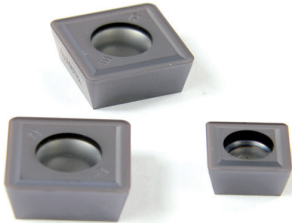




Drilling/Bohren



ZCC Cutting Tools Europe GmbH

your Partner | your Value



WELCOME TO ZCC CUTTING TOOLS EUROPE

ZCC-CT, one of the World's leading carbide tooling manufacturers, welcomes you to its products. We are able to offer you a wide product range of high performance cutting tools at economic prices and a good supply service to support the production and productivity at your manufacturing facilities. You will find the main tool types in the various sections of the catalogue, Turning is in section A, Milling in section B and Drilling in section C of the catalogue.

We are looking forward to working with you and developing good cooperation together. Our team at ZCC Cutting Tools Europe is ready to support you in all of your requirements.



Member of Minmetals Group



EUROPEAN HEADQUARTER / HAUPTSITZ IN EUROPA:

ZCC Cutting Tools GmbH, Heltorfer Str.12, 40472 Düsseldorf, Germany

Tel.: +49 (0) 211/989240-0, Fax: +49 (0) 211/ 989240-111

E-Mail: info@zccct-europe.com, www.zccct-europe.com, www.zccct.com



HERZLICH WILLKOMMEN BEI ZCC CUTTING TOOLS EUROPE

ZCC-CT, einer der weltweit führenden Hartmetall-Werkzeughersteller, begrüßt Sie recht herzlich. Mit unserer umfangreichen Produktpalette an Hochleistungs-Zerspanungswerkzeugen und entsprechenden Serviceleistungen möchten wir gerne bei Ihnen die Bearbeitungssicherheit und die Wirtschaftlichkeit erhöhen. In Teil A des Katalogs finden Sie die Werkzeuge zum Drehen, in Teil B zum Fräsen und in Teil C zum Bohren.

*Wir freuen uns auf eine gute Zusammenarbeit.
Ihr Team von ZCC Cutting Tools Europe steht Ihnen als Partner zur Seite!*

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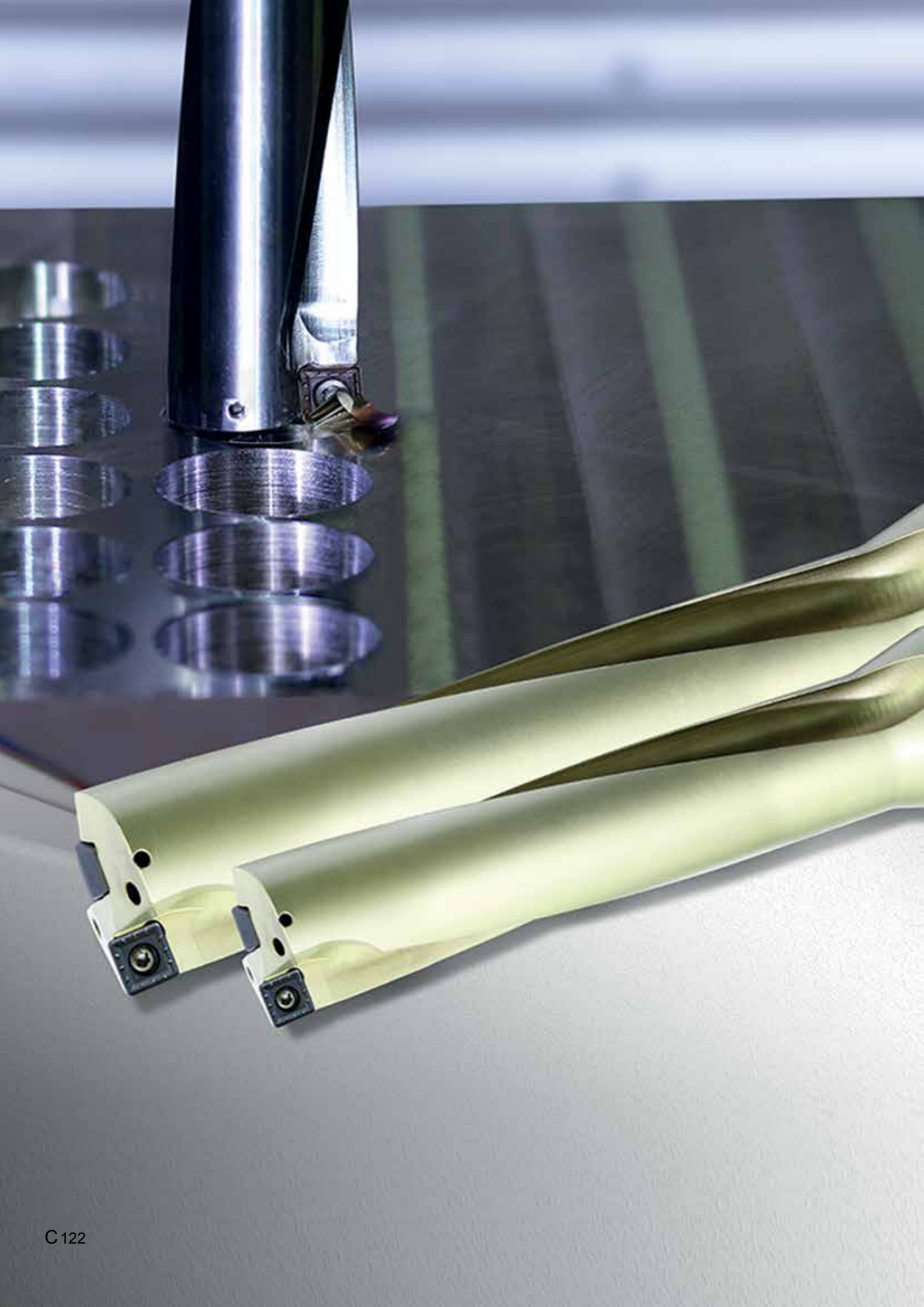




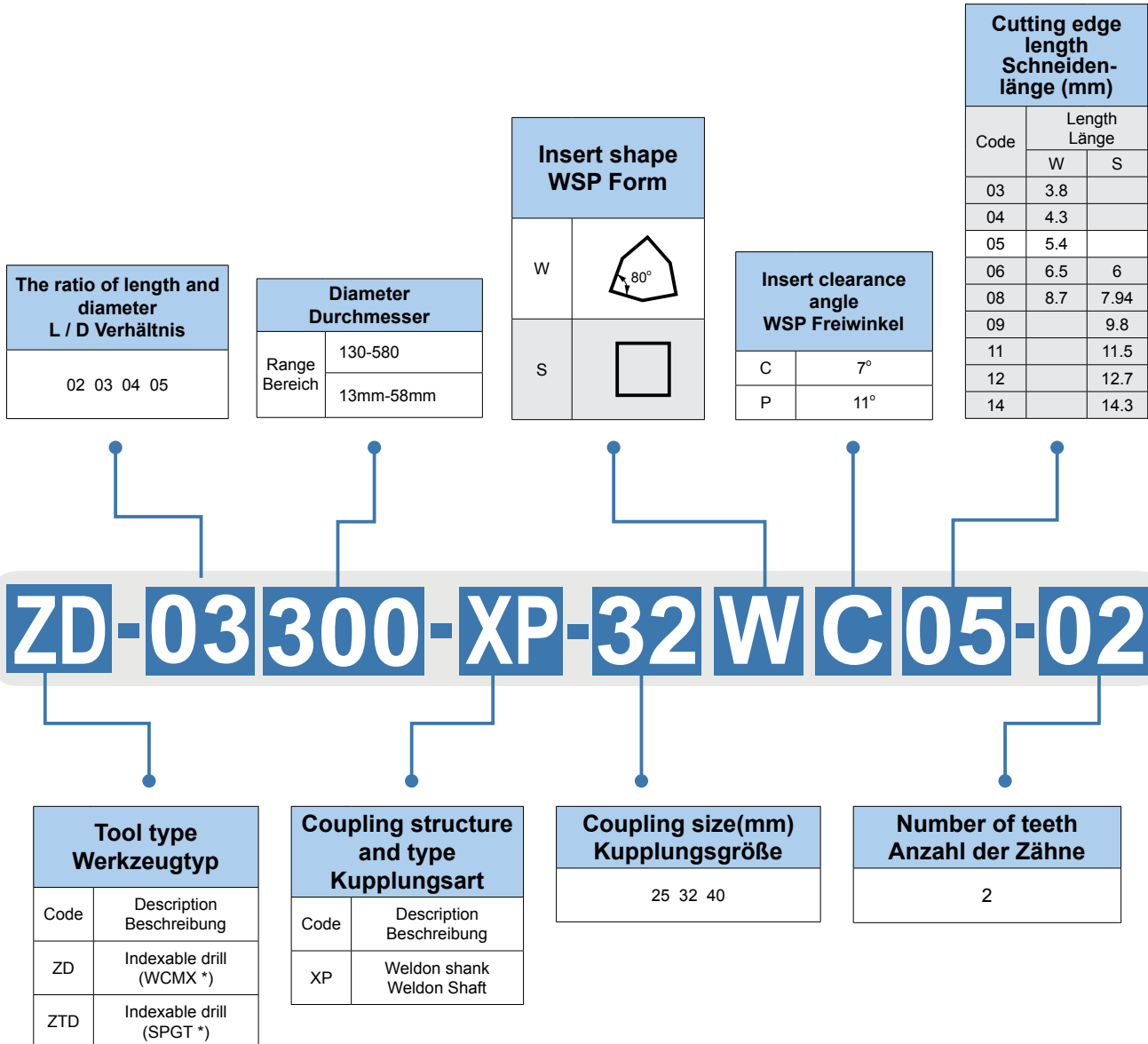
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WSP = Wendeschneidplatte VHM = Vollhartmetall



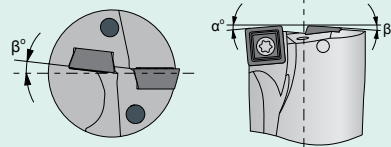
Indexable drill Code Key - ISO Kennzeichnung WSP- Bohrern





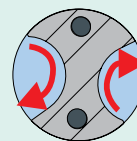
Double helix internal cooling for more effective cooling and good chip removal, especially for in deep hole boring. / *Innenkühlung mit Doppelhelixdesign für effektivere Kühlmittelzufuhr und Spanabfluß speziell bei tieferen Bohrungen.*

Optimised insert seat and clamping, for less vibration and higher tool life. / *Optimierter Plattensitz und Plattenklemmung für vibrationsfreie Bearbeitung mit hohen Standzeiten.*



Drill holder with excellent stiffness and special surface coating for higher feed rate and higher productivity. / *Bohrkörper mit exzellenter Torsionssteifigkeit und speziell beschichteter Oberfläche, die höhere Vorschübe und höhere Produktivität ermöglichen.*

Big chip pocket for better chip removal / *Großer Spanraum für optimalen Spanabfluß*



Adapter for innercooling on conventional machines / *Optional mit Adapter für die Innenkühlung bei konventionellen Maschinen*



YB6338

- New coating technology with improved intermediate layer.
- Binder phase enriched surface toughness gradient cemented carbide substrate material, with excellent resistance to flaking properties, wear resistance and heat resistance of ultrafine coating to achieve the perfect combination of hardness and toughness.
- Suitable for high feed rates and high-speed machining indexable insert drills series.
- *Neue Beschichtungstechnologie mit verbessertem Zwischenlayer.*
- *Verbesserte Substratoberflächenhaftung im Zusammenhang mit einem Superfeinkorn-Substrat mit verbesserter Verschleißbeständigkeit und Wärmebeständigkeit erzielt eine ideale Kombination aus Härte und Zähigkeit.*
- *Eignet sich zum Arbeiten mit hoher Schnittgeschwindigkeit und hohem Vorschub.*



Application Example / Anwendungsbeispiel

Type / Typ	SPGT07T308-PM/YB6338 (outer + inner insert / Außen + Innen -WSP)	Cutting data Schnittdaten	$V_c=150\text{m/min}$ $f=200\text{mm/min}$ $a_p=45\text{mm}$									
Workmaterial Werkstoff	C45R 11201(150-200HB)	Comparison Vergleich	<table border="0"> <tr> <td></td> <td>Rake face Spanfläche</td> <td>Flank face Freifläche</td> </tr> <tr> <td>YB6338</td> <td></td> <td></td> </tr> <tr> <td>Competitor A Wettbewerber A</td> <td></td> <td></td> </tr> </table>		Rake face Spanfläche	Flank face Freifläche	YB6338			Competitor A Wettbewerber A		
	Rake face Spanfläche		Flank face Freifläche									
YB6338												
Competitor A Wettbewerber A												
Cooling system Kühlsystem	Doublehelix internal cooling Doppelhelix-Innenkühlung											
Comparison Vergleich	<table border="1"> <tr> <th>Tool</th> <th>Number of holes</th> </tr> <tr> <td>YB6338</td> <td>610</td> </tr> <tr> <td>Competitor A</td> <td>480</td> </tr> </table>	Tool	Number of holes	YB6338	610	Competitor A	480					
Tool	Number of holes											
YB6338	610											
Competitor A	480											



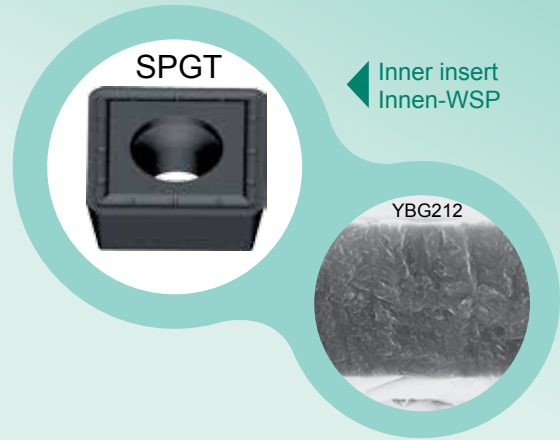
Optimised edge design for stable operation with new chip breaker geometry / *Optimierte Schneidkante für stabile Bearbeitung mit neuem Spanbrecher*

Special grades for outer and inner insert for more efficiency by different materials / *Optimierte Sorten für Innen- und Außenplatte für höhere Effizienz bei verschiedenen Materialien*



YBG205

- New nano coating structure with good hardness and wear resistance, but also good toughness. Ultra fine surface design prevent friction and best chip flow. Excellent thermal and chemical wear resistance. Best choice for all material also for stainless steel and high alloy material.
- *Neue Nano-Beschichtungsstruktur mit gleichzeitiger Härte und Verschleißfestigkeit bzw. Zähigkeit. Eine ultra glatte Schichtoberfläche vermindert die Reibung und garantiert einen optimierten Spanabfluß. Eine hervorragende thermische und chemische Widerstandsfähigkeit zeigt diese Sorte besonders bei der Bearbeitung von rostfreien Stählen und warmfesten Legierungen.*



YBG212

- Special Nano TiAlN coating with smooth surface for less friction and better chipflow.
- In combination with super fine grain size substrate good balance between wear resistance and toughness.
- Excellent thermal and oxidation resistance for more stable edge.
- *Spezielle Nano-TiAlN Beschichtung mit sehr glatter Oberfläche für weniger Reibung und bessere Spanabfuhr.*
- *In Verbindung mit dem neuen Superfeinkorn-Substrat ist dies die ideale Kombination aus Verschleißfestigkeit und Zähigkeit.*
- *Hervorragende Temperatur- und Oxidationsbeständigkeit für optimalen Schneidkantenschutz.*

For boring operation the cutting speed at inner insert is lower. Therefore the grade must be more tough to prevent breakage. YBG212 is best choice in that case. YBG205 is excellent for higher wear resistance.

Bei der Bohrbearbeitung ist die Schnittgeschwindigkeit an der Innenschneide niedriger als an der Außenschneide. Bei solch ungünstigen Bearbeitungsbedingungen sollte die Innenschneide eine höhere Zähigkeit haben. Hier ist die YBG212 optimal einzusetzen. Die Außenplatte hat mit der YBG205 eine höhere Verschleißfestigkeit.

