.6	2.8	0.8									●												
	APKT160408-APF	17.877	9.33	5.76	4.4	0.8									●		●		●								
	APKT11T304-APM	12.24	6.5	3.6	2.8	0.4									●												
	APKT11T308-APM	12.24	6.5	3.6	2.8	0.8				●			●		●												
	APKT11T312-APM	12.24	6.5	3.6	2.8	1.2				●			●		●												
	APKT11T316-APM	12.24	6.5	3.6	2.8	1.6				●			●		●												
	APKT11T320-APM	12.24	6.5	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	6.5	3.6	2.8	0.4																				●	●
	APKT11T308-ALH	12.24	6.5	3.6	2.8	0.8																				●	●
	APKT160408-ALH	17.877	9.33	5.76	4.4	0.8																				●	●

Applicable tool
Werkzeug

Tools code key
WSP ISO

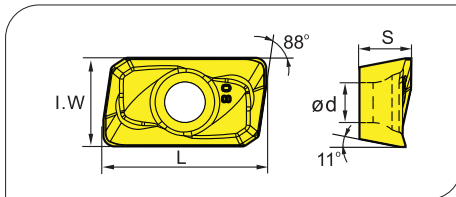
Grade selection guide
Sortenauswahl

Technical data
Technische Daten

Milling · Fräsen

Indexable Milling · Fräswendeplatten

AP**

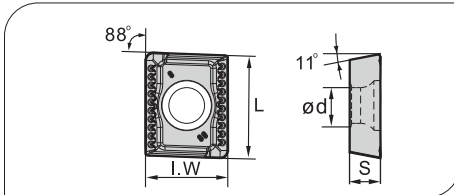


		Ideal Machining Condition Gute Bearbeitungsbedingungen				Normal Machining Condition Normale Bearbeitungsbedingungen				Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen			
Workpiece Material Werkstoffe	P	Steel Stahl											
	M	Stainless Steel Rostfreier Stahl											
	K	Cast iron Gusseisen											
	N	Non-ferrous material Nichtmetalle											
	S	Heat-resistant steel Wärmebeständiger Stahl											

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall							
		L	I.W	S	d	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	APMT1135PDR	11.25	6.2	3.5	2.8	0.8					●						●	●		●							
	APMT160408PDER	17.25	9.25	4.76	4.4	0.8						●					●	●		●							
	APMT160432PDER	17.25	9.25	4.76	4.4	3.2						●															

● Ex Stock / ab Lager ○ On demand / auf Anfrage

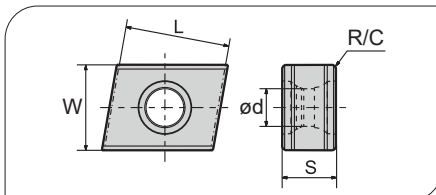
AP**



		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P Steel Stahl	●	●	●
	M Stainless Steel Rostfreier Stahl	●	●	●
	K Cast iron Gusseisen	●	●	●
	N Non-ferrous material Nichtmetalle	●	●	●
	S Heat-resistant steel Wärmebeständiger Stahl	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.					Cermet Cermet	Carbide uncoat. unbe. Hartmetall								
		L	I.W	S	d	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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															●						

CN



		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P Steel Stahl	●	●	●
	M Stainless Steel Rostfreier Stahl	●	●	●
	K Cast iron Gusseisen	●	●	●
	N Non-ferrous material Nichtmetalle	●	●	●
	S Heat-resistant steel Wärmebeständiger Stahl	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet		Carbide uncoat. unbe. Hartmetall				
		L	W	S	R/C	ød	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	CNE121006A	12.8	10.0	6.35	0.4	4.4				●																	
	CNE121006B	12.0	10.0	6.35	0.6	4.4				○			●														

Applicable tool
Werkzeug

Tools code key
WSP ISO

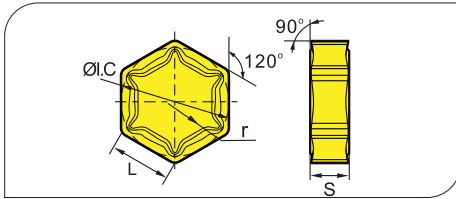
Grade selection guide
Sortenauswahl

Technical data
Technische Daten

Milling · Fräsen

Indexable Milling · Fräswendeplatten

HN**

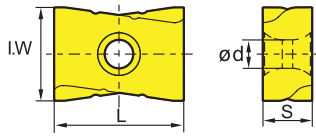


		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen				CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.								Cermet Cermet		Carbide uncoat. unbe. Hartmetall		
		L	I.C	S	R	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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							● ●														
	HNGX090516-MR	9.16	15.875	5.56	1.6							●														
	HNGX090520-MR	9.16	15.875	5.56	2.0							●														
	HNGX090530-HDR	9.16	15.875	5.56	3.0							●														

● Ex Stock / ab Lager ○ On demand / auf Anfrage

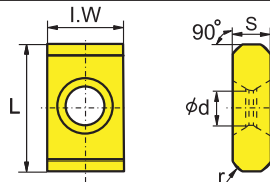
LN**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Guss Eisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen				CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall					
		L	I.W	S	d	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	LNKT120608-ZR	12.7	12	6.65	4.4	●			●					●												
	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						●		●						●							

LN**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Guss Eisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall					
		L	I.W	S	d	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	LNE32.534	15.875	9.525	4.76	4.4	1.6						●	●														
	LNE32.302	15.875	9.525	4.76	4.2	45 Fase								●													

Applicable tool
Werkzeug

Tools code key
WSP ISO

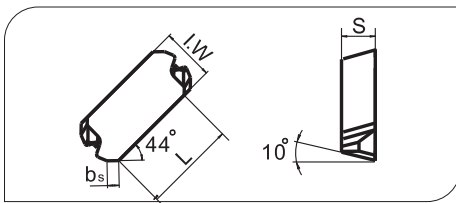
Grade selection guide
Sortenauswahl

Technical data
Technische Daten

Milling · Fräsen

Indexable Milling · Fräswendeplatten

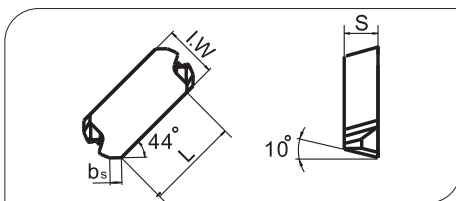
LNCX



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.					PVD Coating PVD Beschicht.					Cermet Cermert	Carbide uncoat. unbe. Hartmetall									
		L	I.W	S	bs		YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	LNCX1806AZR	18.77	10.0	6.4	2.0			○																			○
	LNCX1806AZL	18.77	10.0	6.4	2.0																						

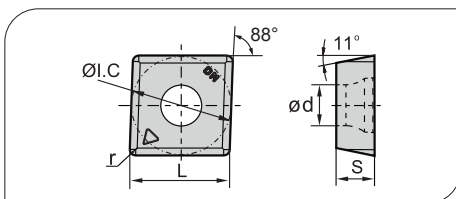
LNCX



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.					Cermet Cermert	Carbide uncoat. unbe. Hartmetall						
		L	I.W	S	bs	T-land	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	LNCX1806AZT11R	18.77	10.0	6.4	2.0	0.1								●													
	LNCX1806AZT11L	18.77	10.0	6.4	2.0	0.1								●													

MP**

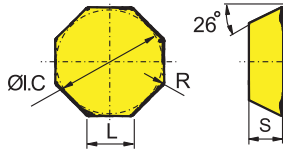


		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.								Cermet Cermert		Carbide uncoat. unbe. Hartmetall		
		I.C	L	S	d	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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	●				●		●							●							

● Ex Stock / ab Lager ○ On demand / auf Anfrage

OF**



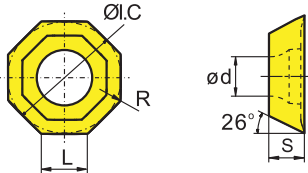
 Ideal Machining Condition
  Normal Machining Condition
  Unfavorable Machining Condition