Application Example / Anwendungsbeispiel

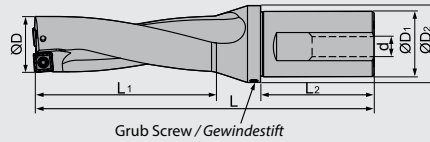
Type / Typ	ZTD04-260-XP25-SP07-02 SPGT07T308-PM / YBG205 (outer insert / Außen-WSP) SPGT07T308-PM / YBG212 (inner insert / Innen-WSP)	Comparison Vergleich	
Workmaterial Werkstoff	C50E 11206(HB240)		
Cooling system Kühlsystem	Doublehelix internal cooling Doppelhelix-Innenkühlung		
Cutting data Schnittdaten	$V_c=130\text{m/min}$ $f=210\text{mm/min}$ $a_p=90\text{mm}$	Chips formation Spanbildung	
Results Ergebnis			

Drilling - Bohren

Indexable drill - Wendeschneidplattenbohrer

ZTD02

2D

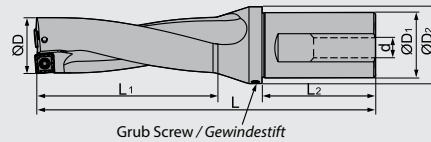


Type Typ	Stock Lager	Dimension Abmessung (mm)						Insert WSP	Screw Schraube	Wrench Schlüssel	Grub Screw Gewindestift	d	
		ØD	ØD1	ØD2	L1	L2	L						
ZTD02-130-XP20-SP05-02	●	13	20	25	31	50	98	SPGT050204-PM/EM	I60M2×4.3	WT06IP		M13×1	
ZTD02-140-XP20-SP05-02	●	14	20	25	33	50	100	SPGT050204-PM/EM	I60M2×4.3	WT06IP	---		
ZTD02-150-XP20-SP05-02	●	15	20	25	35	50	102	SPGT050204-PM/EM	I60M2×4.3	WT06IP			
ZTD02-160-XP20-SP05-02	●	16	20	25	37	50	104	SPGT050204-PM/EM	I60M2×4.3	WT06IP			
ZTD02-170-XP25-SP06-02	●	17	25	32	39	56	117	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP		M16×1,5	
ZTD02-180-XP25-SP06-02	●	18	25	32	41	56	119	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP			
ZTD02-190-XP25-SP06-02	●	19	25	32	43	56	121	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP			
ZTD02-200-XP25-SP06-02	●	20	25	32	45	56	123	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP			
ZTD02-210-XP25-SP06-02	●	21	25	32	47	56	125	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP			
ZTD02-220-XP25-SP07-02	●	22	25	32	49	56	127	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP	---		
ZTD02-230-XP25-SP07-02	●	23	25	32	51	56	129	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP			
ZTD02-240-XP25-SP07-02	●	24	25	32	53	56	131	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP			
ZTD02-250-XP25-SP07-02	●	25	25	32	55	56	133	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP			
ZTD02-260-XP25-SP07-02	●	26	25	32	57	56	135	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP			
ZTD02-270-XP25-SP07-02	●	27	25	32	59	56	137	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP			
ZTD02-280-XP32-SP09-02	●	28	32	37	61	60	146	SPGT090408-PM/EM	I60M3.5×8	WT15IP			M22×2
ZTD02-290-XP32-SP09-02	●	29	32	37	63	60	148	SPGT090408-PM/EM	I60M3.5×8	WT15IP			
ZTD02-300-XP32-SP09-02	●	30	32	37	65	60	150	SPGT090408-PM/EM	I60M3.5×8	WT15IP			
ZTD02-310-XP32-SP09-02	●	31	32	37	67	60	152	SPGT090408-PM/EM	I60M3.5×8	WT15IP			
ZTD02-320-XP32-SP09-02	●	32	32	37	69	60	154	SPGT090408-PM/EM	I60M3.5×8	WT15IP			
ZTD02-330-XP32-SP09-02	●	33	32	37	71	60	156	SPGT090408-PM/EM	I60M3.5×8	WT15IP			
ZTD02-340-XP40-SP11-02	●	34	40	47	73	70	173	SPGT110408-PM/EM	I60M4×10	WT15IP		M6×6 (BSPT)	
ZTD02-350-XP40-SP11-02	●	35	40	47	75	70	175	SPGT110408-PM/EM	I60M4×10	WT15IP			
ZTD02-360-XP40-SP11-02	●	36	40	47	77	70	177	SPGT110408-PM/EM	I60M4×10	WT15IP			
ZTD02-370-XP40-SP11-02	●	37	40	47	79	70	179	SPGT110408-PM/EM	I60M4×10	WT15IP			
ZTD02-380-XP40-SP11-02	●	38	40	47	81	70	181	SPGT110408-PM/EM	I60M4×10	WT15IP			
ZTD02-390-XP40-SP11-02	●	39	40	47	83	70	183	SPGT110408-PM/EM	I60M4×10	WT15IP			
ZTD02-400-XP40-SP11-02	●	40	40	47	85	70	185	SPGT110408-PM/EM	I60M4×10	WT15IP			
ZTD02-410-XP40-SP11-02	●	41	40	47	87	70	187	SPGT110408-PM/EM	I60M4×10	WT15IP			
ZTD02-420-XP40-SP14-02	●	42	40	52	89	70	199	SPGT140512-PM/EM	I60M5×13	WT20IP			M8×8 RC 1/4
ZTD02-430-XP40-SP14-02	●	43	40	52	91	70	201	SPGT140512-PM/EM	I60M5×13	WT20IP			
ZTD02-440-XP40-SP14-02	●	44	40	52	93	70	203	SPGT140512-PM/EM	I60M5×13	WT20IP			
ZTD02-450-XP40-SP14-02	●	45	40	52	95	70	205	SPGT140512-PM/EM	I60M5×13	WT20IP			
ZTD02-460-XP40-SP14-02	●	46	40	52	97	70	207	SPGT140512-PM/EM	I60M5×13	WT20IP			
ZTD02-470-XP40-SP14-02	●	47	40	52	99	70	209	SPGT140512-PM/EM	I60M5×13	WT20IP			
ZTD02-480-XP40-SP14-02	●	48	40	52	101	70	211	SPGT140512-PM/EM	I60M5×13	WT20IP			
ZTD02-490-XP40-SP14-02	●	49	40	52	103	70	213	SPGT140512-PM/EM	I60M5×13	WT20IP			
ZTD02-500-XP40-SP14-02	●	50	40	52	105	70	215	SPGT140512-PM/EM	I60M5×13	WT20IP			

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

ZTD03

3D



Type Typ	Stock Lager	Dimension Abmessung (mm)						Insert WSP	Screw Schraube	Wrench Schlüssel	Grub Screw Gewindestift	d
		ØD	ØD1	ØD2	L1	L2	L					
ZTD03-130-XP20-SP05-02	●	13	20	25	44	50	111	SPGT050204-PM/EM	I60M2×4.3	WT06IP		M13×1
ZTD03-140-XP20-SP05-02	●	14	20	25	47	50	114	SPGT050204-PM/EM	I60M2×4.3	WT06IP		
ZTD03-150-XP20-SP05-02	●	15	20	25	50	50	117	SPGT050204-PM/EM	I60M2×4.3	WT06IP		
ZTD03-160-XP20-SP05-02	●	16	20	25	53	50	120	SPGT050204-PM/EM	I60M2×4.3	WT06IP		
ZTD03-170-XP25-SP06-02	●	17	25	32	56	56	134	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP		M16×1,5
ZTD03-180-XP25-SP06-02	●	18	25	32	59	56	137	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP		
ZTD03-190-XP25-SP06-02	●	19	25	32	62	56	140	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP		
ZTD03-200-XP25-SP06-02	●	20	25	32	65	56	143	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP		
ZTD03-210-XP25-SP06-02	●	21	25	32	68	56	146	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP		
ZTD03-220-XP25-SP07-02	●	22	25	32	71	56	149	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP		
ZTD03-230-XP25-SP07-02	●	23	25	32	74	56	152	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP		
ZTD03-240-XP25-SP07-02	●	24	25	32	77	56	155	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP		
ZTD03-250-XP25-SP07-02	●	25	25	32	80	56	158	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP		
ZTD03-260-XP25-SP07-02	●	26	25	32	83	56	161	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP		
ZTD03-270-XP25-SP07-02	●	27	25	32	86	56	164	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP		
ZTD03-280-XP32-SP09-02	●	28	32	37	89	60	174	SPGT090408-PM/EM	I60M3.5×8	WT15IP		
ZTD03-290-XP32-SP09-02	●	29	32	37	92	60	177	SPGT090408-PM/EM	I60M3.5×8	WT15IP		
ZTD03-300-XP32-SP09-02	●	30	32	37	95	60	180	SPGT090408-PM/EM	I60M3.5×8	WT15IP		
ZTD03-310-XP32-SP09-02	●	31	32	37	98	60	183	SPGT090408-PM/EM	I60M3.5×8	WT15IP		
ZTD03-320-XP32-SP09-02	●	32	32	37	101	60	186	SPGT090408-PM/EM	I60M3.5×8	WT15IP		
ZTD03-330-XP32-SP09-02	●	33	32	37	104	60	189	SPGT090408-PM/EM	I60M3.5×8	WT15IP		
ZTD03-340-XP40-SP11-02	●	34	40	47	107	70	207	SPGT110408-PM/EM	I60M4×10	WT15IP		M6×6 (BSPT)
ZTD03-350-XP40-SP11-02	●	35	40	47	110	70	210	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD03-360-XP40-SP11-02	●	36	40	47	113	70	213	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD03-370-XP40-SP11-02	●	37	40	47	116	70	216	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD03-380-XP40-SP11-02	●	38	40	47	119	70	219	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD03-390-XP40-SP11-02	●	39	40	47	122	70	222	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD03-400-XP40-SP11-02	●	40	40	47	125	70	225	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD03-410-XP40-SP11-02	●	41	40	47	128	70	228	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD03-420-XP40-SP14-02	●	42	40	52	131	70	241	SPGT140512-PM/EM	I60M5×13	WT20IP		M8×8 RC 1/4
ZTD03-430-XP40-SP14-02	●	43	40	52	134	70	244	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD03-440-XP40-SP14-02	●	44	40	52	137	70	247	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD03-450-XP40-SP14-02	●	45	40	52	140	70	250	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD03-460-XP40-SP14-02	●	46	40	52	143	70	253	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD03-470-XP40-SP14-02	●	47	40	52	146	70	256	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD03-480-XP40-SP14-02	●	48	40	52	149	70	259	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD03-490-XP40-SP14-02	●	49	40	52	152	70	262	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD03-500-XP40-SP14-02	●	50	40	52	155	70	265	SPGT140512-PM/EM	I60M5×13	WT20IP		

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

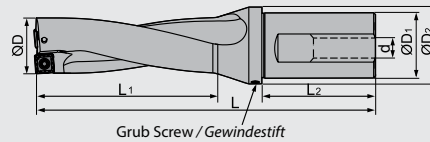


Drilling • Bohren

Indexable drill • Wendeschneidplattenbohrer

ZTD04

4D

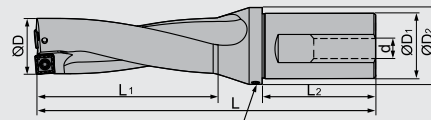


Type Typ	Stock Lager	Dimension Abmessung (mm)						Insert WSP	Screw Schraube	Wrench Schlüssel	Grub Screw Gewindestift	d
		ØD	ØD1	ØD2	L1	L2	L					
ZTD04-130-XP20-SP05-02	●	13	20	25	57	50	124	SPGT050204-PM/EM	I60M2×4.3	WT06IP		M13×1
ZTD04-140-XP20-SP05-02	○	14	20	25	61	50	128	SPGT050204-PM/EM	I60M2×4.3	WT06IP	---	
ZTD04-150-XP20-SP05-02	○	15	20	25	65	50	132	SPGT050204-PM/EM	I60M2×4.3	WT06IP		
ZTD04-160-XP20-SP05-02	●	16	20	25	69	50	136	SPGT050204-PM/EM	I60M2×4.3	WT06IP		
ZTD04-170-XP25-SP06-02	●	17	25	32	73	56	151	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP		M16×1,5
ZTD04-180-XP25-SP06-02	●	18	25	32	77	56	155	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP		
ZTD04-190-XP25-SP06-02	●	19	25	32	81	56	159	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP		
ZTD04-200-XP25-SP06-02	●	20	25	32	85	56	163	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP		
ZTD04-210-XP25-SP06-02	●	21	25	32	89	56	167	SPGT060204-PM/EM	I60M2.2×5.5	WT07IP		
ZTD04-220-XP25-SP07-02	●	22	25	32	93	56	171	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP	---	
ZTD04-230-XP25-SP07-02	●	23	25	32	97	56	175	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP		
ZTD04-240-XP25-SP07-02	●	24	25	32	101	56	179	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP		
ZTD04-250-XP25-SP07-02	●	25	25	32	105	56	183	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP		
ZTD04-260-XP25-SP07-02	●	26	25	32	109	56	187	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP		
ZTD04-270-XP25-SP07-02	●	27	25	32	113	56	191	SPGT07T308-PM/EM	I60M2.5×6.5	WT07IP		
ZTD04-280-XP32-SP09-02	●	28	32	37	117	60	202	SPGT090408-PM/EM	I60M3.5×8	WT15IP		M22×2
ZTD04-290-XP32-SP09-02	●	29	32	37	121	60	206	SPGT090408-PM/EM	I60M3.5×8	WT15IP		
ZTD04-300-XP32-SP09-02	●	30	32	37	125	60	210	SPGT090408-PM/EM	I60M3.5×8	WT15IP		
ZTD04-310-XP32-SP09-02	●	31	32	37	129	60	214	SPGT090408-PM/EM	I60M3.5×8	WT15IP	---	
ZTD04-320-XP32-SP09-02	●	32	32	37	133	60	218	SPGT090408-PM/EM	I60M3.5×8	WT15IP		
ZTD04-330-XP32-SP09-02	●	33	32	37	137	60	222	SPGT090408-PM/EM	I60M3.5×8	WT15IP		
ZTD04-340-XP40-SP11-02	●	34	40	47	141	70	241	SPGT110408-PM/EM	I60M4×10	WT15IP		M6×6 (BSPT)
ZTD04-350-XP40-SP11-02	●	35	40	47	145	70	245	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD04-360-XP40-SP11-02	●	36	40	47	149	70	249	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD04-370-XP40-SP11-02	●	37	40	47	153	70	253	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD04-380-XP40-SP11-02	●	38	40	47	157	70	257	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD04-390-XP40-SP11-02	●	39	40	47	161	70	261	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD04-400-XP40-SP11-02	●	40	40	47	165	70	265	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD04-410-XP40-SP11-02	●	41	40	47	169	70	269	SPGT110408-PM/EM	I60M4×10	WT15IP		
ZTD04-420-XP40-SP14-02	●	42	40	52	173	70	283	SPGT140512-PM/EM	I60M5×13	WT20IP		M8×8 RC 1/4
ZTD04-430-XP40-SP14-02	●	43	40	52	177	70	287	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD04-440-XP40-SP14-02	●	44	40	52	181	70	291	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD04-450-XP40-SP14-02	●	45	40	52	185	70	295	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD04-460-XP40-SP14-02	●	46	40	52	189	70	299	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD04-470-XP40-SP14-02	●	47	40	52	193	70	303	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD04-480-XP40-SP14-02	●	48	40	52	197	70	307	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD04-490-XP40-SP14-02	●	49	40	52	201	70	311	SPGT140512-PM/EM	I60M5×13	WT20IP		
ZTD04-500-XP40-SP14-02	●	50	40	52	205	70	315	SPGT140512-PM/EM	I60M5×13	WT20IP		

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

ZTD05

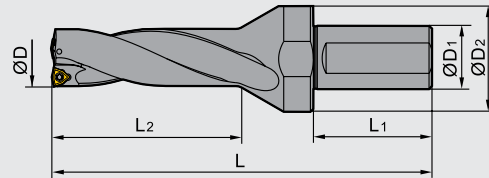
5D



Type Typ	Stock Lager	Dimension Abmessung (mm)						Insert WSP	Screw Schraube	Wrench Schlüssel	Grub Screw Gewindestift	d	
		ØD	ØD1	ØD2	L1	L2	L						
ZTD05-170-XP25-SP06-02	●	17	25	32	90	56	168	SPGT060204-PM/EM	I60M2.2x5.5	WT07IP	---	M13x1	
ZTD05-180-XP25-SP06-02	●	18	25	32	95	56	173	SPGT060204-PM/EM	I60M2.2x5.5	WT07IP			
ZTD05-190-XP25-SP06-02	●	19	25	32	100	56	178	SPGT060204-PM/EM	I60M2.2x5.5	WT07IP			
ZTD05-200-XP25-SP06-02	●	20	25	32	105	56	183	SPGT060204-PM/EM	I60M2.2x5.5	WT07IP			
ZTD05-210-XP25-SP06-02	●	21	25	32	110	56	188	SPGT060204-PM/EM	I60M2.2x5.5	WT07IP	---	M16x1,5	
ZTD05-220-XP25-SP07-02	●	22	25	32	115	56	193	SPGT07T308-PM/EM	I60M2.5x6.5	WT07IP			
ZTD05-230-XP25-SP07-02	○	23	25	32	120	56	198	SPGT07T308-PM/EM	I60M2.5x6.5	WT07IP			
ZTD05-240-XP25-SP07-02	●	24	25	32	125	56	203	SPGT07T308-PM/EM	I60M2.5x6.5	WT07IP			
ZTD05-250-XP25-SP07-02	●	25	25	32	130	56	208	SPGT07T308-PM/EM	I60M2.5x6.5	WT07IP			
ZTD05-260-XP25-SP07-02	●	26	25	32	135	56	213	SPGT07T308-PM/EM	I60M2.5x6.5	WT07IP			
ZTD05-270-XP25-SP07-02	●	27	25	32	140	56	218	SPGT07T308-PM/EM	I60M2.5x6.5	WT07IP			
ZTD05-280-XP32-SP09-02	●	28	32	37	145	60	230	SPGT090408-PM/EM	I60M3.5x8	WT15IP			
ZTD05-290-XP32-SP09-02	●	29	32	37	150	60	235	SPGT090408-PM/EM	I60M3.5x8	WT15IP			
ZTD05-300-XP32-SP09-02	●	30	32	37	155	60	240	SPGT090408-PM/EM	I60M3.5x8	WT15IP			
ZTD05-310-XP32-SP09-02	●	31	32	37	160	60	245	SPGT090408-PM/EM	I60M3.5x8	WT15IP			
ZTD05-320-XP32-SP09-02	●	32	32	37	165	60	250	SPGT090408-PM/EM	I60M3.5x8	WT15IP	---	M22x2	
ZTD05-330-XP32-SP09-02	●	33	32	37	170	60	255	SPGT090408-PM/EM	I60M3.5x8	WT15IP			
ZTD05-340-XP40-SP11-02	●	34	40	47	175	70	275	SPGT110408-PM/EM	I60M4x10	WT15IP			
ZTD05-350-XP40-SP11-02	●	35	40	47	180	70	280	SPGT110408-PM/EM	I60M4x10	WT15IP			
ZTD05-360-XP40-SP11-02	●	36	40	47	185	70	285	SPGT110408-PM/EM	I60M4x10	WT15IP			
ZTD05-370-XP40-SP11-02	●	37	40	47	190	70	290	SPGT110408-PM/EM	I60M4x10	WT15IP			
ZTD05-380-XP40-SP11-02	●	38	40	47	195	70	295	SPGT110408-PM/EM	I60M4x10	WT15IP	M6x6	(BSPT) RC 1/4	
ZTD05-390-XP40-SP11-02	●	39	40	47	200	70	300	SPGT110408-PM/EM	I60M4x10	WT15IP			
ZTD05-400-XP40-SP11-02	●	40	40	47	205	70	305	SPGT110408-PM/EM	I60M4x10	WT15IP			
ZTD05-410-XP40-SP11-02	●	41	40	47	210	70	310	SPGT110408-PM/EM	I60M4x10	WT15IP			
ZTD05-420-XP40-SP14-02	●	42	40	52	215	70	325	SPGT140512-PM/EM	I60M5x13	WT20IP			
ZTD05-430-XP40-SP14-02	●	43	40	52	220	70	330	SPGT140512-PM/EM	I60M5x13	WT20IP			
ZTD05-440-XP40-SP14-02	●	44	40	52	225	70	335	SPGT140512-PM/EM	I60M5x13	WT20IP			
ZTD05-450-XP40-SP14-02	●	45	40	52	230	70	340	SPGT140512-PM/EM	I60M5x13	WT20IP			
ZTD05-460-XP40-SP14-02	●	46	40	52	235	70	345	SPGT140512-PM/EM	I60M5x13	WT20IP			M8x8
ZTD05-470-XP40-SP14-02	●	47	40	52	240	70	350	SPGT140512-PM/EM	I60M5x13	WT20IP			
ZTD05-480-XP40-SP14-02	●	48	40	52	245	70	355	SPGT140512-PM/EM	I60M5x13	WT20IP			
ZTD05-490-XP40-SP14-02	●	49	40	52	250	70	360	SPGT140512-PM/EM	I60M5x13	WT20IP			
ZTD05-500-XP40-SP14-02	●	50	40	52	255	70	365	SPGT140512-PM/EM	I60M5x13	WT20IP			
ZTD03-470-XP40-SP14-02	●	47	40	52	146	70	256	SPGT140512-PM/EM	I60M5x13	WT20IP			
ZTD03-480-XP40-SP14-02	●	48	40	52	149	70	259	SPGT140512-PM/EM	I60M5x13	WT20IP			
ZTD03-490-XP40-SP14-02	●	49	40	52	152	70	262	SPGT140512-PM/EM	I60M5x13	WT20IP			
ZTD03-500-XP40-SP14-02	●	50	40	52	155	70	265	SPGT140512-PM/EM	I60M5x13	WT20IP			

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

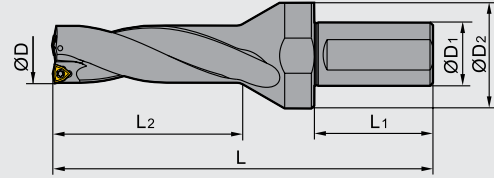
ZD03



Type Typ	Stock Lager	Basic dimension(mm) Abmessungen						Inserts WSP	Screw Schraube	Wrench Schlüssel
		D	D ₁	D ₂	L ₁	L ₂	L			
ZD03-160-XP25-WC03-02	●	16	25	32	56	52	129	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-170-XP25-WC03-02	●	17	25	32	56	55	133	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-180-XP25-WC03-02	●	18	25	32	56	58	137	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-190-XP25-WC03-02	●	19	25	32	56	61	140	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-200-XP25-WC03-02	●	20	25	32	56	64	143	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-210-XP25-WC04-02	●	21	25	45	56	67	153	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-220-XP25-WC04-02	●	22	25	45	56	70	156	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-230-XP25-WC04-02	●	23	25	45	56	73	159	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-240-XP25-WC04-02	●	24	25	45	56	76	162	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-250-XP25-WC04-02	●	25	25	45	56	79	165	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-260-XP32-WC05-02	●	26	32	55	60	83	176	WCMX050308	I60M3×7	WT09IP
ZD03-270-XP32-WC05-02	●	27	32	55	60	86	180	WCMX050308	I60M3×7	WT09IP
ZD03-280-XP32-WC05-02	●	28	32	55	60	89	184	WCMX050308	I60M3×7	WT09IP
ZD03-290-XP32-WC05-02	●	29	32	55	60	92	188	WCMX050308	I60M3×7	WT09IP
ZD03-300-XP32-WC05-02	●	30	32	55	60	95	192	WCMX050308	I60M3×7	WT09IP
ZD03-310-XP40-WC06-02	●	31	40	60	70	98	203	WCMX06T308	I60M3×7	WT09IP
ZD03-320-XP40-WC06-02	●	32	40	60	70	101	206	WCMX06T308	I60M3×7	WT09IP
ZD03-330-XP40-WC06-02	●	33	40	60	70	104	209	WCMX06T308	I60M3×7	WT09IP
ZD03-340-XP40-WC06-02	●	34	40	60	70	107	212	WCMX06T308	I60M3×7	WT09IP
ZD03-350-XP40-WC06-02	●	35	40	60	70	110	215	WCMX06T308	I60M3×7	WT09IP
ZD03-360-XP40-WC06-02	●	36	40	60	70	113	218	WCMX06T308	I60M3×7	WT09IP
ZD03-370-XP40-WC06-02	●	37	40	60	70	116	221	WCMX06T308	I60M3×7	WT09IP
ZD03-380-XP40-WC06-02	●	38	40	60	70	119	225	WCMX06T308	I60M3×7	WT09IP
ZD03-390-XP40-WC06-02	●	39	40	60	70	122	228	WCMX06T308	I60M3×7	WT09IP

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

ZD03



Type Typ	Stock Lager	Basic dimension(mm) Abmessungen						Inserts WSP	Screw Schraube	Wrench Schlüssel
		D	D ₁	D ₂	L ₁	L ₂	L			
ZD03-400-XP40-WC06-02	●	40	40	60	70	125	231	WCMX06T308	I60M3×7	WT09IP
ZD03-410-XP40-WC06-02	●	41	40	60	70	128	234	WCMX06T308	I60M3×7	WT09IP
ZD03-420-XP40-WC08-02	●	42	40	60	70	131	239	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-430-XP40-WC08-02	●	43	40	60	70	134	242	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-440-XP40-WC08-02	●	44	40	60	70	137	245	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-450-XP40-WC08-02	●	45	40	60	70	140	248	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-460-XP40-WC08-02	●	46	40	60	70	143	251	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-470-XP40-WC08-02	●	47	40	60	70	146	253	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-480-XP40-WC08-02	●	48	40	70	70	149	255	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-490-XP40-WC08-02	○	49	40	70	70	152	257	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-500-XP40-WC08-02	●	50	40	70	70	155	259	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-510-XP40-WC08-02	○	51	40	70	70	158	261	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-520-XP40-WC08-02	○	52	40	70	70	161	263	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-530-XP40-WC08-02	○	53	40	70	70	164	265	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-540-XP40-WC08-02	●	54	40	70	70	167	267	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-550-XP40-WC08-02	○	55	40	70	70	170	269	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-560-XP40-WC08-02	○	56	40	70	70	173	271	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-570-XP40-WC08-02	○	57	40	70	70	176	273	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-580-XP40-WC08-02	●	58	40	70	70	179	275	WCMX080412	I60M3.5×10.4	WT15IP



Drilling - Bohren

Indexable drill - Wendeschneidplattenbohrer

Inserts Drills Code Key - ISO Kennzeichnung Wendeschneidplatten

Insert shape · Plattenform	
Code	Insert shap Plattenform
S	
W	

Tolerance · Toleranz							
Code	m Tolerance(mm) Toleranz	ØI.C Tolerance(mm) Toleranz	S Tolerance(mm) Toleranz	Code	m Tolerance(mm) Toleranz	ØI.C Tolerance(mm) Toleranz	S Tolerance(mm) Toleranz
A	±0.005	±0.025	±0.025	J	±0.005	±0.05-±0.13	±0.025
F	±0.005	±0.013	±0.025	K	±0.013	±0.05-±0.13	±0.025
C	±0.013	±0.025	±0.025	L	±0.025	±0.05-±0.13	±0.025
H	±0.013	±0.013	±0.025	M	±0.08-±0.18	±0.05-±0.13	±0.13
E	±0.025	±0.025	±0.025	N	±0.08-±0.18	±0.05-±0.13	±0.025
G	±0.025	±0.025	±0.13	U	±0.13-±0.38	±0.08-±0.25	±0.13

W C M X

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

Chipbreaker and clamping system Spanformstufen und Klemmung							
Metric · Metrisch							
Code	With / Without hole Mit / Ohne Loch	With / Without chipbreaker Mit / Ohne Spanbrecher	Section plane of Insert Plattenform	Code	With / Without hole Mit / Ohne Loch	With / Without chipbreaker Mit / Ohne Spanbrecher	Section plane of Insert Plattenform
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					

C

Indexable drills
WPS-Bohrer

Length of cutting edge Schneidenlänge		
Code	Length · Länge	
	W	S
03	3.8	
04	4.3	
05	5.4	
06	6.5	6.35
08	8.7	8.0
09		9.525
12		12.7

Insert thickness Dicke			
Thickness is defined as height from bottom of insert to the highest part of cutting edge Dicke ist definiert als Höhe von der Unterseite der WSP bis zur höchsten Stelle der Scheikante			
Code	Insert thickness WSP Dicke (mm)	Code	Insert thickness WSP Dicke (mm)
00	0.79	05	5.96
T0	0.99	T5	5.95
01	1.59	06	6.35
T1	1.98	T6	6.75
02	2.38	07	7.94
T2	2.58	09	9.52
03	3.18	T9	9.72
T3	3.97	11	11.11
04	4.76	12	12.70
T4	4.96		

08 04 12 R - PG

Nose radius Schneidenradius	
Code	Description Beschreibung
04	0.4mm
08	0.8mm
12	1.2mm

Cutting direction Vorschubrichtung	
Code	Description Beschreibung
R	Right hand / Rechts
L	Left hand / Links
N	Neutral

Chipbreaker code
Spanformstufe

Drilling - Bohren

Indexable drill - Wendeschneidplattenbohrer

PM For general steel machining / Für die allgemeine Stahlbearbeitung



Type Typ	Dimension Abmessung (mm)					Grade / Sorte		
						PVD		CVD
	L	ØI.C	s	ød	r	YBG205 outer insert Außenschneide	YBG212 inner insert Innenschneide	YB6338
SPGT050204-PM	5	5	2.38	2.2	0.4	•	•	•
SPGT060204-PM	6	6	2.38	2.6	0.4	•	•	•
SPGT07T308-PM	7.94	7.94	3.97	2.8	0.8	•	•	•
SPGT090408-PM	9.8	9.8	4.3	4.2	0.8	•	•	•
SPGT110408-PM	11.5	11.5	4.76	4.4	0.8	•	•	•
SPGT140512-PM	14.3	14.3	5.2	5.75	1.2	•	•	•

EM For soft and stainless steel / Für weichen und rostfreien Stahl



Type Typ	Dimension Abmessung (mm)					Grade / Sorte	
						PVD	
	L	ØI.C	s	ød	r	YBG205 outer insert Außenschneide	YBG212 inner insert Innenschneide
SPGT050204-EM	5	5	2.38	2.2	0.4	•	•
SPGT060204-EM	6	6	2.38	2.6	0.4	•	•
SPGT07T308-EM	7.94	7.94	3.97	2.8	0.8	•	•
SPGT090408-EM	9.8	9.8	4.3	4.2	0.8	•	•
SPGT110408-EM	11.5	11.5	4.76	4.4	0.8	•	•
SPGT140512-EM	14.3	14.3	5.2	5.75	1.2	•	•

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

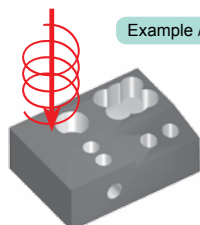
Adapter for innercooling on conventional machine / Adapter für Innenkühlung bei konventionellen Maschinen (Please order separately / Bitte separat bestellen)

Shank-Type Schaft-Typ	Adapter	D1	L1	L	H	d	(BSPT) Rc
XP20	ZTD-XP20-THIN	18	4.23	13	14	M13x1	1/8
XP25	ZTD-XP25-THIN	22	4.65	17	17	M16x1.5	1/8
XP32	ZTD-XP32-THIN	29	5.65	21	22	M22x2	1/4

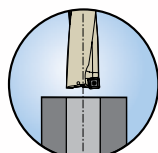
Material Overview - Material Übersicht

✓ = Very suitable · Sehr empfohlen
✓ = Suitable · Empfohlen

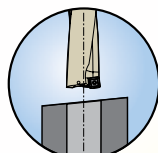
Grade Sorte	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel Alloy Steel Kohlenstoff-, Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG Kugelgrahitguss	Aluminum alloy Aluleg.	Copper alloy Kupferleg.	Heat resist. alloy Warmfeste Leg.
			~40HRC	~50HRC	~60HRC						
SPGT* - PM	✓	✓				✓	✓	✓			
SPGT* - EM	✓	✓				✓				✓	