Gute Bearbeitungsbedingungen
 Normale Bearbeitungsbedingungen
 Ungünstige Bearbeitungsbedingungen

	P	M	K	N	S
Steel <i>Stahl</i>					
Stainless Steel <i>Rostfreier Stahl</i>					
Cast iron <i>Gusseisen</i>					
Non-ferrite material <i>Ne Metalle</i>					
Heat-resistant steel <i>Wärmester Stahl</i>					

[illegible]

OF**



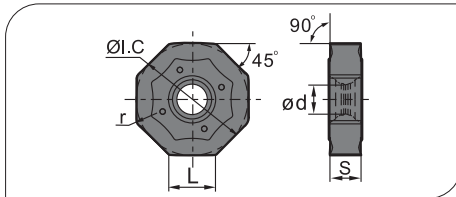
 Ideal Machining Condition
 Normal Machining Condition
 Unfavorable Machining Condition

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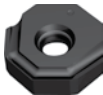
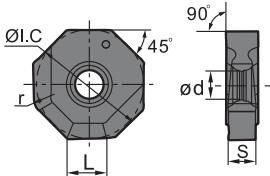
Milling · Fräsen

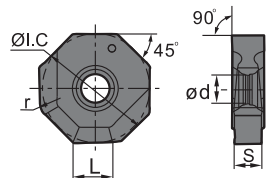
Indexable Milling · Fräswendeplatten

ON**



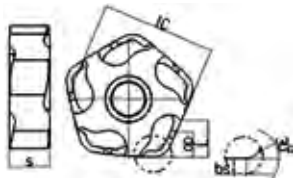
		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl								
	M	Stainless Steel Rostfreier Stahl								
	K	Cast iron Gusseisen								
	N	Non-ferrous material Nichtmetalle								
	S	Heat-resistant steel Wärmebeständiger Stahl								

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.								Cermet Cermet	Carbide uncoat. unbe. Hartmetall			
		L	ØI.C	S	ød	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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	●			●		●	●														
	ONHU08T624R-GM	6.38	20.2	6.3	2.4	0.8				●			●				●										
	ONHU08T508-W	6.9	20.5	6.00	5.3	0.80							●		○												
																											



● Ex Stock / ab Lager ○ On demand / auf Anfrage

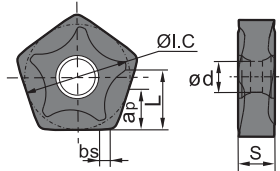
PN**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichte Metalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmeester Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimension (mm) Abmessung						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall							
		L	ØI.C	S	ød	bs	a _p	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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							●														

PN**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichte Metalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmeester Stahl	●	●	●	●	●	●	●	●

Insert WSP	Insert Typ	Dimension (mm) Abmessung						CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall					
		L	ØI.C	S	ød	bs	ap _{max}	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	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	○			○																	

Applicable tool
Werkzeug

Tools code key
WSP ISO

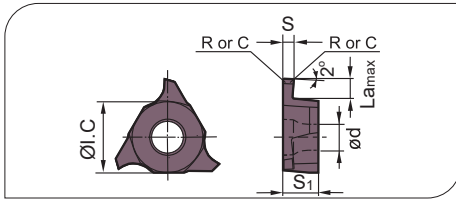
Grade selection guide
Sortenauswahl

Technical data
Technische Daten

Milling · Fräsen

Indexable Milling · Fräswendeplatten

QC**L

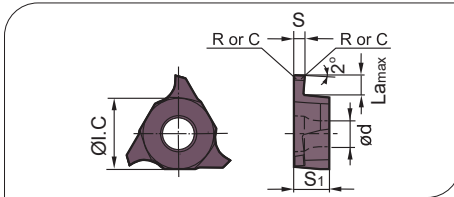


		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P Steel Stahl	●	●	●
	M Stainless Steel Rostfreier Stahl	●	●	●
	K Cast iron Gusseisen	●	●	●
	N Non-ferrous material Nichtmetalle	●	●	●
	S Heat-resistant steel Wärmebeständiger Stahl	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.								Cermet Cermet	Carbide uncoat. unbe. Hartmetall				
		S±0.025	La _{max}	R/C	ØI.C	S ₁	ød	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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											●											

● Ex Stock / ab Lager ○ On demand / auf Anfrage

QC**L



		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P Steel Stahl	●	●	●
M Stainless Steel Rostfreier Stahl		●	●	●
K Cast iron Gusseisen		●	●	●
N Non-ferrous material Nichtmetalle		●	●	●
S Heat-resistant steel Wärmebeständiger Stahl		●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.								Cermet Cermet	Carbide uncoat. unbe. Hartmetall			
		S±0.025	La _{max}	R/C	ØI.C	S ₁	ød	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	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											○	○									

Applicable tool
Werkzeug

Tools code key
WSP ISO

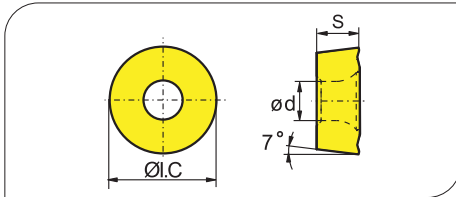
Grade selection guide
Sortenauswahl

Technical data
Technische Daten

Milling · Fräsen

Indexable Milling · Fräswendeplatten

RC**

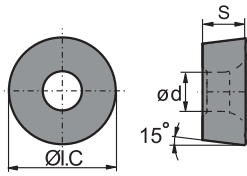


		● Ideal Machining Condition Gute Bearbeitungsbedingungen	● Normal Machining Condition Normale Bearbeitungsbedingungen	● Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P Steel Stahl	●	●	●
	M Stainless Steel Rostfreier Stahl	●	●	●
	K Cast iron Gusseisen	●	●	●
	N Non-ferrous material Nichtmetalle	●	●	●
	S Heat-resistant steel Wärmebeständiger Stahl	●	●	●

Insert shape WSP	Type Typ	Dimension (mm) Abmessung			CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.								Cermet Cermet	Carbide uncoat. unbe. Hartmetall			
		I.C	S	d	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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		●	●		●						●			●							
	RCKT2006MO-DM	20.0	6.35	6.55		●	●		●																
	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													●								

● Ex Stock / ab Lager ○ On demand / auf Anfrage

RD**

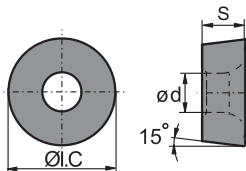


		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P Steel Stahl	●	●	●
	M Stainless Steel Rostfreier Stahl	●	●	●
	K Cast iron Gusseisen	●	●	●
	N Non-ferrous material Nichtmetalle	●	●	●
	S Heat-resistant steel Wärmebeständiger Stahl	●	●	●

Insert shape Plattenform	Type Typ	Dimension (mm) Abmessung			CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall					
		I.C	S	d	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	RDKW0702MO-1	7.0	2.38	2.7																					
	RDKW0702MO-2	7.0	2.38	2.7																					
	RDKW1003MO-1	10.0	3.18	3.9																					
	RDKW1003MO-2	10.0	3.18	3.9																					
	RDKW1003MO-3	10.0	3.18	3.9																					
	RDKW12T3MO-1	12.0	3.97	3.9																					
	RDKW12T3MO-2	12.0	3.97	3.9																					
	RDKW12T3MO-3	12.0	3.97	3.9																					
	RDKW1604MO-1	16.0	4.76	5.2																					
	RDKW1604MO-2	16.0	4.76	5.2																					
	RDKW1604MO-3	16.0	4.76	5.2																					

-1 normale Fase/ standard chamfer -2 kleine Fase/ small chamfer -3 große Fase/ large chamfer

RD**



		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P Steel Stahl	●	●	●
	M Stainless Steel Rostfreier Stahl	●	●	●
	K Cast iron Gusseisen	●	●	●
	N Non-ferrous material Nichtmetalle	●	●	●
	S Heat-resistant steel Wärmebeständiger Stahl	●	●	●