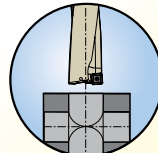
Example / Beispiel



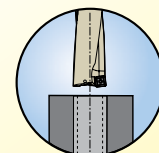
1 General boring
Allgemeine Bohrung



2 Inclined plane
Schiefe Ebene

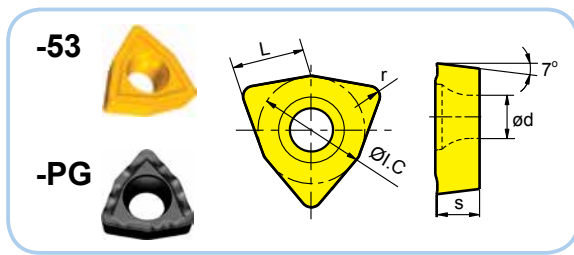


3 Cross hole
Kreuzbohrung



4 expansion boring
Expansionsbohrung

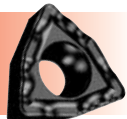
Indexable inserts for drilling · WSP zum Bohren



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

Type Typ	Basic dimension(mm) · Basis Abmessungen					Grade · Sorte					
	L	I.C	s	d	r	YBG202	YBG205	YBG201	YBD252	YBG40	YD201
WCMX030208R-53	3.8	5.56	2.38	2.8	0.8	●		○	●		
WCMX040208R-53	4.3	6.35	2.38	3.1	0.8	●		○	●		○
WCMX050308R-53	5.4	7.94	3.18	3.2	0.8	●		○	●		
WCMX06T308R-53	6.5	9.525	3.97	3.7	0.8	●		○	●		●
WCMX080412R-53	8.7	12.7	4.76	4.3	1.2	●		○	●		○
WCMX030208-D	3.8	5.56	2.38	2.8	0.8				○		
WCMX040208-D	4.3	6.35	2.38	3.1	0.8				○		
WCMX050308-D	5.4	7.94	3.18	3.2	0.8				○		
WCMX06T308-D	6.5	9.525	3.97	3.7	0.8				○		
WCMX080412-D	8.7	12.7	4.76	4.3	1.2				●		
WCMX030208R-PG	3.8	5.56	2.38	2.8	0.8	●					
WCMX040208R-PG	4.3	6.35	2.38	3.1	0.8	●					
WCMX050308R-PG	5.4	7.94	3.18	3.2	0.8	●	○		○		
WCMX06T308R-PG	6.5	9.525	3.97	3.7	0.8	●					
WCMX080412R-PG	8.7	12.7	4.76	4.3	1.2	●			○		

-PG chipbreaker -PG Spanbrecher



Unique design of waveform edge ensure high edge strength and good chip breaking performance for machining carbon steel and alloy steel.

Wellenförmige Schneide mit hoher Stabilität und Spankontrolle zur Bearbeitung von Kohlenstoffstahl, legiertem Stahl und Guss

-53 chipbreaker -53 Spanbrecher



Sharp cutting edge benefits to achieve low roughness surface, mainly applicable for low load cutting of aluminum alloy, mild steel, stainless steel and cast iron.

Scharfe Schneidkante zur Erzielung exklusiver Oberflächen. Zur Bearbeitung von Alulegierungen, Baustahl, rostfreiem Stahl und Grauguss.

-D chipbreaker -D Spanbrecher



Inserts for outer positioning with optimized chipbreaker geometry. And good chip breaking performance for machining, steel, stainless steel, cast iron for common cutting speed .

Optimierte Geometrie als Außenschneide einsetzbar. Gute Spankontrolle bei Stahl, rostfreiem Stahl, Grauguss bei mittleren Schnittgeschwindigkeiten.

Drilling - Bohren

General technical information - Allgemeine Technische Information

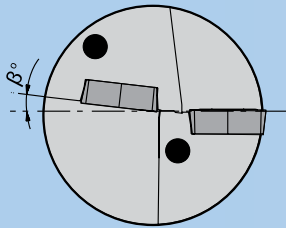
Comparison table for drilling Insert - Grades
Bohrwendepplatten Übersichtstabelle - Sorten

Workpiece material Werkstück Material	ISO	Coating · Beschichtung		Cermet Cermet	uncoated carbide unb. Hartmetall	PCBN & PCD PCBN & PKD
		CVD	PVD			
P Steel · Stahl	P01					
	P10		YBG202 YBG205 YBG212			
	P20	YBD252 YB6338				
	P30					
	P40					
M Stainless Steel Rostfreier Stahl	M01					
	M10		YBG202 YBG205 YBG212			
	M20					
	M30					
	M40					
K Cast iron · Grauguss	K01					
	K10	YBD252 YB6338		YBG202 YBG205 YBG212		
	K20					
	K30					
	K40					
N Non-ferrous materials Ne Metalle	N01					
	N10					
	N20				YD201	
	N30					
S Heat-resistant steel Warmfester Stahl	S01					
	S10		YBG202 YBG205 YBG212			
	S20					
	S30					
H Hardened material Gehärtete Werkstoffe	H01					
	H10					
	H20					
	H30					



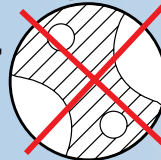
Features of drill - Merkmale der WSP-Bohrer

- Perfect insert assembling angle makes balanced cutting force, low vibration in machining process, thus achieve excellent surface quality.
- Advanced flute design possesses large chip pocket for chip removal.
- Complete diameter range, from 16 mm to 58 mm.
- Perfekte WSP Positionierung für ausgewogene Schnittkraftverteilung. Zur Erzielung guter Oberflächen.
- Fortschrittlicher großer Spanraum für eine gute Spanabfuhr.
- kompletter Durchmesserbereich von 16 mm-58mm

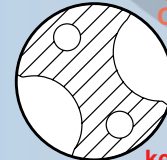


Small chip pocket
Easy to generate chips
jamming

kleiner Spanraum,
Spanstau.



Competitor
Wettbewerber

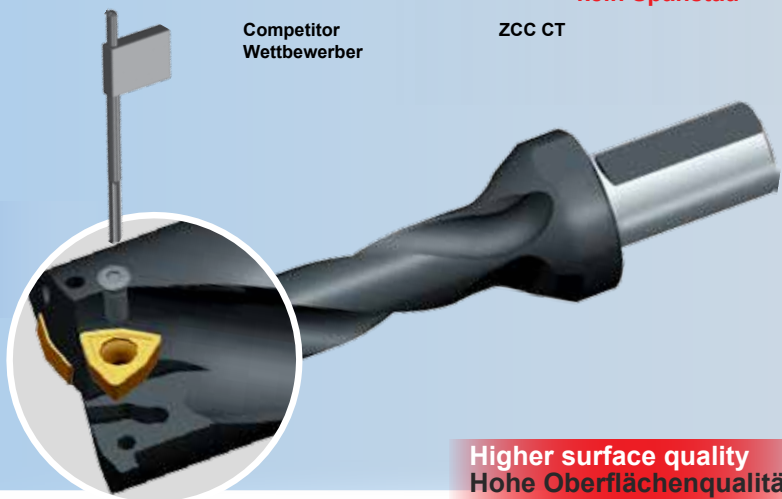


Large chip pocket
Chip jamming
free

Großer
Spanraum
kein Spanstau

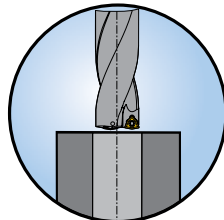
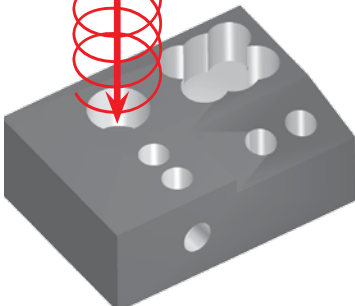
ZCC CT

Insert assembling WSP Wechsel

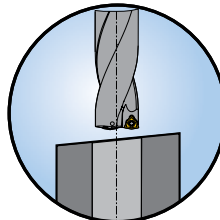


Higher surface quality
Hohe Oberflächenqualität

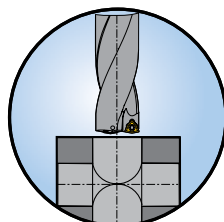
Applications Anwendung



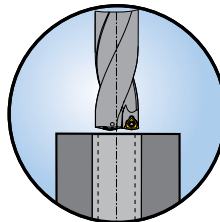
1. Common drilling
Normalbohren



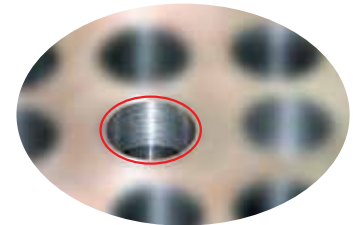
2. Slant face drilling
Schrägbohren



3. Cross-hole drilling
Bohren bei
Querbohrungen



4. Counterboring
Aufbohren



Better chip breaking performance
Gute Spankontrolle

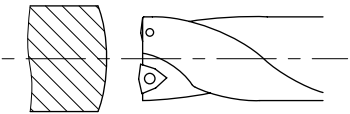
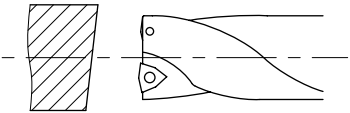
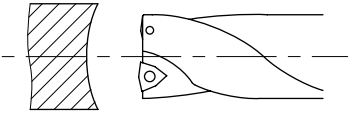
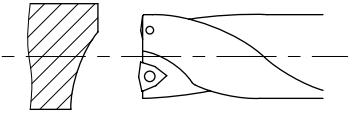
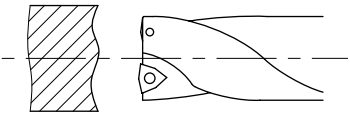


Technical information for indexable drills · Technische Informationen über WSP-Bohrer

■ Initial drill penetration · Das Anbohren

Initial drill penetration is an important factor for successful drilling. One way of ensuring good hole quality is to make sure the penetration surface of the workpiece is vertical to the drill centre axis. In addition, an indexable drill can carry out initial penetration of convex, concave, inclined and irregular surfaces when accompanied with an adjustment of feed rates.

Das Anbohren ist ein wichtiger bzw. entscheidender Faktor für das erfolgreiche Bohren. Eine gute Bohrungsqualität und Standzeit erzielt man bei einer ebenen Anbohrfläche vertikal zur Bohrerachse. Beim Anbohren in konkaven, konvexen und unebenen Flächen soll der Vorschub entsprechend reduziert werden.

Workpiece surface Werkstück Oberflächen	Countermeasures Maßnahmen
	<p>For a convex surface, the conditions are relatively good and the centre of the drill ideally makes contact with the workpiece first, thus can adopt normal feed.</p> <p>Bei konvexen Anbohrflächen ist die Bearbeitungssituation relativ gut. Der erste Kontakt des Bohrers geschieht über die Zentrumschneide, so dass normale Vorschübe gewählt werden können.</p>
	<p>When penetrating an inclined surface, the cutting edges will be unevenly loaded which may result in the premature drill wear. If the angle of the inclined surface is larger than two degrees, the feed should be reduced to 1/3 of that recommended for the drill.</p> <p>Bei Schrägflächen wird der Bohrer aus dem Zentrum gedrückt. Dadurch wird der Bohrerverschleiß erhöht. Bei einem Winkel von über 2° sollte der Vorschub auf 1/3 der empfohlenen Werte reduziert werden.</p>
	<p>When drilling into concave surface, drill center axis normally tends to off-center, the feed should be reduced to 1/3 of that recommended for the drill.</p> <p>Beim Anbohren in konkaven Flächen kann der Bohrer aus dem Zentrum gedrückt werden. Vorschub auf 1/3 reduzieren.</p>
	<p>When drilling into non-symmetric curved surfaces, the drill tends to deviate from the centre because of penetrating against an inclined surface. The feed should be reduced to lower than that recommended for the initial penetration of concave surfaces.</p> <p>Beim Bohren in asymmetrischen Flächen sollte der Vorschub entsprechend reduziert werden, eventuell auf unter die Werte, die für das erste Eindringen in konkave Flächen empfohlen werden.</p>
	<p>When drilling into irregular surface, there is a risk of the inserts chipping and this may also occur when drilling through the workpiece. Therefore the feed rate should be reduced.</p> <p>Beim Bohren in stark asymmetrische Flächen können beim Anbohren und beim Austritt des Bohres aus dem Werkstück Ausbrüche an der Wendeschneidplatte entstehen. Auch hier den Vorschub entsprechend reduzieren.</p>

Calculations for indexable drilling · Berechnungsbeispiele für WSP-Bohrer

• Cutting speed · Schnittgeschwindigkeit (V_c)

$$V_c = \frac{D_c \times \pi \times n}{1000}$$

V_c (m/min): cutting speed
Schnittgeschwindigkeit
 n (rev/min): rotating speed · Umdrehungen

D_c (mm): drill diameter
Bohrerdurchm. \varnothing
 $\pi \sim 3,14$

- Example Spindle speed is 1600 rev/min, drill diameter is 20mm, thus cutting speed is:
Beispiel Spindelumdrehung beträgt 1600 u/min, Bohrerdurchmesser ist 20mm, dadurch ist die Schnittgeschw.:

$$V_c = \frac{D_c \times \pi \times n}{1000} = \frac{20 \times 3.14 \times 1600}{1000} = 100 \text{ (m/min)}$$

• Feed rate · Vorschub

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

V_f (mm/min): feed rate
Vorschub
 n (rev/min): spindle speed · Umdrehungen

fr (mm/rev): feed rate per revolution
Vorschub pro Umdrehung

- Example Spindle speed is 1500 rev/min, feed rate per revolution is 0.1mm/rev, thus feed rate is:
Beispiel Spindelumdrehung beträgt 1500 u / min, Vorschub pro Umdrehung = 0,1 mm / rev; dadurch ist der Vorschub:

$$V_f = fr \times n = 0.1 \times 1500 = 150 \text{ (mm/min)}$$

• Machining time · Bearbeitungszeit

$$T_c = \frac{I_d \times i}{n \times f}$$

T_c (min): machining time
Bearbeitungszeit
 i : number of holes
 i : Anzahl der Bohrung.