Insert shape Plattenform	Type Typ	Dimension (mm) Abmessung			CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall					
		I.C	S	d	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	RDKW0803MO	8.0	3.18	3.4						●					●										
	RDKW10T3MO	10.0	3.97	4.4	●	○				○			●		●		●								
	RDKW1204MO	12.0	4.76	4.4	●				●	●			●	●	●	●		●							
	RDKW1605MO	16.0	5.56	5.5						●						●		●							
	RDKW2006MO	20.0	6.35	6.5		●				●	●	○													
	RDKW2006MO-3	20.0	6.35	6.5											●										

Applicable tool
Werkzeug

Tools code key
WSP ISO

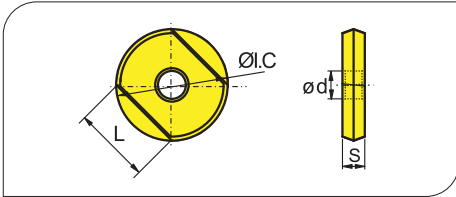
Grade selection guide
Sortenauswahl

Technical data
Technische Daten

Milling · Fräsen

Indexable Milling · Fräswendeplatten

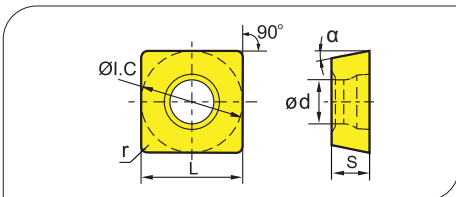
RO**



		Ideal Machining Condition Gute Bearbeitungsbedingungen				Normal Machining Condition Normale Bearbeitungsbedingungen				Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen			
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen											
	N	Non-ferrous material Nichtmetalle											
	S	Heat-resistant steel Wärmebeständiger Stahl											

Insert WSP	Type Typ	Dimensions (mm) Abmessungen				CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.					Cermet Cermet	Carbide uncoat. unbe. Hartmetall						
		I.C	L	S	d	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	ROHX1203	12	8.5	3	4									○			●				●					
	ROHX1604	16	11.3	4	5												●				●					
	ROHX2005	20	14.1	5	5												●				●					

SD**

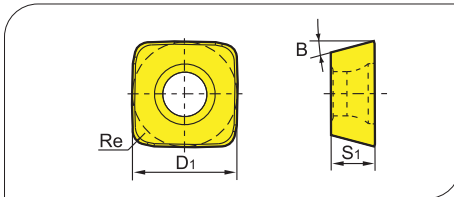


		Ideal Machining Condition Gute Bearbeitungsbedingungen				Normal Machining Condition Normale Bearbeitungsbedingungen				Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen			
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen											
	N	Non-ferrous material Nichtmetalle											
	S	Heat-resistant steel Wärmebeständiger Stahl											

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall					
		r	L	I.C	S	d	α	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	SDMT090308	0.8	9.525	9.525	3.18	4.4	15°					●	●															

● Ex Stock / ab Lager ○ On demand / auf Anfrage

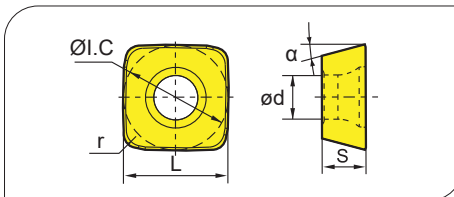
SD**



		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P	Steel Stahl	●	●
	M	Stainless Steel Rostfreier Stahl	●	●
	K	Cast iron Gusseisen	●	●
	N	Non-ferrous material Nichtmetalle	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall							
		B	Re	S ₁	D ₁	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	SDMT06T208-DM	15°	0.8	2.58	6.35																					
	SDMT09T312-DM	15°	1.2	3.97	9.525																					
	SDMT120412-DM	15°	1.2	4.76	12.7																					
	SDMT150520-DM	15°	2.0	5.56	15.875																					

SD**



		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P	Steel Stahl	●	●
	M	Stainless Steel Rostfreier Stahl	●	●
	K	Cast iron Gusseisen	●	●
	N	Non-ferrous material Nichtmetalle	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall							
		ØI.C	L	r	S	ød	α	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
 <i>New!</i>	SDMT06T208-PM	6.35	6.35	0.8	6.35	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	6.35	6.35	0.8	6.35	5.5	15°					○							○									

Applicable tool
Werkzeug

Tools code key
WSP ISO

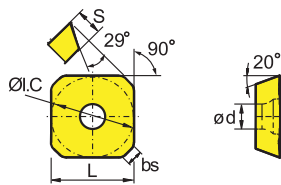
Grade selection guide
Sortenauswahl

Technical data
Technische Daten

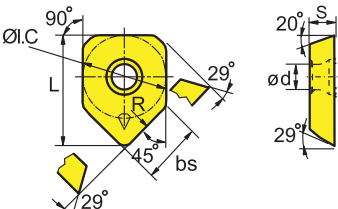
Milling · Fräsen

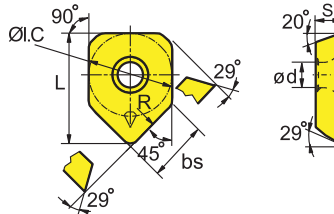
Indexable Milling · Fräswendeplatten

SE**



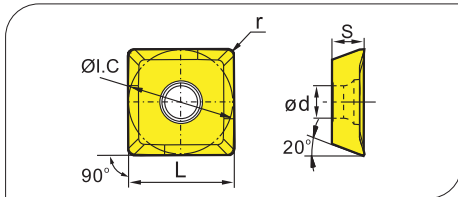
		Ideal Machining Condition Gute Bearbeitungsbedingungen				Normal Machining Condition Normale Bearbeitungsbedingungen				Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen			
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.								Cermet Cermet	Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	d	bs	R	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	SEET12T3-DF	13.40	13.40	3.97	4.1	2.55		●	●			●	●						●	○				●	●			
	SEET12T3-CF	13.40	13.40	3.97	4.1	2.55								●		●												
	SEET12T3-EF	13.40	13.40	3.97	4.1	2.55													●		●							
	SEET12T3-DM	13.40	13.40	3.97	4.1	2.55		●	●	●	●	●	●				●		●		●							
	SEET18T6-DM	13.90	18.00	6.10	5.5	2.29		●			●																	
	SEET12T3-CM	13.40	13.40	3.97	4.1	2.55								●		●												
	SEET12T3-EM	13.40	13.40	3.97	4.1	2.55						●	●							●		●						
	SEET12T3-DR	13.40	13.40	3.97	4.1	2.55			●	●			●		●				○		○							
	SEET12T3-CR	13.40	13.40	3.97	4.1	2.55								●	●													
	SEET12T3-LH	13.40	13.40	3.97	4.1	2.55										○											●	●
	SEET12T3-W	17.82	13.40	3.97	4.1	9.46	500					○	●					●					●	○				
																												



● Ex Stock / ab Lager ○ On demand / auf Anfrage

SE**



		Ideal Machining Condition Gute Bearbeitungsbedingungen		Normal Machining Condition Normale Bearbeitungsbedingungen		Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen	
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.								Cermet Cermet		Carbide uncoat. unbe. Hartmetall		
		L	I.C	S	d	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	SEET09T308PER-PF	9.525	9.525	4.01	3.3	0.8												●									
	SEET09T308PER-PM	9.525	9.525	4.01	3.3	0.8							●					●									
	SEET09T308PER-PR	9.525	9.525	4.01	3.3	0.8							●							●							
	SEET120308PER-PF	13.308	13.308	4.04	4.1	0.8	●	●				●						●									
	SEET120308PER-PM	13.308	13.308	4.04	4.1	0.8	●				●	●	●	●	●			●		●							
	SEET120308PER-PR	13.308	13.308	4.04	4.1	0.8	●				●	●	●	●	○			●		●							
	SEET120308-LH	13.308	13.308	4.04	4.1	0.8									●											●	