I_d (mm): drilling depth
Bohrtiefe

fr (mm/rev): feed rate per revolution
Vorschub pro Umdrehung
 n (rev/min): spindle speed
Drehzahl

- Example Calculate the drilling time, with following formular:
Beispiel

drill diameter 20mm, depth 40mm
cutting speed 100m/min
feed rate 0,1/rev

$$n = \frac{V_c \times 1000}{D_c \times \pi} = \frac{100 \times 1000}{20 \times 3.14} = 1600 \text{ (rev/min)}$$

Berechnen Sie die Bohrzeit, mit folgender Formel:

Bohrerdurchm. 20mm, Bohrtiefe 40mm
Schnittgeschwindigk. 100m/min
Vorschub pro Umdrehung 0,1/re

$$T_c = \frac{I_d \times i}{n \times fr} = \frac{40 \times 1}{1600 \times 0.1} = 0.25 \text{ (min)}$$

• Metal removal rate · Zerspanungsvolumen

$$Q = \frac{V_f \times \pi \times D_c^2}{4 \times 1000}$$

Q (cm³/min): metal removal rate
 Q (cm³/min): Zerspanungsvolumen
 V_f (mm/min): feed rate · Vorschub
 $\pi \sim 3,14$

D_c (mm): drill diameter
 D_c (mm): Bohrerdurchmesser

- Example Drill diameter is 20mm, feed rate is 160mm/min, thus metal removal rate is:
Beispiel Bohrdurchmesser 20mm, Vorschub ist 160mm/min, dadurch liegt das Zerspanungsvolumen bei:

$$Q = \frac{V_f \times \pi \times D_c^2}{4 \times 1000} = \frac{160 \times 3.14 \times 20^2}{4 \times 1000} = 50.24 \text{ (cm}^3\text{/min)}$$

Drilling · Bohren

Indexable drill · Wendeschneidplattenbohrer

Recommended cutting data for indexable drills · Empfohlene Schnittdaten für WSP-Bohrern

ISO	Material	Hardness HB Härte HB	Diameter Ø Durchmesser [mm]	Feed rate Vorschub fn [mm/r]	Cutting speed Schnittgeschwindigkeit Vc [m/min]
P	Carbon steel Kohlenstoff- stahl	80-200	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.09 0.06-0.10 0.07-0.11 0.08-0.12	200(170-240)
	Low alloy steel Niedrigleg. Stahl	150-260	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.14 0.08-0.16 0.10-0.20	170(140-220)
	High alloy steel Hochleg. Stahl	150-320	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.16 0.08-0.18 0.10-0.22	150(120-180)
	Cast steel Gussstahl	180-250	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.08 0.05-0.08 0.06-0.10 0.07-0.11 0.07-0.12	140(120-170)
M	Stainless steel Ferrite Martensite Rostfreier Stahl	150-270	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.16 0.08-0.18 0.10-0.22	160(110-230)
	Austenite Austenit	150-275	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.11 0.06-0.13 0.08-0.14 0.10-0.16	140(110-220)
K	Malleable cast iron Temperguss	150-230	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.10 0.05-0.14 0.08-0.16 0.10-0.20 0.12-0.24	160(120-220)
	Gray cast iron Grauguss	150-220	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.10 0.05-0.14 0.08-0.16 0.10-0.20 0.12-0.24	200(170-240)
	Nodular cast iron GGG Kugelgra- phitguss	160-250	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.14 0.08-0.16 0.10-0.20	160(130-200)
N	Al alloy Alulegierung	60-110	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.10 0.05-0.14 0.08-0.16 0.10-0.20 0.12-0.24	300(250-350)

C

Indexable drills
WSP-Bohrer

Threading pre-hole diameter · Kernlochdurchmesser

- Metric Coarse thread
- Metrisch - Gewinde

- Metric fine screw fine
- Metrisch - Feingewinde

Thread code Gewindebez.	Pre-hole diameter (mm) Kerndurchmesser
M3×0.5	2.5
M3.5×0.6	2.9
M4×0.7	3.3
M5×0.8	4.2
M6×1.0	5.0
M7×1.0	6.0
M8×1.25	6.75
M9×1.25	7.75
M10×1.5	8.5
M11×1.5	9.5
M12×1.75	10.25
M14×2.0	12.0
M16×2.0	14.0
M18×2.5	15.5
M20×2.5	17.5
M24×3.0	21.0
M27×3.0	24.0
M30×3.5	26.5

Thread code Gewindebez.	Pre-hole diameter (mm) Kerndurchmesser
M3×0.35	2.65
M3.5×0.35	3.15
M4×0.5	3.5
M4.5×0.5	4.0
M5×0.5	4.5
M5.5×0.5	5.0
M6×0.75	5.25
M7×0.75	6.25
M8×1.0	7.0
M8×0.75	7.25
M9×1.0	8.0
M9×0.75	8.25
M10×1.25	8.75
M10×1.0	9.0
M10×0.75	9.25
M11×1.0	10.0
M11×0.75	10.25
M12×1.5	10.5
M12×1.25	10.75
M12×1.0	11.0

Thread code Gewindebez.	Pre-hole diameter (mm) Kerndurchmesser
M14×1.5	12.5
M14×1.0	13.0
M15×1.5	13.5
M15×1.0	14.0
M16×1.5	14.5
M16×1.0	15.0
M17×1.5	15.5
M17×1.0	16.0
M18×2.0	16.0
M18×1.5	16.5
M18×1.0	17.0
M20×2.0	18.0
M20×1.5	18.5
M20×1.0	19.0
M22×2.0	20.0
M22×1.5	20.5
M22×1.0	21.0
M24×2.0	22.0
M24×1.5	22.5
M24×1.0	23.0

Surface roughness · Oberflächenrauigkeit

D

Technical Info
Technische Info

Type Typ	Code	Calculation method · Berechnungsmethode	Calculation example (figure) · Meßaufnahme (Abb.)
Arithmetic average deviation of profile Mittlere Rauhtiefe	Ra	<p>Within sampling length l, the arithmetic average absolute value of profile deviation is</p> $R_a = \frac{1}{l} \int_0^l y(x) dx$ <p>In the formula, the profile deviation y is the distance between profile points and reference line in the measuring direction. Reference line is the profile least-square average line O. This line divide the profile and make the sum of squares of profile deviation to be the minimum within the sampling length.</p> <p>Der Mittelrauhwert R_a ist der arithmetische Mittelwert der absoluten Beträge der Abstände y des Rauheitsprofils von der Mittellinie innerhalb der Messstrecke. Dies ist gleichbedeutend mit der Höhe des Rechtecks, dessen Länge gleich der Gesamtstrecke l ist und das flächengleich mit der Summe der zwischen dem Rauheitsprofil und der Mittellinie eingeschlossenen Fläche ist $y=f$</p>	
Irregularity ten-point high Gemittelte Rauhtiefe	Rz	<p>Within sampling length l, the sum of the average value of heights of five highest profile peak and the depths of five deepest profile valleys</p> $R_z = \frac{\sum_{i=1}^5 y_{pi} + \sum_{i=1}^5 y_{vi}}{5}$ <p>In the formula, y_{pi} means the height of 'i'th highest profile peak. In the formula, y_{vi} means the depth of 'i'th deepest profile valley.</p> <p>Maximum height of profile R_y: the distance between the top profile peak line and the bottom profile valley line in the longitudinal direction within the sampling length l.</p> <p>Die gemittelte Rauhtiefe R_z ist das arithmetische Mittel aus den Einzelrauhtiefen fünf aufeinander grenzender Einzelmessstrecken gleicher Länge. R_z wird ebenfalls in (μm) angegeben.</p>	
Maximum height of profile Maximale Rauhtiefe	Ry	<p>The distance between the inner profile peak line and the bottom profile valley line in the longitudinal direction within the sampling length l.</p> <p>Top profile peak line is the line that parallels to the reference line and passes through the highest point of profile peak.</p> <p>Bottom profile line is the line that parallels to the reference line and passes through the lowest point of profile valley.</p> <p>Die maximale Rauhtiefe R_y ist die größte der auf der Gesamtmeßstrecke l vorkommenden Einzelrauhtiefen, R_y wird auch in (μm) Mikrometer angegeben. (Bemerkung) Um R_z herausfinden, wird ein Anteil ohne außergewöhnliche Höhen und Tiefen als Stichprobenlänge ausgewählt und als Schwachstelle betrachtet.</p>	

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	GB	AISI/SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS	GOST
P	Alloy steel · Legierter Stahl											
	15	1015	1.0401	C15	080M15	-	1350	CC12	C15C16	F.111	-	-
	20	1020	1.0402	C22	050A20	2C	1450	CC20	C20C21	F.112	-	20
	35	1035	1.0501	C35	060A35	-	1550	CC35	C35	F.113	-	35
	45	1045	1.0503	C45	080M40	-	1650	CC45	C45	F.114	-	45
	55	1055	1.0535	C55	070M55	-	1655	-	C55	-	-	55
	60	1060	1.0601	C60	080A62	43D	-	CC55	C60	-	-	60
	Y15	1213	1.7015	9SMn28	230M07	-	1912	S250	CF9SMn28	11SMn28	SUM22	15Ch
	-	12L13	1.0718	9SMnPb28	-	-	1914	S250Pb	CF9MnPb28	11SMnPb28	SUM22L	-
	-	-	1.0722	10SPb20	-	-	-	10PbF2	CF10Pb20	10SPb20	-	-
	-	1140	1.0726	35S20	212M36	8M	1957	35MF4	-	F210G	-	-
	Y13	1215	1.0736	9SMn36	240M07	1B	-	S300	CF9SMn36	12SMn35	-	-
	-	12L14	1.0737	9SMnPb36	-	-	1926	S300Pb	CF9SMnPb36	12SMnP35	-	-
	55Si2Mn	9255	1.0904	55Si9	250A53	45	2085	55S7	55Si8	56Si7	-	-
	-	9262	1.0961	60SiCr7	-	-	-	60SC7	60SiCr8	60SiCr8	-	-
	15	1015	1.1141	Ck15	080M15	32C	1370	XC12	C16	C15K	S15C	15
	40Mn	1039	1.1157	40Mn4	150M36	15	-	35M5	-	-	-	40G
	25	1025	1.1158	Ck25	-	-	-	-	-	-	S25C	25
	35Mn2	1335	1.1167	36Mn5	-	-	2120	40Mn5	-	36Mn5	SMn438(H)	35G2,35GL
	30Mn	1330	1.1170	28Mn6	150M28	14A	-	20M5	C28Mn	-	SCMn1	30G
	35Mn	1035	1.1183	CF35	060A35	-	1572	XS38TS	C36	-	S35C	-
	Ck45	1045	1.1191	45	080M46	-	1672	XC42	C45	C45K	S45C	-
	55	1055	1.1203	Ck55	070M55	-	-	XC45	C50	C55K	S55C	55
	50	1050	1.1213	Cf53	060A52	-	1674	XC48TS	C53	-	S50C	-
	60Mn	1060	1.1221	Ck60	080A62	43D	1678	XC60	C60	-	S58C	60,60G
	-	1095	1.1274	Ck101	060A96	-	1870	-	-	-	SUP4	-
	-	-	1.3401	X120Mn12	Z120M12	-	-	X120M12	XG120Mn12	X120Mn12	SCMnH/1	110G13L
	Gr15;45Gr	52100	1.3505	100Cr6	534A99	31	2258	100C6	100Cr6	F.131	SUJ2	SchCh 15
	-	ASTM A204Gr.A	1.5415	15Mo3	1501-240	-	2912	15D3	16Mo3KW	16Mo3	-	-
	-	4520	1.5426	16Mo5	1503-245-420	-	-	-	16Mo5	16Mo5	-	-
	-	ASTM A350LF5	1.5622	14Ni6	-	-	-	16N6	14Ni6	15Ni6	-	-
	-	ASTM A353	1.5662	X8Ni9	1501-509;510	-	-	-	X10Ni9	XBNi09	-	-

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P	Alloy steel · Legierter Stahl											
	-	2515	1.5680	12Ni19	-	-	-	Z18N5	-	-	-	-
	-	3135	1.5710	36NiCr6	640A35	111A	-	35NC6	-	-	SNC236	-
	-	3415	1.5732	14NiCr10	-	-	-	14NC11	16NiCr11	15NiCr11	SNC415(H)	-
	-	3415 3310	1.5752	14NiCr14	655M13 655A12	36A	-	12NC15	-	-	SNC815(H)	-
	-	9840	1.6511	36CrNiMo4	816M40	110	-	40NCD3	38CrNiMo4(KB)	35CrNiMo4	-	40 ChN2MA
	-	8620	1.6523	21NiCrMo2	850M20	362	2503	20NCD2	20NiCrMo2	20NiCrMo2	SNCCM220(H)	-
	-	8740	1.6546	40NiCrMo2	311-Type7	-	-	-	40NiCrMo2(KB)	40NiCrMo2	SNC240	38ChGNM
	40CrNiMoA	4340	1.6582	34CrNiMo6	817M40	24	2541	35NCD6	35CrNiMo6(KB)	-	-	38Ch2N2MA
	-	-	1.6587	17CrNiMo6	820A16	-	-	18NCD6	-	14CrNiMo13	-	-
	15Cr	5015	1.7015	15Cr3	523M15	-	-	12C3	-	-	SCr415(H)	15Ch
	35Cr	5132	1.7033	34Cr4	530A32	18B	-	32C4	34Cr4(KB)	35Cr4	SCr430(H)	35Ch
	40Cr	5140	1.7035	41Cr4	530M40	18	-	42C4	41Cr4	42Cr4	SCr440(H)	40Ch
	40Cr	5140	1.7045	42Cr4	-	-	2245	-	-	42Cr4	SCr440	40Ch
	18CrMn	5115	1.7131	16MnCr15	(527M20)	-	2511	16MC5	16MnCr15	16MnCr15	-	18ChG
	20CrMn	5155	1.7176	55Cr3	527A60	48	-	55C3	-	-	SUP9(A)	50ChGA
	30CrMn	4130	1.7218	25CrMo4	1717CDS110	-	2225	25CD4	25CrMo4(KB)	55Cr3	SCM420; SCM430	30ChM
	35CrMo	4137;4135	1.7220	34CrMo4	708A37	19B	2234	35CD4	35CrMo4	34CrMo4	SCM432; SCRMM3	AS38ChGM
	40CrMoA	4140;4142	1.7223	41CrMo4	708M40	19A	2244	42CD4TS	41CrMo4	41CrMo4	SCM440	40 ChFA
	42CrMo 42CrMnMo	4140	1.7225	42CrMo4	708M40	19A	2244	42CD4	42CrMo4	42CrMo4	SCM440(H)	-
	-	-	1.7262	15CrMo5	-	-	2216	12CD4	-	12CrMo4	SCM415(H)	-
	-	ASTM A182 F11;F12	1.7335	13CrMo44	1501-620Gr.27	-	-	15CD3.5; 15CD4.5	14CrMo44	14CrMo45	-	12ChM , 15ChM
	-	-	1.7361	32CrMo12	722M24	40B	2240	30CD12	32CrMo12	F.124.A	-	-
	-	ASTM A182 F.22	1.7380	10CrMo910	1501- 622Gr.31;45	-	2218	12CD9;10	12CrMo9,10	TU.H	-	-
	-	-	1.7715	14MoV63	1503-660-440	-	-	-	-	13MoCrV6	-	-
	50CrVA	6150	1.8159	50CrV4	735A50	47	2230	50CV4	50CrV4	51CrV4	SUP10	50ChGFA
	-	-	1.8509	41CrAlMo7	905M39	41B	2940	40CAD6,12	41CrAlMo7	41CrAlMo7	-	38ChMJuA
	-	-	1.8523	39CrMoV139	897M39	40C	-	-	36CrMoV12	-	-	-

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	GB	AISI/SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS	GOST
P	Tool steel · Werkzeugstahl											
	T10	W.110	1.1545	C105W1	-	-	1880	Y1105	C98KU C100KU	F.515 F.516	-	U10A
	T12A	W.112	1.1663	C125W	-	-	-	Y2120	C120KU	(C120)	SK2	U13
	CrV;9SiCr	L3	1.2067	100Cr6	BL3	-	-	Y100C6	-	100Cr6	-	-
	Cr12	D3	1.2080	X210Cr12	BD3	-	-	Z200Cr12	X210Cr13KU X250Cr12KU	X210Cr12	SKD1	Ch12
	4Cr5MoVSi	H13	1.2344	X40CrMoV5 1	BH13	-	2242	Z40CDV5	X35CrMoV05KU X40CrMoV51KU	X40CrMoV5	SKD61	4Ch5MF1S
	Cr6WV	A2	1.2363	X100CrMoV5 1	BA2	-	2260	Z100CDV5	X100CrMoV51KU	X100CrMoV5	SKD12	-
	CrWMo	-	1.2419	105WCr6	-	-	2140	105WC13	10WCr6 107WCr5KU	105WCr5	SKS31 SKS2 SKS3	ChWG
	Cr12W	-	1.2436	X210CrW12	-	-	2312	-	X215CrW12 1KU	X210CrW12	SKD2	-
	5CrNiMo	S1	1.2542	45WCrV7	BS1	-	2710	-	45WCrV8KU	45WCrSi8	-	-
	3Cr2W8V	H21	1.2581	X30WCrV9 3 X30WCrV93KU	BH21	-	-	Z30WCV9	X28W09KU X30WCrV9 3KU	X30WCrV9	SKD5	3Ch2W8F
	Cr12MoV	-	1.2601	X165CrMoV 12	-	-	2310	-	X165CrMoW12KU	X160CrMoV12	SKD11	-
	5CrNiMo	L6	1.2713	55NiCrMoV6	-	-	-	55NCDV7	-	F.250.S	SKT4	5ChNM
	V	W210	1.2833	100V1	BW2	-	-	Y1105V	-	-	SKS43	-
	W6Mo5Cr4V2Co5	-	1.3243	S6-5-2-5	-	-	2723	Z85WDCV	HS6-5-2-5	HS6-5-2-5	SKH55	R6M5K5
	W18Cr4VCo5	T4	1.3255	S18-1-2-5	BT4	-	-	Z80WKCV 10-05-04-01	X78WCo1805KU	HS18-1-1-5	SKH3	-
	W6Mo5Cr4V2	M2	1.3343	S6-5-2	BM2	-	2722	Z85WDCV 06-05-04-02	X82WMo0605KU	HS6-5-2	SKH9	R6M5
	-	M7	1.3348	S2-9-2	-	-Z-	2782	Z100WCWV 09-02-04-02	HS2-9-2	HS2-9-2	-	-
	W18Cr4V	T1	1.3355	S18-0-1	BT1	-	-	Z80WCV 18-04-01	X75W18KU	HS18-0-1	SKH2	-
	W6Mo5Cr4V3	M3	-	S6-5-3	-	-	-	-	-	-	SKH52	-
-	M42	-	-	BM42	-	-	-	-	-	SKH59	-	