Applicable tool
Werkzeug

Tools code key
WSP ISO

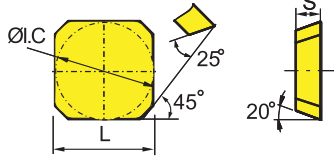
Grade selection guide
Sortenauswahl

Technical data
Technische Daten

Milling · Fräsen

Indexable Milling · Fräswendeplatten

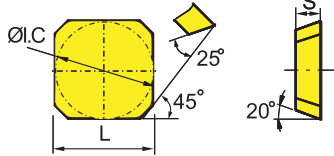
SE**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen			CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.					Cermet Cermet	Carbide uncoat. unbe. Hartmetall						
		L	I.C	S	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	SEEN1203AFTN	12.7	12.7	3.18																	●				
	SEKN1203AFFN	12.7	12.7	3.18																					
	SEKN1203AFN	12.7	12.7	3.18	●																				
	SEKN1203AFTN	12.7	12.7	3.18	●			●	●							●						●	●	●	●
	SEKN1203AFS13N	12.7	12.7	3.18	○																				
	SEKN1204AFN	12.7	12.7	4.76																					
	SEKN1204AFTN	12.7	12.7	4.76	●																		●		●
	SEKN1204AFS13N	12.7	12.7	4.76	○																				
	SEKN1504AFN	15.875	15.875	4.76	○																				
	SEKN1504AFTN	15.875	15.875	4.76	●	●			●	●													○		
	SEKN1504AFZN	15.875	15.875	4.76																					
	SEKN1204AZ	15.875	15.875	4.76	●	○																			
	SEKN1504AZ	15.875	15.875	4.76	●																				○

SE**

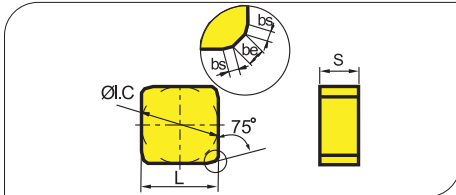


		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen			CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.					Cermet Cermet		Carbide uncoat. unbe. Hartmetall					
		L	I.C	S	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	SEKR1203AFN	12.7	12.7	3.18		●										●									
	SEKR1504AFN	15.875	15.875	4.76																			○		

● Ex Stock / ab Lager ○ On demand / auf Anfrage

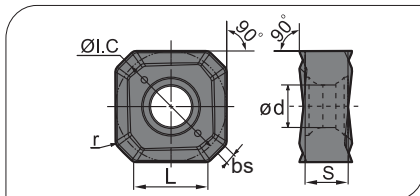
SN**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall						
		L	I.C	S	be	bs	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101
	SNKN1204ENN	12.7	12.7	4.76	0.9	1.5		●					●	●											●	●
	SNKN1504ENN	15.875	15.875	4.76	0.9	1.5		●					●											●		○
	SNKN1904ENN	19.05	19.05	4.76	1.0	1.5																				

SN**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet		Carbide uncoat. unbe. Hartmetall				
		L	ØI.C	S	bs	ød	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	SNEG1205ANR-GM	7.6	12.0	4.76	1.05	4.6	0.8	●			●			●		●												
	SNEG1506ANR-GM	7.6	15.0	5.54	1.30	5.5	0.9	●			●			●														
	SNEG1506ANR-GR	9.4	15.0	5.54	1.30	5.5	0.9	●			●			●														
	SNEG1907ANR-GR	12.1	19.0	7.0	1.67	7.2	1.0	●			●			●	●													
	SNEG1506ANR-E	9.4	15.0	5.6	1.30	5.5	0.9										●											
	SNEG1205ANR-W	12	12	4.76	0.6	4.6	0.8										●											

Applicable tool
Werkzeug

Tools code key
WSP ISO

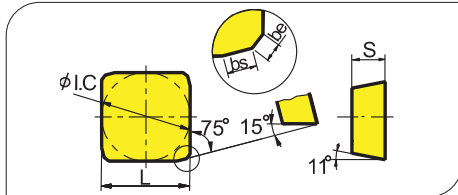
Grade selection guide
Sortenauswahl

Technical data
Technische Daten

Milling · Fräsen

Indexable Milling · Fräswendeplatten

SP*N

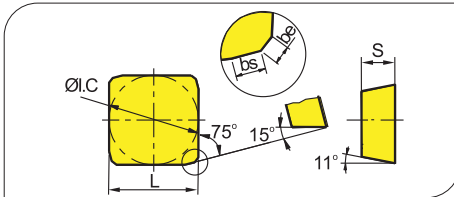


		Ideal Machining Condition Gute Bearbeitungsbedingungen										Normal Machining Condition Normale Bearbeitungsbedingungen										Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen									
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
S		Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall							
		L	I.C	S	be	bs	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	SPAN1203EDEL	12.7	12.7	1.4	1	3.18	●																				
	SPAN1203EDER	12.7	12.7	1.4	1	3.18	●																				
	SPAN1203EDFL	12.7	12.7	1.4	1	3.18																					○
	SPAN1203EDFR	12.7	12.7	1.4	1	3.18																					●
	SPAN1203EDL	12.7	12.7	1.4	1	3.18																					○
	SPAN1203EDR	12.7	12.7	1.4	1	3.18																					○
	SPAN1504EDFR	15.875	15.875	1.4	1	4.76																					○
	SPAN1504EDFL	15.875	15.875	1.4	1	4.76																					○
	SPCN1203EDSKR	12.7	12.7	1.4	1	3.18	●																				
	SPCN1504EDSKR	15.875	15.875	1.4	1	4.76	●																				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

SP*N



		Ideal Machining Condition Gute Bearbeitungsbedingungen												Normal Machining Condition Normale Bearbeitungsbedingungen												Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen											
Workpiece Material Werkstoffe	P	Steel Stahl																																			
	M	Stainless Steel Rostfreier Stahl																																			
	K	Cast iron Gusseisen																																			
	N	Non-ferrous material Nichte Metalle																																			
	S	Heat-resistant steel Wärmeleiter Stahl																																			

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.								Cermet Cermet	Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	be	bs	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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																					
	SPKN1203EDS31PR	12.7	12.7	3.18	1	1.4												○									
	SPKN1203EDS31PL	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																					
	SPKN1204EDFL	12.7	12.7	4.76	1	1.4		●	●																	●	
	SPKN1204EDER	12.7	12.7	4.76	1	1.4																					
	SPKN1204EDFR	12.7	12.7	4.76	1	1.4																					
	SPKN1204EDSKR	12.7	12.7	4.76	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																					●
	SPKN1504EDL	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																					
	SPKN1504EDS32PR	15.875	15.875	4.76	1	1.4		○												●							
	SPKN1504EDS32PL	15.875	15.875	4.76	1	1.4																					
	SPKN1504EDT32PR	15.875	15.875	4.76	1	1.4													●								
	SPKN1504EDT32PL	15.875	15.875	4.76	1	1.4																					

SPKN1203EDT31R chamfer · Fase 20° X 0.15 mm

Applicable tool
Werkzeug B11-B18

Tools code key
WSP ISO B202-B203

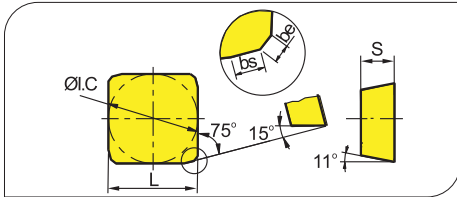
Grade selection guide
Sortenauswahl B19-B23

Technical data
Technische Daten B236-B241

Milling · Fräsen

Indexable Milling · Fräswendeplatten

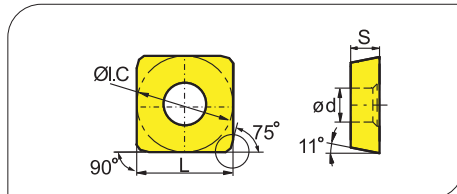
SP*R



		Ideal Machining Condition Gute Bearbeitungsbedingungen										Normal Machining Condition Normale Bearbeitungsbedingungen										Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen									
Workpiece Material Werkstoffe	P	Steel Stahl																													
	M	Stainless Steel Rostfreier Stahl																													
	K	Cast iron Gusseisen																													
	N	Non-ferrous material Nichtmetalle																													
	S	Heat-resistant steel Wärmebeständiger Stahl																													

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall						
		L	I.C	S	be	bs	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201	
	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					●								●									
	SPKR1203EDR	12.7	12.7	3.18	1	1.4		●																		●		
	SPKR1904EDFL	19.05	19.05	4.76	1	1.4																						
	SPKR1904EDFR	19.05	19.05	4.76	1	1.4																						

SP*W

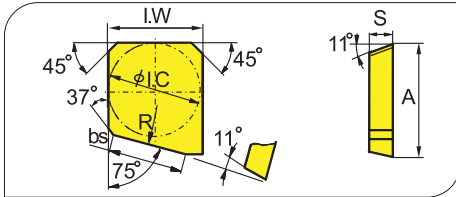


		Ideal Machining Condition Gute Bearbeitungsbedingungen										Normal Machining Condition Normale Bearbeitungsbedingungen										Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen									
Workpiece Material Werkstoffe	P	Steel Stahl																													
	M	Stainless Steel Rostfreier Stahl																													
	K	Cast iron Gusseisen																													
	N	Non-ferrous material Nichtmetalle																													
	S	Heat-resistant steel Wärmebeständiger Stahl																													

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall					
		r	L	I.C	S	d	α	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	SPKW1204EDFR	---	12.7	12.7	4.76	5.56	11°												●									
	SPKW1204EDSR	---	12.7	12.7	4.76	5.56	11°												●									

● Ex Stock / ab Lager ○ On demand / auf Anfrage

SP*X



		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P	Steel Stahl		
	M	Stainless Steel Rostfreier Stahl		
	K	Cast iron Gusseisen		
	N	Non-ferrous material Nichtmetalle		
	S	Heat-resistant steel Wärmebeständiger Stahl		

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet		Carbide uncoat. unbe. Hartmetall				
		A	I.C	I.W	S	bs	R	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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																					●

B

Milling Tools
Fräser

Applicable tool
Werkzeug

Tools code key
WSP ISO

Grade selection guide
Sortenauswahl

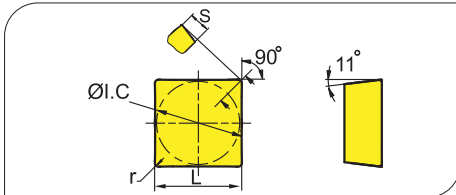
Technical data
Technische Daten

B227

Milling · Fräsen

Indexable Milling · Fräswendeplatten

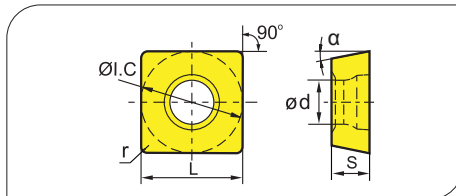
SP**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichte Metalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmefester Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen				CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.				Cermet Cermet	Carbide uncoat. unbe. Hartmetall							
		L	I.C	s	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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						●															

SP**

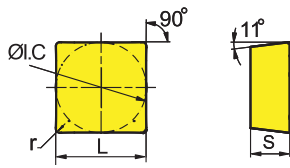


		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichte Metalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmefester Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall							
		r	L	I.C	S	d	α	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	SPMT060304-KT	0.4	6.35	6.35	3.18	2.8	11°		●																			
	SPMT060304	0.4	6.35	6.35	3.18	2.8	11°					●																
	SPMT09T308-HT	0.8	9.525	9.525	3.97	4.4	11°					●			●				●									
	SPMT09T308	0.8	9.525	9.525	3.97	4.4	11°		●	○																		
	SPMT120408	0.8	12.7	12.70	4.76	5.5	11°		●	●		●	●								●							
	SPMT120408-HT-1	0.8	12.7	12.70	4.76	5.5	11°													●								
	SPMT120408-PM	0.8	12.7	12.70	4.76	5.5	11°				●									●								
	SPMT120408-KM	0.8	12.7	12.70	4.76	5.5	11°															●						
	SPKT1204EDR	—	12.7	12.7	4.76	5.56	11°												●									

● Ex Stock / ab Lager ○ On demand / auf Anfrage

SP**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen				CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall					
		L	I.C	s	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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																			○		
	SPGN120304	12.7	12.7	3.18	0.4													○						●		
	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																				●	
	SPGN150412	15.875	15.875	4.76	1.2																				●	
	SPGN190408	19.05	19.05	4.76	0.8																				●	
	SPGN190416	19.05	19.05	4.76	1.6																					

Applicable tool
Werkzeug

Tools code key
WSP ISO

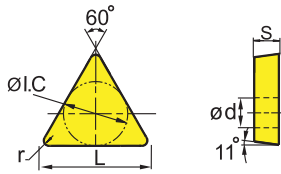
Grade selection guide
Sortenauswahl

Technical data
Technische Daten

Milling · Fräsen

Indexable Milling · Fräswendeplatten

TP**

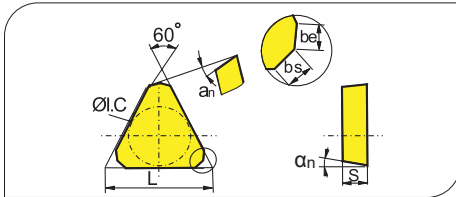


		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl								
	M	Stainless Steel Rostfreier Stahl								
	K	Cast iron Gusseisen								
	N	Non-ferrous material Nichtmetalle								
	S	Heat-resistant steel Wärmebeständiger Stahl								

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					S	CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall					
		L	I.C	bs	be	an		YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	TPCN1103PPS22PN	11	6.35	0.721	0.704	11°	3.175																			●		
	TPCN1603PPS42PN	16.5	9.525	1.197	1.235	11°	3.18																			●		
	TPCN2204PDFR	22	12.7	1.4	1.4	15°	4.76																			○		
	TPCN2204PDRSKR	22	12.7	1.4	1.4	15°	4.76	●																		●		
	TPCN2204PPEN	22	12.7	1.4	1.4	11°	4.76	○																				
	TPAN1103PP22PN	11	6.35	0.7	0.7	11°	3.18	○										○								○		
	TPAN1603PPS42PN	16.5	9.525	1.2	1.2	11°	3.18																			●		
	TPAN2204PDER	22	12.7	1.4	1.4	15°	4.76																			○		
	TPAN2204PDFR	22	12.7	1.4	1.4	11°	4.76																				○	

● Ex Stock / ab Lager ○ On demand / auf Anfrage

TP**



		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P Steel Stahl	●	●	●
	M Stainless Steel Rostfreier Stahl	●	●	●
	K Cast iron Gusseisen	●	●	●
	N Non-ferrous material Nichtmetalle	●	●	●
	S Heat-resistant steel Wärmebeständiger Stahl	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall								
		L	I.C	S	be	bs	an	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201	
	TPKN1603PDRSKR	16.5	9.525	3.18	1.2	1	11°	●											●		●						●		
	TPKN1603PDSKL	16.5	9.525	3.18	1.2	1	11°																						
	TPKN1603PDTKR	16.5	9.525	3.18	1.2	1	11°									●												●	
	TPKN1603PPER	16.5	9.525	3.18	1.2	1	11°	●																			●		
	TPKN1603PPFR	16.5	9.525	3.18	1.2	1	11°												○									●	
	TPKN2204PDTKR	22	12.7	4.76	1.4	0.7	11°									●													
	TPKN2204PDFR	22	12.7	4.76	1.4	0.7	11°									●												●	
	TPKN2204PDFL	22	12.7	4.76	1.4	0.7	11°																					○	
	TPKN2204PDSKR	22	12.7	4.76	1.4	0.7	11°		●	●				●		●		●	●		●						●		
	TPKN2204PDL	22	12.7	4.76	1.4	0.7	11°		●																		●	●	
	TPKN2204PDTR	22	12.7	4.76	1.4	0.7	11°		○											○							●		
	TPKN2204PDS32PR	22	12.7	4.76	0.693	1.411	11°														●								
	TPKN2204PDSKL	22	12.7	4.76	1.419	0.712	11°		●																				
	TPKN2204PDR	22	12.7	4.76	1.4	0.7	11°													●									