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ISO	Country and Standard · Standardbezeichnung nach Länder						Main application Hauptanwendung
	China	USA	Germany	Japan	Daido Steel Co., Ltd (Japan)	Russia	
	GB	AISI/SAE	DIN	JIS	DAIDO	GOST	
P	Plastic die steel · Gesenkstahl						
	-	P20 mod.		-	PX5N		For mass production of large mirror dies. Automobile tail light, front fender of car, video camera, household electrical appliances etc Große hochglänzende Präzisionsgesenke für die Serienproduktion. Automobilteile, Videokameras, elektr. Haushaltsgeräte ect.
	-	-		-	NAK55		High precision mirror die. Video camera, music disc, Cosmetic Containers, transparent covers, transparent films etc Hochglänzende Präzisionsgesenke für Videokameras, Musik CDs, Kosmetik Behälter, Transparente Abdeckungen.
	-	-		-	NAK80		High precision mirror die. Video camera, music disc, Cosmetic Containers, transparent covers, transparent films etc Hochglänzende Präzisionsgesenke für Videokameras, Musik CDs, Kosmetik Behälter, Transparente Abdeckungen und Beläge.
	3Cr13	420 mod.		SUS420J2 mod.	S-STAR		For ultra-mirror corrosion resistant precise dies. Accessories of camera, CD, lens, watch case. Für ultra-fein spiegelnde korrosionsbeständige Gesenke für Zubehör von Kameras. CD, Linsen, Armbanduhren.
	Cold-working die steel · Kaltarbeitsstahl						
	-	02	-	SKS93	YK30		Stamping die, gauge calipers, paper cutter, auxiliary tools Für Gesenkstempel, Meßkaliber, Papierschneidmesser, Werkzeuge
	9CrWMn	01 mod.	-	SKS3 mod.	GOA		Blanking die, gauge calipers, drawing die, taps, Perforated punch. Für Schnittmatrizen, Meßkaliber, Gewindebohrer, Perforationswerkzeuge, Kaltziehsteine
	Cr12MoV	D2	X165CrMoV12	SKD11	DC11		Blanking die, cold forming die, cold drawing die, forming roller, punch Für Schnittmatrizen, Kaltformpressgesenke, Kaltziehsteine, Formwalzen.
	-	D2 mod.	-	SKD11 mod.	DC53		Blanking die, cold forming die, cold drawing die, forming roll, punch Für Schnittmatrizen, Kaltformpressgesenke, Kaltziehsteine, Formwalzen.
Hot-working die steel · Warmarbeitsstahl							
4Cr5MoSiV1	H13	X40CrMoV51	SKD61	DHA1		Aluminum-compression die, connecting parts of compression die, hot stamping die, hot extrusion die, thermal shear cutting blade Aluminium Druckgesenke, Verbindungsstücke für Druckgesenke, Heißpressgesenke, Heiß-Extruder-Gesenke, warmfeste Schnittmesser ect.	
-	-	-	-	DH21		Long life Aluminum compression die Alu-Druckgesenke für lange Lebensdauer	
-	-	-	-	DH31-S		Compression die, Druckgesenke	
-	-	-	-	DH2F		Compression die, plastic die Druckgesenke, Plastik-Gesenke	

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	GB	AISI/ SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS	GOST
M	Stainless steel · Rostfreier Stahl											
	0Cr13; 1Cr12	403	1.4000	X6Cr13	403S17	-	2301	Z6C13	X6Cr13	F.3110	SUS403	08Ch13
	-	-	1.4001	X7Cr14	-	-	-	-	-	F.8401	-	-
	1Cr13	410	1.4006	X10Cr13	410S21	56A	2302	Z10C14	X12Cr13	F.3401	SUS410	12Ch13
	1Cr17	430	1.4016	X6Cr17	430S15	60	220	Z8C17	X8Cr17	F.3113	SUS430	12Ch17
	2Cr13	410	1.4021	X20Cr13	S62	56B; 56C	-	Z20C13	X20C13	F.3401	SUS410	20Ch13
	-	-	1.4027	G-X20Cr14	420C29	56B	-	Z20C13M	-	-	SCS2	20Ch13L
	4Cr13	-	1.4034	X46Cr13	420S45	56D	2304	Z40CM Z38C13M	X40Cr14	F.3405	SUS420J2	40Ch13
	1Cr17Ni2	431	1.4057	X20CrNi172	431S29	57	2321	Z15CNi6.02	X16CrNi16	F.3427	SUS431	20Ch17N2
	Y1Cr17	430F	1.4104	X12CrMoS17	-	-	2383	Z10CF17	X10CrS17	F.3117	SUS430F	-
	1Cr17Mo	434	1.4113	X6CrMo171	434S17	-	2325	Z8CD17.01	X8CrMo17	-	SUS434	-
	-	-	1.4313	X5CrNi134	425C11	-	-	Z4CND13.4M	-	-	SCS5	-
	-	-	1.4408	G-X6CrNiMo1810	316C16	-	-	-	-	F.8414	SCS14	07Ch18N10G2S2M2L
	4Cr9Si2	HW3	1.4718	X45CrSi93	401S45	52	-	Z45CS9	X45CrSi8	F.322	SUH1	40Ch9S2
	0Cr13Al	405	1.4724	X10CrAl13	403S17	-	-	Z10C13	X10CrAl12	F.311	SUS405	10Ch13SJ
	Cr17	430	1.4742	X10CrAl18	430S15	60	-	Z10CAS18	X8Cr17	F.3113	SUS430	15Ch18SJ
	8Cr20Si2Ni	HNV6	1.4757	X80CrNiSi20	443S65	59	-	Z80CSN20.02	X80CrSiNi20	F.320V	SUH4	-
	2Cr25N	446	1.4762	X10CrAl24	-	-	2322	Z10CAS24	X16Cr26	-	SUH446	-
	Austenitic stainless steel · Austenitischer Rostfreier Stahl											
	0Cr18Ni9	304	1.4301	X5CrNi1810	304S15	58E	2332	Z6CN18.09	X5CrNi1810	F.3551; F.3541; F.3504	SUS304	08Ch18N10
	1Cr18Ni9MoZr	303	1.4305	X10CrNiS189	303S21	58M	2346	Z10CNF18.09	X10CrNiS18.09	F.3508	SUS303	-
	0Cr19Ni10	304L	1.4306	X2CrNi1911	304S12	-	2352	Z2CN18.10	X2CrNi18.11	F.3503	SCS19	03Ch18N11
	-	-	1.4308	G-X6CrNi189	304C15	-	-	Z6CN18.10M	-	-	SCS13	07Ch18N9L
	Cr17Ni7	301	1.4310	X12CrNi177	-	-	2331	Z12CN17.07	X12CrNi1707	F.3517	SUS301	-
	-	304LN	1.4311	X2CrNiN1810	304S62	-	2371	Z2CN18.10	-	-	SUS304LN	-
	0Cr19Ni9	304	1.4350	X5CrNi189	304S31	58E	-	Z6CN18.09	X5CrNi1810	-	SUS304	-
	0Cr17Ni11Mo2	316	1.4401	X5CrNiMo1712	316S16	Z6CND17.11	2347	1.4401	X5CrNiMo1712	F.3543	SUS316	-
	00Cr17Ni13Mo2	316LN	1.4429	X2CrNiMo17133	-	-	2375	Z2CND17.13	-	-	SUS316LN	-
	0Cr27Ni12Mo3	316L	1.4435	X2CrNiMo18143	316S12	-	2353	Z2CDN17.13	X2CrNiMo1713	-	SCS16,	03Ch17N14M2
	00Cr19Ni13Mo3	317L	1.4438	X2CrNiMo17133	317S12	-	2367	Z2CND19.15	X2CrNiMo18.16	-	SUS317L	-
-	329L	1.4460	X8CrNiMo275	-	-	2324	-	-	-	SUS329L; SCH11; SCS11	-	
1Cr18Ni9Ti	321	1.4541	X6CrNiTi1810	2337	321S12	58B	Z6CNT18.10	X6CrNiTi1811	F.3553	SUS321	12Ch18N10T	
1Cr18Ni11Nb	347	1.4550	X6CrNiNb1810	347S17	58F	2338	Z6CNnb18.1	X6CrNiTi1811	F.3552	SUS347	08Ch18N12B	
1Cr18Ni12Mo2Ti	316Ti	1.4571	X6CrNiMoTi17122	320S17	58J	2350	Z6NDT17.12	X6CrNiMoTi17	F.3535	-	10Ch17N13M2T	

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M	Austenitic stainless steel · Austenitischer Rostfreier Stahl											
	-	-	1.4581	G-X5CrNiMoNb1810	318C7	-	-	Z4CNDNb1812M	XG8CrNiMo18	-	SCS22	-
	Cr17Ni12Mo3Nb	318	1.4583	X10CrNiMoNb1812	-	-	-	Z6CNDNb1713B	X6CrNiMoTiNb17	-	-	-
	1Cr23Ni13	309	1.4828	X15CrNiSi2012	309S24	-	-	Z15CNS20.1	-	-	SUH309	20Ch20N14S2
	0Cr25Ni20	310S	1.4845	X12CrNi2521	310S24	-	2361	Z12CN2520	X6CrNi2520	F.331	SUH310	20Ch23N18
	Cr15Ni36W3Ti	330	1.4864	X12NiCrSi3616	-	-	-	Z12CNS35.1	-	-	SUH330	-
	-	-	1.4865	G-X40NiCrSi3818	330C11	-	-	-	XG50NiCr3919	-	SCH15	-
	5Cr2Mn9Ni4N	EV8	1.4871	X53CrMnNiN219	349S54; 321S12	-	58B	-	Z52CMN21.0	X53CrMnNiN219	-	SUH35
1Cr18Ni9Ti	321	1.4878	X12CrNiTi189	321S320	58C	-	Z6CNT18.12	X6CrNiTi1811	F.3523	SU321	09Ch18N10T	

ISO	Country and Standard · Standardbezeichnung nach Länder									
	China	USA	Germany	Great Britain	Sweden	France	Italy	Spain	Japan	Russia
K	Nodular cast iron · GGG									
	QT400-18	60-40-18	GGG40	400/17	0717-02	FGS370-17	GS370-17	FGE38-17	FCD400	VC 42-12
	QT450-10	65-45-12	--	420/12	--	FGS400-12	GS400-12	FGE42-12	FCD450	-
	QT500-7	70-50-05	GGG50	500/7	0727-02	FGS500-7	GS500-7	FGE50-7	FCD500	VC 50-2
	QT600-3	80-60-03	GGG60	600/7	0732-03	FGS600-2	GS600-2	FGE60-2	FCD600	VC 60-2
	QT700-2	100-70-03	GGG70	700/2	0737-01	FGS700-2	GS700-2	FGE70-2	FCD700	VC 70-2
	QT800-2	120-90-02	GGG80	800/2	0864-03	FGS800-2	GS800-2	FGE80-2	FCD800	VC 80-2
	QT900-2	--	--	900/2	--	--	--	--	--	-
	Grey cast iron · Grauguss									
	--	NO.60	GG40	--	0140	FGL400	--	--	--	Sc 40
	HT350	NO.50	GG35	350	0135	FGL350	G35	FG35	FC350	Sc 35
	HT300	NO.45	GG30	300	0130	FGL300	G30	FG30	FC300	Sc 30
	HT250	NO.35	GG25	250	0125	FGL250	G25	FG25	FC250	Sc 25
	HT200	NO.30	GG20	200	0120	FGL200	G20	FG20	FC200	Sc 20
HT150	NO.20	GG15	150	0115	FGL150	G15	FG15	FC150	Sc 15	
HT100	--	--	100	0110	--	G10	--	FC100	-	

ISO	Country and Standard · Standardbezeichnung nach Länder											
	China	USA	Germany		Great Britain		Sweden	France	Italy	Spain	Japan	Russia
	GB	AISI/SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS	GOST
H	Hardened materials · Gehärtete Werkstoffe											
	-	440A	1.4108	X100CrMo03	-	-	2258 08	-	-	-	C4BS	-
	-	610	1.4111	X100CrMoV15	-	-	2534 05	-	-	-	AC4A	-
-	0-2	-	X65CrMo14	-	-	2541 06	-	-	-	AC4A	-	

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ISO	Country and Standard · Standardbezeichnung nach Länder												
	China	USA	Germany		Great Britain		Sweden	France	Italy	Spain	Japan		Russia
	GB	AISI/SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS		GOST
N	Aluminium-based alloys · Aluminium Legierungen												
	-	SC64D	3.2373	G-AISI9MGWA			4251	A-S7G			C4BS	-	
	-	DG-AISI12		G-ALMG5	LM5		4252	A-SU12			AC4A		
	-	356.1			LM25		4244				A5052		
	-	A413.0		GD-AISI12			4247				A6061		
	-	A380.1		GD-AISI8Cu3	LM24		4250				A7075		
	-	A413.1		G-AISI12(Cu)	LM20		4260				ADC12		
	-	A413.2		G-AISI12	LM6		4261						
	-	A360.2		G-AISI10Mg(Cu)	LM9		4253						

ISO	Country and Standard · Standardbezeichnung nach Länder												
	China	USA	Germany		Great Britain		Sweden	France	Italy	Spain	Japan		Russia
	GB	AISI/SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS		GOST
S	Nickel based alloys · Nickel Legierungen												
	-	5391	LW2 4670	S-NiCr13A16MoNb	mar-46	-	-	NC12AD	-	-			
	-	AMS 5397	LW2 4674	NiCo15Cr10MoAlTi	-	-	-	-	-	-			
	-	5660	LW2.4662	NiFe35Cr14MoTi	-	-	-	ZSNCDT42	-	-			
	-	5383	LW2.4668	NiCr19Fe19NbMo	HR8	-	-	NC19eNB	-	-			
	-	-	2.4631	NiCr20TiAk	Hr401.601	-	-	NC20TA	-	-		-	
	-	AMS 5399	2.4973	NiCr19Co11MoTi	-	-	-	NC19KDT	-	-		-	
	-	AMS 5544	LW2.4668	NiCr19Fe19NbMo	-	-	-	NC20K14	-	-			
	-	5390A	2.4603	-	-	-	-	NC22FeD	-	-		-	
	-	5666	2.4856	NiCr22Mo9Nb	-	-	-	NC22FeDNB	-	-		-	
	-	-	2.4630	NiCr20Ti	HR5.2034	-	-	NC20T	-	-		-	
	-	4676	2.4375	NiCu30AL3Ti	3072-76	-	-	-	-	-		-	
	Cobalt based alloys · Kobalt Legierungen												
	-	5537C AMS		CoCr20W15Ni	-	-	-	KC20WN	-	-			
	-	5772	LW2.4964	CoCr20W14Ni				KC22WN					
	Titanium alloys · Titanium Legierungen												
	-	UNS R54520	3.7115.1	TiAl5Sn2.5	TA14/17	-	-	T-A5E	-	-			
	-							UNS R56400					
	-	-	3.7165.1	TiAl6V4	TA10-13/ TA28		-	UNS R56401	T-A6V	-	-		
	-			TiAl5V5Mo5Cr3									
	-	-	3.7185	TiAl4Mo4Sn4Si0.5	-	-	-	-	-	-			