Applicable tool
Werkzeug

Tools code key
WSP ISO

Grade selection guide
Sortenauswahl

Technical data
Technische Daten

B231

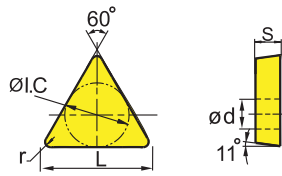
B

Milling Tools
Fräser

Milling · Fräsen

Indexable Milling · Fräswendeplatten

TP**

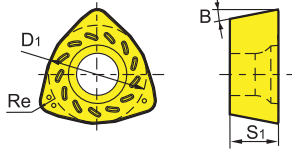


		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichtmetalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmebeständiger Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen				CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall					
		L	I.C	s	r	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	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																					○
	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																					

● Ex Stock / ab Lager ○ On demand / auf Anfrage

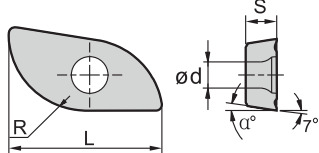
WP**



		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P Steel Stahl	●	●	●
	M Stainless Steel Rostfreier Stahl	●	●	●
	K Cast iron Gusseisen	●	●	●
	N Non-ferrous material Nichtmetalle	●	●	●
	S Heat-resistant steel Wärmebeständiger Stahl	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen				CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall					
		B	Re	S ₁	D ₁	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	WPGT050315ZSR	11°	1.5	3.5	7.94	●				●							●									
	WPGT060415ZSR	11°	1.5	4.2	9.525	●				●						●	●									
	WPGT080615ZSR	11°	1.5	6.35	12.85	●				●						●	●									
	WPGT090725ZSR	11°	2.5	7	15					●						●	○									
New! 	WPGT050315ZSR-PM	11°	1.5	3.5	7.94										●											
	WPGT060415ZSR-PM	11°	1.5	4.2	9.525	●										●										
	WPGT080615ZSR-PM	11°	1.5	6.35	12.85	●										●										
	WPGT090725ZSR-PM	11°	2.5	7	15											●										

XP**



		Ideal Machining Condition Gute Bearbeitungsbedingungen	Normal Machining Condition Normale Bearbeitungsbedingungen	Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen
Workpiece Material Werkstoffe	P Steel Stahl	●	●	●
	M Stainless Steel Rostfreier Stahl	●	●	●
	K Cast iron Gusseisen	●	●	●
	N Non-ferrous material Nichtmetalle	●	●	●
	S Heat-resistant steel Wärmebeständiger Stahl	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.					Cermet Cermet	Carbide uncoat. unbe. Hartmetall						
		R	d	S	α°	L	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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	6.8	7.94	9	40															●						
	XPHT50R2507-GM	25	9.2	7.94	9	50															●						

Applicable tool
Werkzeug

Tools code key
WSP ISO

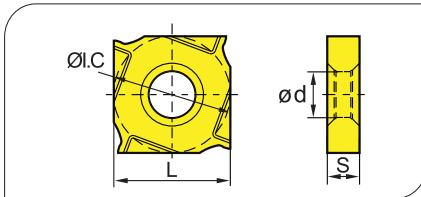
Grade selection guide
Sortenauswahl

Technical data
Technische Daten

Milling · Fräsen

Indexable Milling · Fräswendeplatten

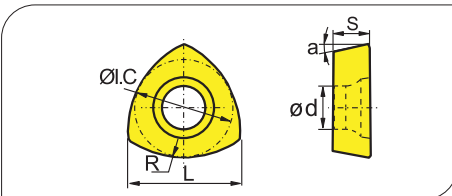
XS**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichte Metalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmefester Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen				CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.					Cermet Cermet	Carbide uncoat. unbe. Hartmetall						
		I.C	L	S	d	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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														●							

ZD**

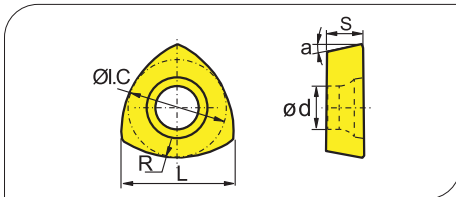


		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichte Metalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmefester Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall							
		I.C	L	S	R	d	α	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	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°					●																
	ZDET13T3CYR16-PM	10.5	13.2	3.97	16	4.4	14°					●								●								

● Ex Stock / ab Lager ○ On demand / auf Anfrage

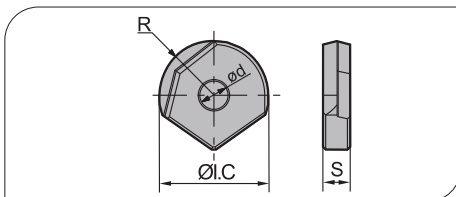
ZP**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichte Metalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmefester Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall							
		I.C	L	S	R	d	α	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YBG320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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°					●																

ZO**



		Ideal Machining Condition Gute Bearbeitungsbedingungen			Normal Machining Condition Normale Bearbeitungsbedingungen			Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen		
Workpiece Material Werkstoffe	P	Steel Stahl	●	●	●	●	●	●	●	●
	M	Stainless Steel Rostfreier Stahl	●	●	●	●	●	●	●	●
	K	Cast iron Gusseisen	●	●	●	●	●	●	●	●
	N	Non-ferrous material Nichte Metalle	●	●	●	●	●	●	●	●
	S	Heat-resistant steel Wärmefester Stahl	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide uncoat. unbe. Hartmetall							
		R	I.C	S	d	YBC302	YBC301	YBC401	YBM253	YBM251	YBM351	YBD152	YBD252	YBG102	YB9320	YBG205	YBG202	YBG212	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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																●					

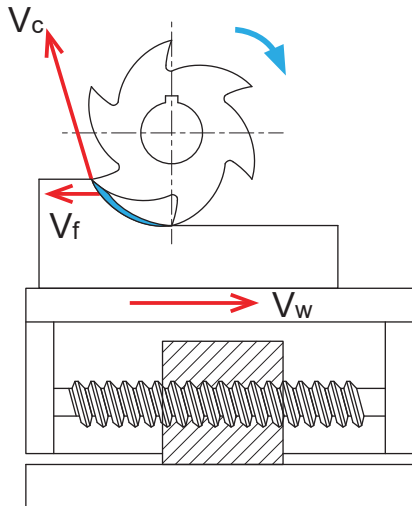
Applicable tool
Werkzeug

Tools code key
WSP ISO

Grade selection guide
Sortenauswahl

Technical data
Technische Daten

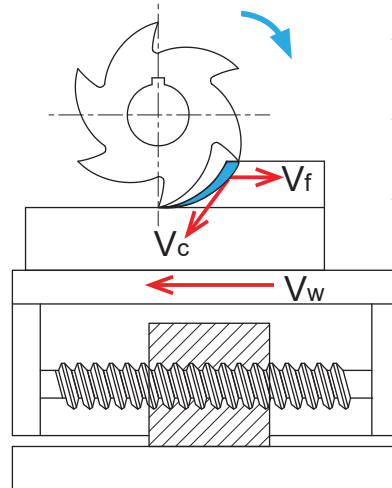
Difference and selection between down milling and up milling Unterschied zwischen Gleichlauf- und Gegenlauf



**Up milling
Gegenlaufräsen**

Up milling (conventional milling): the feed direction of workpiece is opposite to that of the milling rotation at the connecting position.

Beim Gegenlaufräsen ist die Drehrichtung des Fräswerkzeugs und die Vorschubrichtung des Werkstücks entgegengesetzt.