Fitting dimension tolerance · Passtoleranzen

Basic dimensions (mm)		Standard tolerance class of holes · Standard-Toleranzklassen																	
		IT1	IT2	IT3	IT4	IT5	IT6	IT7	IT8	IT9	IT10	IT11	IT12	IT13	IT14	IT15	IT16	IT17	IT18
>	≤	µm											mm						
---	3	0.8	1.2	2	3	4	6	10	14	25	40	60	0.1	0.14	0.25	0.4	0.6	1	1.4
3	6	1	1.5	2.5	4	5	8	12	18	30	48	75	0.12	0.18	0.3	0.48	0.75	1.2	1.8
6	10	1	1.5	2.5	4	6	9	15	22	36	58	90	0.15	0.22	0.36	0.58	0.9	1.5	2.2
10	18	1.2	2	3	5	8	11	18	27	43	70	110	0.18	0.27	0.43	0.7	1.1	1.8	2.7
18	30	1.5	2.5	4	6	9	13	21	33	52	84	130	0.21	0.33	0.52	0.84	1.3	2.1	3.3
30	50	1.5	2.5	4	7	11	16	25	39	62	100	160	0.25	0.39	0.62	1	1.6	2.5	3.9
50	80	2	3	5	8	13	19	30	46	74	120	190	0.3	0.46	0.74	1.2	1.9	3	4.6
80	120	2.5	4	6	10	15	22	35	54	87	140	220	0.35	0.54	0.87	1.4	2.2	3.5	5.4
120	180	3.5	5	8	12	18	25	40	63	100	160	250	0.4	0.63	1	1.6	2.5	4	6.3
180	250	4.5	7	10	14	20	29	46	72	115	185	290	0.46	0.72	1.15	1.85	2.9	4.6	7.2
250	315	6	8	12	16	23	32	52	81	130	210	320	0.52	0.81	1.3	2.1	3.2	5.2	8.1
315	400	7	9	13	18	25	36	57	89	140	230	360	0.57	0.89	1.4	2.3	3.6	5.7	8.9
400	500	8	10	15	20	27	40	63	97	155	250	400	0.63	0.97	1.55	2.5	4	6.3	9.7
500	630	9	11	16	22	32	44	70	110	175	280	440	0.7	1.1	1.75	2.8	4.4	7	11
630	800	10	13	18	25	36	50	80	125	200	320	500	0.8	1.25	2	3.2	5	8	12.5
800	1000	11	15	21	28	40	56	90	140	230	360	560	0.9	1.4	2.3	3.6	5.6	9	14
1000	1250	13	18	24	33	47	66	105	165	260	420	660	1.05	1.65	2.6	4.2	6.6	10.5	16.5
1250	1600	15	21	29	39	55	78	125	195	310	500	780	1.25	1.95	3.1	5	7.8	12.5	19.5
1600	2000	18	25	35	46	65	92	150	230	370	600	920	1.5	2.3	3.7	6	9.2	15	23
2000	2500	22	30	41	55	78	110	175	280	440	700	1100	1.75	2.8	4.4	7	11	17.5	28
2500	3150	26	36	50	68	96	135	210	330	540	860	1350	2.1	3.3	5.4	8.6	13.5	21	33

Note:

From IT1 to IT5, the standard tolerance with basic dimension more than 500 mm is as trial.
When the basic dimension 1 mm, the tolerances from IT4 to IT8 are invalid.

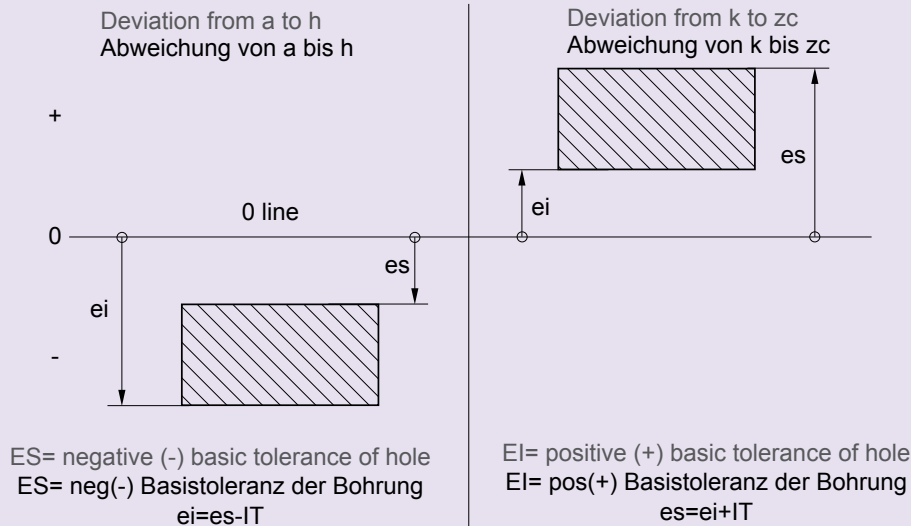
Bemerkung:

Für die Standardt Toleranzen IT1 bis IT5 bei Durchmesser über 500 mm ist eine Anpassung notwendig. Bei Basis abmessungen unter 1 mm ist das Toleranzfeld IT4 bis IT8 ungültig.

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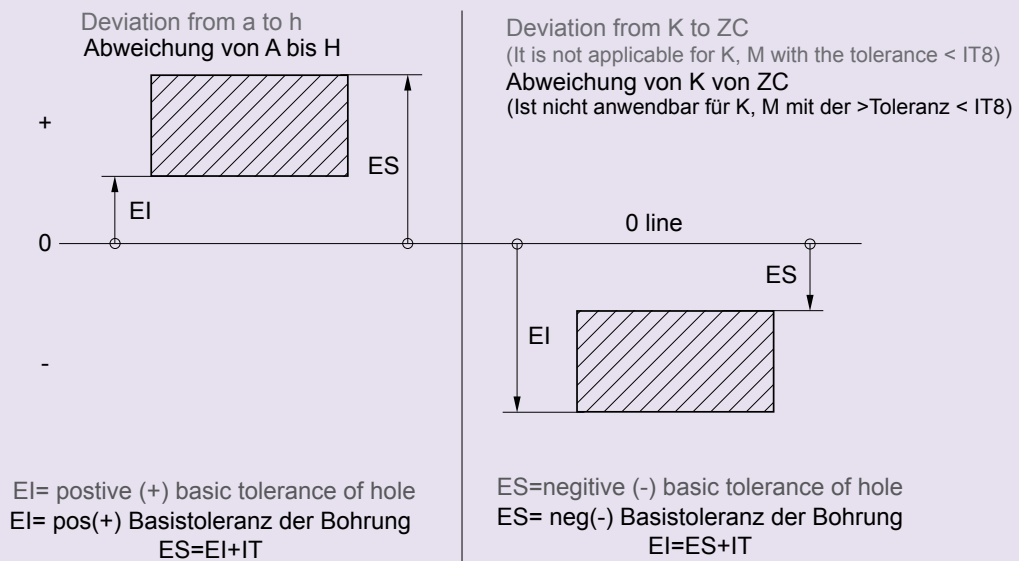
The shaft lower deviation(ei) and upper deviation (es) can be obtained by basic tolerance and standard tolerance (IT) of shaft.

Toleranz Einheitswelle: Die geringste Abweichung (ei) und die größte Abweichung (es) sind als Basis bzw. Standard-Toleranzen (IT) in der Tabelle angegeben.



The hole lower deviation(EI) and upper deviation (ES) can be obtained by basic tolerance and standard tolerance (IT) of hole.

Toleranz Einheitsbohrung: Die geringste Abweichung (EI) und die größte Abweichung (ES) sind als Basis bzw. Standard-Toleranzen (IT)- Bohrung in der Tabelle angegeben.



For example: for a hole with diameter 3 mm and tolerance H7, we can find that the lower deviation $EI=0$ in relation to H7 from the basic tolerance table, and the standard tolerance $IT=10\mu\text{m}$ corresponding to H7, thus the upper deviation $ES=EI+IT=10\mu\text{m}$. Therefore the hole fitting

dimension is $\varnothing 3_0^{+0.01}$ mm.

Beispiel: Bei einem Durchmesser von 3mm und einer Toleranz H7 ist bei der Basis Toleranz H7 $EI=0$ bei der Standard-Toleranz H7 ist es $IT=10\mu\text{m}$. Die größte Abweichung ist demzufolge: $ES=EI+IT=10\mu\text{m}$.

Die Bohrungstoleranz ist bei einem $\varnothing 3_0^{+0.01}$ mm.

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- Basic deviations value of shaft
- Basistoleranzwerte Einheitswelle

Diameter Durchmesser Ø (mm)		Basic deviation value · Basistoleranzwerte											
		Upper deviation es · Höchstabweichung											
		Standard tolerance class · Standard-Toleranzklasse											
>	≤	a	b	c	cd	d	e	ef	f	fg	g	h	js
---	3	-270	-140	-60	-34	-20	-14	-10	-6	-4	-2	0	Die Formel für die Abweichung $\pm \frac{IT_n}{2}$, ITn ist der IT Wert entsprechend zu "n" zugeordnet.
3	6	-270	-140	-70	-46	-30	-20	-14	-10	-6	-4	0	
6	10	-280	-150	-80	-56	-40	-25	-18	-13	-8	-5	0	
10	14	-290	-150	-95		-50	-32		-16		-6	0	
14	18												
18	24	-300	-160	-110		-65	-40		-20		-7	0	
24	30												
30	40	-310	-170	-120		-80	-50		-25		-9	0	
40	50	-320	-180	-130									
50	65	-340	-190	-140		-100	-60		-30		-10	0	
65	80	-360	-200	-150									
80	100	-380	-220	-170		-120	-72		-36		-12	0	
100	120	-410	-240	-180									
120	140	-460	-260	-200		-145	-85		-43		-14	0	
140	160	-520	-280	-210									
160	180	-580	-310	-230									
180	200	-660	-340	-240									
200	225	-740	-380	-260		-170	-100		-50		-15	0	
225	250	-820	-420	-280									
250	280	-920	-480	-300		-190	-110		-56		-17	0	
280	315	-1050	-540	-330									
315	355	-1200	-600	-360		-210	-125		-62		-18	0	
355	400	-1350	-680	-400									
400	450	-1500	-760	-440		-230	-135		-68		-20	0	
450	500	-1650	-840	-480									
500	560					-260	-145		-76		-22	0	
560	630												
630	710					-290	-160		-80		-24	0	
710	800												
800	900					-320	-170		-86		-26	0	
900	1000												
1000	1120					-350	-195		-98		-28	0	
1120	1250												
1250	1400					-390	-220		-110		-30	0	
1400	1600												
1600	1800					-430	-240		-120		-32	0	
1800	2000												
2000	2240					-480	-260		-130		-34	0	
2240	2500												
2500	2800					-520	-290		-145		-38	0	
2800	3150												

Note: 1. If basic dimension ≤ 1mm, the basic deviation a and b are not adopted.

Bemerkungen: 1. Bei Abmessungen ≤ 1mm, sind die Basisabweichungen a und b nicht berücksichtigt.

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µm

Basic deviation value · Basistoleranzwerte Einheitswelle																			
Lower deviation ei · geringste Abweichung																			
IT5 IT6	IT7	IT8	IT4 IT7	≤IT3 >IT7	Standard tolerance class · Standard-Toleranzklasse														
j			k		m	n	p	r	s	t	u	v	x	y	z	zn	zb	zc	
-2	-4	-6	0	0	+2	+4	+6	+10	+14		+18		+20		+26	+32	+40	+60	
-2	-4		+1	0	+4	+8	+12	+15	+19		+23		+28		+35	+42	+50	+80	
-2	-5		+1	0	+6	+10	+15	+19	+23		+28		+34		+42	+52	+67	+97	
-3	-6		+1	0	+7	+12	+18	+23	+28		+33		+40		+50	+64	+90	+130	
												+39	+45		+60	+77	+108	+150	
-4	-8		+2	0	+8	+15	+22	+28	+35		+41	+47	+54	+63	+73	+98	+136	+188	
											+41	+48	+55	+64	+75	+88	+118	+160	+218
-5	-10		+2	0	+9	+17	+26	+34	+43		+48	+60	+68	+80	+94	+112	+148	+200	+274
											+54	+70	+81	+97	+114	+136	+180	+242	+325
-7	-12		+2	0	+11	+20	+32	+41	+53	+66	+87	+102	+122	+144	+172	+226	+300	+405	
								+43	+59	+75	+102	+120	+146	+174	+210	+274	+360	+480	
-9	-15		+3	0	+13	+23	+37	+51	+71	+91	+124	+146	+178	+214	+258	+335	+445	+585	
								+54	+79	+104	+144	+172	+210	+254	+310	+400	+525	+690	
-11	-18		+3	0	+15	+27	+43	+63	+92	+122	+170	+202	+248	+300	+365	+470	+620	+800	
								+65	+100	+134	+190	+228	+280	+340	+415	+535	+700	+900	
								+68	+108	+146	+210	+252	+310	+380	+465	+600	+780	+1000	
-13	-21		+4	0	+17	+31	+50	+77	+122	+166	+236	+284	+350	+425	+520	+670	+880	+1150	
								+80	+130	+180	+258	+310	+385	+470	+575	+740	+960	+1250	
								+84	+140	+196	+284	+340	+425	+520	+640	+820	+1050	+1350	
-16	-26		+4	0	+20	+34	+56	+94	+158	+218	+315	+385	+475	+580	+710	+920	+1200	+1550	
								+98	+170	+240	+350	+425	+525	+650	+790	+1000	+1300	+1700	
-18	-28		+4	0	+21	+37	+62	+108	+190	+268	+390	+475	+590	+730	+900	+1150	+1500	+1900	
								+114	+208	+294	+435	+530	+660	+820	+1000	+1300	+1650	+2100	
-20	-32		+5	0	+23	+40	+68	+126	+232	+330	+490	+595	+740	+920	+1100	+1450	+1850	+2400	
								+132	+252	+360	+540	+660	+820	+1000	+1250	+1600	+2100	+2600	
			0	0	+26	+44	+78	+150	+280	+400	+600								
								+155	+310	+450	+660								
			0	0	+30	+50	+88	+175	+340	+500	+740								
								+185	+380	+560	+840								
			0	0	+34	+56	+100	+210	+430	+620	+940								
								+220	+470	+680	+1050								
			0	0	+40	+66	+120	+250	+520	+780	+1150								
								+260	+580	+840	+1300								
			0	0	+48	+78	+140	+300	+640	+960	+1450								
								+330	+720	+1050	+1600								
			0	0	+58	+92	+170	+370	+820	+1200	+1850								
								+400	+920	+1350	+2000								
			0	0	+68	+110	+195	+440	+1000	+1500	+2300								
								+460	+1100	+1650	+2500								
			0	0	+76	+135	+240	+550	+1250	+1900	+2900								
								+580	+1400	+2100	+3200								



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- Basic deviations value of hole
- Basistoleranzwerte Einheitsbohrung