**Down milling
Gleichlaufräsen**

Down milling (climb milling): the feed direction of workpiece is the same as that of the milling rotation at the connecting position.

Beim Gleichlaufräsen sind die Drehrichtung des Fräswerkzeugs und die Vorschubrichtung des Werkstücks gleich gerichtet.

V_c = Cutting Speed
Schnittgeschwindigkeit

V_f = Feedrate tool
Vorschub Werkzeug

V_w = Feedrate Workpiece
Vorschub Werkstück

Advantage and Disadvantage · Vor- und Nachteile :

Direction Richtung	Advantage Vorteil	Disadvantage Nachteil
Up milling Gegenlaufräsen	Prevent hooking of tool, more smooth cut Verhindert das Einhaken des Werkzeugs, ruhigerer Lauf	Bigger stress on cutting edge, tool life shorter Größere Belastung für den Schneidstoff, kürzere Standzeiten
Down milling Gleichlaufräsen	Higher tool life, less thermal stress Höhere Standzeiten, weniger thermische Belastung	Hooking of tool possible Einhaken des Werkzeugs möglich

Pitch selection · Fräserteilung

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, fine and extra fine pitches.

Als Fräserteilung wird der Abstand von einer Schneidenecke zur nächsten Schneidenecke bezeichnet. Die Einteilung erfolgt in weite (differential), enge und extra enge Teilung.

Operational stability · Bearbeitungsstabilität		
L (Low / Niedrig)	M (Medium / Mittel)	H (High / Hoch)
Coarse pitch · weite Teilung  (Differential Pech) When the milling width equal to diameter of cutter, the machining system is stable and main power of machine is sufficient, selecting coarse pitch can achieve high productive efficiency. Ist die Fräsbreite gleich dem Fräserdurchmesser, die Maschinen in sich stabil, und mit genügend Leistung, wird eine weite Teilung verwendet, um eine hohe Produktivität zu erreichen.	Fine pitch · Enge Teilung  General milling function and multiple mixed productions Erste Wahl für allgemeine Fräsbearbeitung und Mischbearbeitung	Extra fine pitch Extra Enge Teilung  When the milling width is less than diameter of cutter, cutting by maximum edges can achieve high productive efficiency. Ist die Fräsbreite kleiner als der Fräserdurchmesser, ermöglicht eine große Schneidenanzahl eine hohe Produktivität. Für alle Materialien geeignet, besonders auch bei hochwarmfesten Werkstoffen.

Selection of approach angle · Einstellwinkel

The approach angle is composed by insert and tool body, Chip thickness, cutting forces and tool-life are affected especially by the approach angle. Decreasing the approach angle reduces chip thickness and spreads the cutting area between cutting edge and workpiece for a given feed rate.

A smaller approach angle also guarantee that it is stable entering into or exiting workpiece, to protect the cutting edge and extend tool life. However this will increase higher axial cutting forces on the workpiece, thus is not suitable for machining thin workpiece such as thin plate.

Approach angle	Feed rate per tooth Zahnvorschub	Real max. cutting depth Max. Spandicke
90°	f_z	$h_{ex} = f_z \times \sin \alpha$
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	$h_{ex} = \frac{\sqrt{i C^2 \times (i C - 2 a_p)^2}}{i C} \times f_z$

Der Einstellwinkel eines Planfräasers steht in Verbindung mit der Spandicke. Dies ist der Winkel zwischen der Hauptschneide der Wendschneidplatte und der Werkstückoberfläche. Spandicke, Schnittkräfte und Standzeit werden insbesondere durch den Einstellwinkel beeinflusst. Durch Verringern des Einstellwinkels wird die Spandicke bei einer gegebenen Vorschubrate kleiner. Dieser Effekt führt dazu, dass sich die Werkstückstoffmenge über einen größeren Teil der Schneidkante verteilt. Ein kleiner Einstellwinkel sorgt auch für einen weniger abrupten Eintritt in den Schnitt, wodurch der radiale Druck sinkt und die Schneidkante geschont wird. Die höheren axialen Kräfte verstärken jedoch den Druck auf das Werkstück. Für die Bearbeitung von dünnwandigen Bauteilen nicht geeignet.

General formula · Allgemeine Formeln

V_c : cutting speed (m/min) Schnittgeschwindigkeit (m/min)	V_f : feed rate of worktable (feed speed) (mm/min) Vorschub Maschinentisch (feed speed) (mm/min)
D_c : nominal diameter of milling tool (mm) Sollmaß von Fräswerkzeugen (mm)	f_z : feed rate per tooth (mm/z) Zahnvorschub (mm/z)
n : spindle speed (rev/min) Umdrehungsgeschwindigkeit (u/min)	π : circumference ratio ≈ 3.14 Kreiszahl $\sim 3,4$
z_n : number of teeth Zähne Anzahl	T_c : machining time (min) Bearbeitungszeit (min)
Q : metal removal rate (cm ³ /min) Material Abtragungsrate (cm ³ /min)	f_n : feed rate per revolution (mm/rev) Vorschub pro Umdrehung (mm/u)

● Cutting speed · Schnittgeschwindigkeit

$$V_c = \frac{\pi \times D_c \times n}{1000} \text{ (m/min)}$$

● Spindle speed · Umdrehungsgeschwindigkeit

$$n = \frac{1000 \times V_c}{\pi \times D_c} \text{ (rev/min)}$$

● Feed rate of worktable (feed speed)

● Vorschub des Maschinentisches

$$V_f = f_z \times n \times z_n \text{ (mm/min)}$$

● Feed rate per tooth · Zahnvorschub

$$f_z = \frac{V_f}{n \times z_n} \text{ (mm/z)}$$

● Feed rate per revolution · Vorschub pro Umdrehung

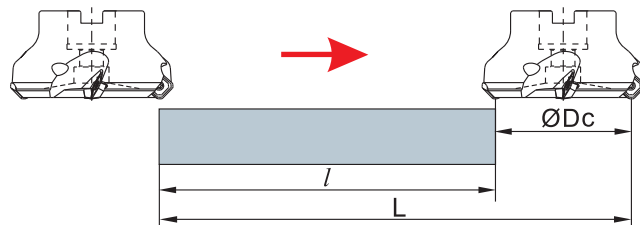
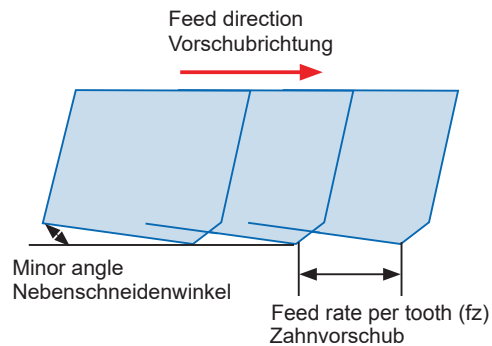
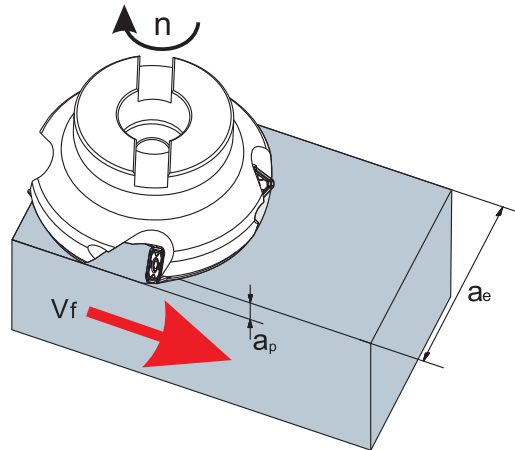
$$f_n = \frac{V_f}{n} \text{ (mm/rev)}$$

● Machining time · Bearbeitungszeit

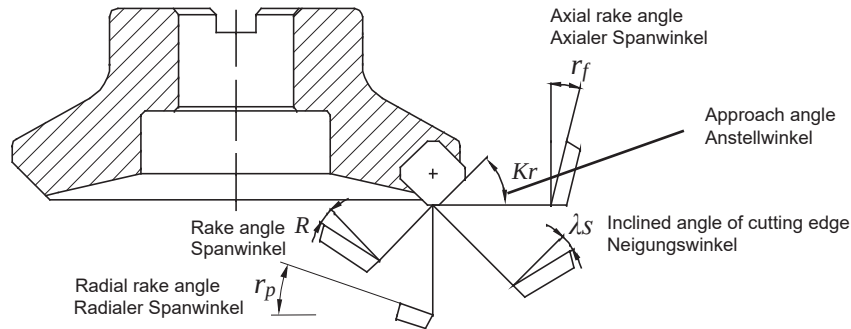
$$T_c = \frac{1000 \times V_c}{\pi \times D_c} \text{ (min)}$$

● Metal removal rate · Zerspanungsvolumen

$$Q = \frac{a_p \times a_e \times V_f}{1000} \text{ (cm}^3\text{/min)}$$



Function of each part in face milling · Winkelfunktion beim Planfräsen



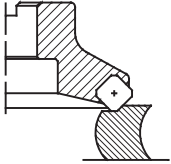
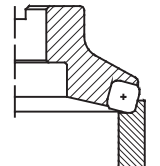
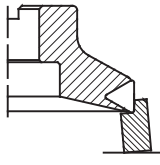
Main angles of face mills · Winkel beim Planfräsen

Designation Winkel	Function Funktion	Effect Auswirkung		
Axial rake angle Axialer Spanwinkel r_f	Determining the chip direction Beeinflusst die Spanflußrichtung	negative angle, excellent chip removal Negativer <Spanwinkel, gute Späneabfuhr		
Radial rake angle Radialer Spanwinkel r_p	Determining sharpness of cutting edge Definiert die Schneidenschärfe	Positive angle, good cutting performance Positive Winkel, gute Schnittleistung		
Approach angle Anstellwinkel Kr	Determining the chip thickness Beeinflusst die Spandicke	$Kr \uparrow$, chip thickness $\uparrow$; $Kr \downarrow$, chip thickness $\downarrow$; $Kr \uparrow$, Spandicke $\uparrow$; $Kr \downarrow$, Spandicke $\downarrow$;		
Rake angle Spanwinkel R	Determining true sharpness of cutting edge Beeinflusst die wahre Plattenschärfe	Poor cutting performance, high strength of cutting edge Schlechte Schnittleistung, starke Schneidkante	$(-) \leftarrow 0 \rightarrow (+)$	Good cutting performance, low strength of cutting edge Gute Schnittleistung, schwächere Schneidkante
Inclined angle of cutting edge Neigungswinkel λ_s	Determining the chip flow direction Beeinflusst die Spanflußrichtung	Poor cutting performance, high strength of cutting edge Schlechte Schnittleistung, starke Schneidkante	$(-) \leftarrow 0 \rightarrow (+)$	Good cutting performance, low strength of cutting edge Gute Schnittleistung, schwächere Schneidkante

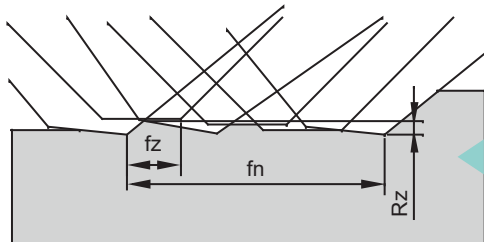
Combination of different rake angles · Kombination von verschiedenen Spanwinkeln

Negative rake angle Negativer Spanwinkel		Double positive Doppelt Positiv	Double negative Doppelt Negativ	One pos., one neg. Positiv / Negativ
0° rake angle Neutraler Winkel				
Positive rake angle Positiver Spanwinkel				
Axial rake angle r_f / axialer Spanwinkel		+	-	+
Radial rake angle r_p / radialer Spanwinkel		+	-	-
Applicable material machined Anwendungsbereich	P	✓		✓
	M	✓		✓
	K		✓	✓
	N	✓		
	S	✓		✓

Cutting performances of different approach angles Schneidleistung bei verschiedenen Anstellwinkeln

Approach angle Anstellwinkel	Schematic diagram Darstellung	Instruction Erklärung
45°		Axial force is largest. It will bend when machining thin-wall workpiece, and reduces the precision of workpiece. It is benefit to avoid fringe breakage of workpiece when machining cast iron. Die axiale Kraft ist sehr hoch. Wegen der Verbiegung nicht geeignet für die Bearbeitung von dünnwandigen Bauteilen. Optimal für die Planbearbeitung von Stahl, Guss und rostfreien Materialien.
75°		The main purpose is to resolve the radial cutting force, it is often used for general face milling. Zur Reduzierung der radialen Kräfte. Für die allgemeine Planbearbeitung.
90°		The axial force is zero in theory, suitable for milling thin plate workpiece. Die axiale Kraft ist nahezu null. Für die Zerspaltung von dünnen, labilen Werkstücken geeignet.

Wiper insert · Wiper Platte



Required surface roughness with common insert isn't achieved.

Geforderte Oberflächengüte mit herkömmlichen Platten wird nicht erreicht.

Solution · Lösung

Assembling wiper inserts
Einsatz von Wiperplatten

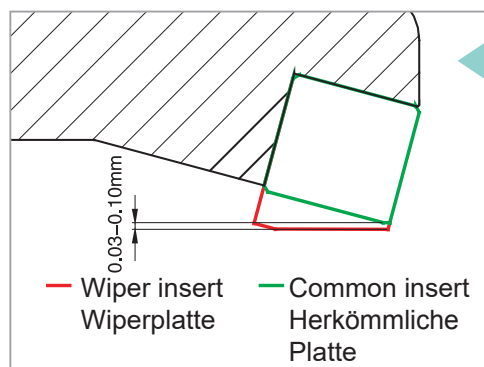
usage · Anwendung

The wiper insert must protrude below the other inserts by 0.03-0.10 mm at axial direction, only that the wiping function can take into effect.

Generally speaking, a cutter can just assemble only one wiper insert. If the diameter of cutter is much bigger or cutter's feed rate per revolution is bigger than the length of wiper edge, 2 to 3 wiper inserts can be assembled.

Die Wiperplatte muss ca. 0,03 – 0,1 mm über den normalen Platten in axialer Richtung stehen, um den Wipereffekt zu erreichen.

Bei Standarddurchmessern reicht eine Wiperplatte.
Bei sehr großen Fräserdurchmessern oder großen Vorschubraten können bis zu 3 Wiperplatten eingesetzt werden.

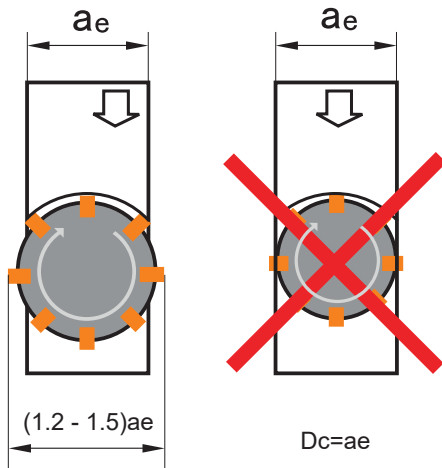


— Wiper insert
Wiperplatte

— Common insert
Herkömmliche Platte

Selection of cutting width and tool cutting diameter in face milling

Schnittbreiten - Auswahl und Werkzeug - Durchmesser beim Planfräsen



Generally speaking, the relation between cutting width and tool cutting diameter is $D_c = (1.2 - 1.5) a_e$. In the machining practice, it need to avoid coincidence of tool center and workpiece center as much as possible.

In der allgemeinen Anwendung sollte der Fräserdurchmesser 1.2 – 1,5 mal a_e betragen.
Positionieren Sie den Fräser leicht außermittig.

D_c : Diameter of milling tool · Werkzeugdurchmesser

a_e : Cutting width · Seitliche Zustellung