Diameter Durchmesser Ø (mm)		Basic deviation value · Basis-Toleranzwerte Einheitswelle																						
		Lower deviation EI · geringste Abweichung EI											Upper deviation ES · Höchstabweichung ES											
		Standard tolerance class · Standard-Toleranzklasse											IT6	IT7	IT8	≤IT8	>IT8	≤IT8	>IT8	≤IT8	>IT8	≤IT7		
>	≤	A	B	C	CD	D	E	EF	F	FG	G	H	JS	J		K		M		N		P to ZC		
---	3	+270	+140	+60	+34	+20	+14	+10	+6	+4	+2	0	In the formula Deviation = ± $\frac{IT_n}{2}$, ITn is the IT value corresponding to 'n'. Die Formel für die Abweichung = ± $\frac{IT_n}{2}$, ITn ist der IT Wert entsprechend zu 'n' zugeordnet.	+2	+4	+6	0	0	-2	-2	-4	-4	Wenn IT ≥ IT7, wird der Δ wert zuaddiert.	
3	6	+270	+140	+70	+46	+30	+20	+14	+10	+6	+4	0		+5	+6	+10	-1+Δ		-4+Δ	-4	-8+Δ	0		
6	10	+280	+150	+80	+56	+40	+25	+18	+13	+8	+5	0		+5	+8	+12	-1+Δ		-6+Δ	-6	-10+Δ	0		
10	14	+290	+150	+95		+50	+32		+16		+6	0			+6	+10	+15	-1+Δ		-7+Δ	-7	-12+Δ		0
14	18																							
18	24	+300	+160	+110		+65	+40		+20		+7	0			+8	+12	+20	-2+Δ		-8+Δ	-8	-15+Δ		0
24	30																							
30	40	+310	+170	+120		+80	+50		+25		+9	0			+10	+14	+24	-2+Δ		-9+Δ	-9	-17+Δ		0
40	50	+320	+180	+130																				
50	65	+340	+190	+140		+100	+60		+30		+10	0			+13	+18	+28	-2+Δ		-11+Δ	-11	-20+Δ		0
65	80	+360	+200	+150																				
80	100	+380	+220	+170		+120	+72		+36		+12	0			+16	+22	+34	-3+Δ		-13+Δ	-13	-23+Δ		0
100	120	+410	+240	+180																				
120	140	+460	+260	+200		+145	+85		+43		+14	0			+18	+26	+41	-3+Δ		-15+Δ	-15	-27+Δ		0
140	160	+520	+280	+210																				
160	180	+580	+310	+230		+170	+100		+50		+15	0			+22	+30	+47	-4+Δ		-17+Δ	-17	-31+Δ		0
180	200	+660	+340	+240																				
200	225	+740	+380	+260		+190	+110		+56		+17	0			+25	+36	+55	-4+Δ		-20+Δ	-20	-34+Δ		0
225	260	+820	+420	+280																				
260	280	+920	+480	+300		+210	+125		+62		+18	0			+29	+39	+60	-4+Δ		-21+Δ	-21	-37+Δ		0
315	355	+1200	+600	+360																				
355	400	+1350	+680	+400		+230	+135		+68		+20	0			+33	+43	+66	-5+Δ		-23+Δ	-23	-40+Δ		0
400	450	+1500	+760	+440																				
450	500	+1650	+840	+480		+260	+145		+76		+22	0						0		-26		-44		
500	560																							
560	630					+290	+160		+80		+24	0						0		-30		-50		
630	710																							
710	800					+320	+170		+86		+26	0						0		-34		-56		
800	900																							
900	1000					+350	+195		+98		+28	0						0		-40		-66		
1000	1120																							
1120	1250					+390	+220		+110		+30	0						0		-48		-78		
1250	1400																							
1400	1600					+430	+240		+120		+32	0					0		-58		-92			
1600	1800																							
1800	2000					+480	+260		+130		+34	0					0		-68		-110			
2000	2240																							
2240	2500					+520	+290		+145		+38	0					0		-76		-135			
2500	2800																							
2800	3150																							

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µm

Basic deviation value · Basis-Toleranzwerte Einheitswelle												Δ					
Upper deviation ES · Höchstabweichung ES																	
Standard tolerance class >IT7 · Standard-Toleranzklasse > IT7												Standard tolerance class Standard-Toleranzklasse					
P	R	S	T	U	V	X	Y	Z	ZA	ZB	ZC	IT3	IT4	IT5	IT6	IT7	IT8
-6	-10	-14		-18		-20		-26	-32	-40	-60	0	0	0	0	0	0
-12	-15	-19		-23		-28		-35	-42	-50	-80	1	1.5	1	3	4	6
-15	-19	-23		-28		-34		-42	-52	-67	-97	1	1.5	2	3	6	7
-18	-23	-28		-33		-40		-50	-64	-90	-130	1	2	3	3	7	9
					-39	-45		-60	-77	-108	-150						
-22	-28	-35		-41	-47	-54	-63	-73	-98	-136	-188	1.5	2	3	4	8	12
			-41	-48	-55	-64	-75	-88	-118	-160	-218						
-26	-34	-43	-48	-60	-68	-80	-94	-112	-148	-200	-274	1.5	3	4	5	9	14
			-54	-70	-81	-97	-114	-136	-180	-242	-325						
-32	-41	-53	-66	-87	-102	-122	-144	-172	-226	-300	-405	2	3	5	6	11	16
	-43	-59	-75	-102	-120	-146	-174	-210	-274	-360	-480						
-37	-51	-71	-91	-124	-146	-178	-214	-258	-335	-445	-585	2	4	5	7	13	19
	-54	-79	-104	-144	-172	-210	-254	-310	-400	-525	-690						
-43	-63	-92	-122	-170	-202	-248	-300	-365	-470	-620	-800	3	4	6	7	15	23
	-65	-100	-134	-190	-228	-280	-340	-415	-535	-700	-900						
	-68	-108	-146	-210	-252	-310	-380	-465	-600	-780	-1000						
-50	-77	-122	-166	-236	-284	-350	-425	-520	-670	-880	-1150	3	4	6	9	17	26
	-80	-130	-180	-258	-310	-385	-470	-575	-740	-960	-1250						
	-84	-140	-196	-284	-340	-425	-520	-640	-820	-1050	-1350						
-56	-94	-158	-218	-315	-385	-475	-580	-710	-920	-1200	-1550	4	4	7	9	20	29
	-98	-170	-240	-350	-425	-525	-650	-790	-1000	-1300	-1700						
-62	-108	-190	-268	-390	-475	-590	-730	-900	-1150	-1500	-1900	4	5	7	11	21	32
	-114	-208	-294	-435	-530	-660	-820	-1000	-1300	-1650	-2100						
-68	-126	-232	-330	-490	-595	-740	-920	-1100	-1450	-1850	-2400	5	5	7	13	23	34
	-132	-252	-360	-540	-660	-820	-1000	-1250	-1600	-2100	-2600						
-78	-150	-280	-400	-600													
	-155	-310	-450	-660													
-88	-175	-340	-500	-740													
	-185	-380	-560	-840													
100	-210 -220	-430 -470	-620 -680	-940 -1050													
-120	-250 -260	-520 -580	-780 -840	-1150 -1300													
-140	-300 -330	-640 -720	-960 -1050	-1450 -1600													
-170	-370	-820	-1200	-1850													
	-400	-920	-1350	-2000													
-195	-440 -460	-1000 -1100	-1500 -1650	-2300 -2500													
-240	-550 -580	-1250 -1400	-1900 -2100	-2900 -3200													

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Hardness reference table (conversion of hardness and strength for ferrous metal) Härte Vergleichstabelle (Konversationstabelle von Härte und Zugfestigkeit für Stahl)

Hardness · Härte				Tensile strength Zugfestigkeit N/mm ²	Hardness · Härte				Tensile strength Zugfestigkeit N/mm ²
Rockwell hardness · Härte		Vickers hardn. · Härte	Brinell hardn. · Härte		Rockwell hardness · Härte		Vickers hardn. · Härte	Brinell hardn. · Härte	
HRC	HRA	HV	HB		HRC	HRA	HV	HB	
70.0	86.6	1037	—	—	51.0	76.3	525	501	1780
69.5	86.3	1017	—	—	50.5	76.1	517	494	1750
69.0	86.1	997	—	—	50.0	75.8	509	488	1720
68.5	85.8	978	—	—	49.5	75.5	501	481	1690
68.0	85.5	959	—	—	49.0	75.3	493	474	1660
67.5	85.2	941	—	—	48.5	75.0	485	468	1630
67.0	85.0	923	—	—	48.0	74.7	478	461	1605
66.5	84.7	906	—	—	47.5	74.5	470	455	1575
66.0	84.4	889	—	—	47.0	74.2	463	449	1550
65.5	84.1	872	—	—	46.5	73.9	456	442	1525
65.0	83.9	856	—	—	46.0	73.7	449	436	1500
64.5	83.6	840	—	—	45.5	73.4	443	430	1475
64.0	83.3	825	—	—	45.0	73.2	436	424	1450
63.5	83.1	810	—	—	44.5	72.9	429	418	1430
63.0	82.8	795	—	—	44.0	72.6	423	413	1405
62.5	82.5	780	—	—	43.5	72.4	417	407	1385
62.0	82.2	766	—	—	43.0	72.1	411	401	1360
61.5	82.0	752	—	—	42.5	71.8	405	396	1340
61.0	81.7	739	—	—	42.0	71.6	399	391	1320
60.5	81.4	726	—	—	41.5	71.3	393	385	1300
60.0	81.2	713	—	2555	41.0	71.1	388	380	1280
59.5	80.9	700	—	2500	40.0	70.8	382	375	1260
59.0	80.6	688	—	2450	40.0	70.5	377	370	1245
58.5	80.3	676	—	2395	39.5	70.3	372	365	1225
58.0	80.1	664	—	2345	39.0	70.0	367	360	1210
57.5	79.8	653	—	2295	38.5	—	362	355	1190
57.0	79.5	642	—	2250	38.0	—	357	350	1175
56.5	79.3	631	—	2205	37.5	—	352	345	1160
56.0	79.0	620	—	2160	37.0	—	347	341	1140
55.5	78.7	609	—	2115	36.5	—	342	336	1125
55.0	78.5	599	—	2075	36.0	—	338	332	1110
54.5	78.2	589	—	2035	35.5	—	333	327	1095
54.0	77.9	579	—	1995	35.0	—	329	323	1080
53.5	77.7	570	—	1955	34.5	—	324	318	1065
53.0	77.4	561	—	1920	34.0	—	320	314	1050
52.5	77.1	551	—	1885	33.5	—	316	310	1035
52.0	76.9	543	—	1850	33.0	—	312	306	1020
51.5	76.6	534	—	1815	32.5	—	308	302	1010

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Hardness reference table (conversion of hardness and strength for ferrous metal) Härte Vergleichstabelle (Konversationstabelle von Härte und Zugfestigkeit für Stahl)

Hardness · Härte				Tensile strength Zugfestigkeit N/mm ²	Hardness · Härte				Tensile strength Zugfestigkeit N/mm ²
Rockwell hardness · Härte		Vickers hardn. · Härte	Brinell hardn. · Härte		Rockwell hardness · Härte		Vickers hardn. · Härte	Brinell hardn. · Härte	
HRC	HRA	HV	HB		HRC	HRA	HV	HB	
32.0	—	304	298	995	24.0	—	249	245	820
31.5	—	300	294	980	23.5	—	246	242	810
31.0	—	296	291	970	23.0	—	243	240	800
30.5	—	292	287	960	22.5	—	240	237	790
30.0	—	289	283	950	22.0	—	237	234	785
29.5	—	285	280	935	21.5	—	234	232	775
29.0	—	281	276	920	21.0	—	231	229	765
28.5	—	278	273	910	20.5	—	229	227	760
28.0	—	274	269	900	20.0	—	226	225	750
27.5	—	271	266	890	19.5	—	223	222	745
27.0	—	268	263	880	19.0	—	221	220	735
26.5	—	264	260	870	18.5	—	218	218	730
26.0	—	261	257	860	18.0	—	216	216	725
25.5	—	258	254	850	17.5	—	214	214	715
25.0	—	255	251	835	17.0	—	211	211	710
24.5	—	252	248	830					

Note: The conversion values for steel in the table are commonly applicable for the steels with carbon from low to high.
Bemerkung: Die in der Tabelle aufgeführten Werte sind für Kohlenstoffstahl anwendbar.

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Comparison table for turning inserts chip breaker - Übersichtstabelle der WSP-Spanbrecher

ISO		Comparison table for turning inserts chip breaker Übersichtstabelle der WSP-Spanbrecher																								
		Application Anwendung	ZCC-CT		Sandvik		Seco		Kennametal		ISCAR		Walter		Mitsubishi		Sumitomo		Tungaloy		Kyocera		Korloy		Ingersoll Tague Tec	
P	Steel · Stahl	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	
				WG		WF WL	WF WK	W-MF2	W-F1	FW-MW	FW-MW	WF	NF	PF	SW	FW	NLU-W	NLU-W	ASW	WP	VW LW				WS	
		DF EF	SF HF	PF UF	PF UF	FF1 MF1	FF1 F1	11 UF	11 UF	SF	NF3 NS6	PF4 PF5	FH FS	FJ FV	NSE NSU NLU NFA NFL	TF TS 17	DP GP VF	CG	VG VF VL				FG FC VF			FASA FG
		DM EM	HM	PM QM	PM UM	MF2	F2	MF	MF	NF TF SM 14 16 17 19	NS6	SH SA MV	SW SV MV	NSU NSC NSK	TS TM AS	HQ CQ CJ	CK DP GP VF XP	VQ VC VB				WTML				WT
		DM PM	HR	PM QM	PR UR	M3 MF3	F2	MN	MF	GN PP NR 17 19	NM4 NM6	PM5	MV MZ MA	MV MW	NGE NGU NUX	TM DM	GS CS HQ XQ HS PS GK G	VM				PC MC MT MG MF				PC MT PMR
				WR WM	WM	W-M3 W-R4 W-R7	W-F2	MW RW	MW	WG	NM	PM	MW		NGU-W		WQ									
		DR		PR QR	31	M5 MR5 MR7		RP UN RN		TNM GN 19	NM9	GH MAT MT			NMU NMX	TH TR TU	PT GT HT	G St-form	HR			RT				
		HDR 31HPR DR LR		HR QR		R8 RR9 -56 -57 -UX		RH RM RP		NM	NR6 NR8	HA HZ HH HV HX			NMP NHG NHP NHU NHW		HX		GH VH VT			HT HD HY HZ RX RH				CMX
		WG		WF WL	WF WK	W-MF2	W-F1	FW-MW	FW-MW	WF		PF	SW	FW	NLU-W											
		EF DF	EF HF	MF UF	MF UF	FF1 F2 MF1	F1	FF FP	11 UF LF	NF VL PF SM NF4	PF4 PF5	FS	FJ FV	NSU NLU	SS	GU										FG
		EF EM	EF EM HF HM	MF MM	MF MM UM	MF3	F2	FP	MF	PP TF 14 16 17 19	NM4	SH MS MV	SW SV MV	NSU NEX NUP	SS SM	MS	CK DP GP VF XP	VP2								
		EM DM	EM HM	MM	MM UM	R6 56	F2	MP	HP	PP TF 17 19	NM4 NR4	MES MH	MV MW	NGU	SAS	MS	HQ XQ GK G	HS VP3								MT PMR WT
				WR WM	WM	W-M3		MW RW	MW	WG		PM	MW		NGU -W											
		ER DR	HR	MR QR	MR	R7 R8		MP -P		HTW NR 19	NR4	GH HZ		NMU NMX NHG												CMX
		ER DR HDR LR		HR QR		-56		RP		NM				NMP NHG NHP NHU NHW												

M Stainless Steel · Rostfreier Stahl

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Comparison table for turning inserts chip breaker - Übersichtstabelle der WSP-Spanbrecher

Comparison table for turning inserts chip breaker · Übersichtstabelle der WSP-Spanbrecher																										
ISO	Application Anwendung	ZCC-CT		Sandvik		Seco		Kennametal		ISCAR		Walter		Mitsubishi		Sumitomo		Tungaloy		Kyocera		Korloy		Ingersoll Tague Tec		
		Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	
K Cast IronGuss	Wiper-finishing Wiper-Schichten	WG		WF WM	WF	W-MF2	W-F1	FW MW	FW MW	WF							NLU-W	NLU-W								
	Finishing · Schichten	DF	HF	KF	KF	F1	F1	FF FN	11 UF LF	NF SM	14 19	PS5				NSU	NLU	C				VM				
	Semi-finishing Schichten-Mittlere Bearbeitung	PM	HM	KF KM	KF KM	M3	F2	FN	MF	GN	14 19	NM5	GH		NUX NGU	NSU		C Stand- form	CM			B25	HMP			
	Medium machining light roughing Mittlere Bearbeitung-leichte Schruppbearbeitung	DR	HM HR	KM QM	KM	M3	F2	UN	HP	GN NR		NM6	PM5		NUZ NGU NMU	NMU		GC ZS	CM			VK GR	C25	MT MG	MT PMR WT	
	Wiper medium					W-M3 W-R4 W-R7		MW	MW	WG		NM	PM		NGU-W											
	Roughing Schruppbearbeitung	DR	HR	KR QR	KR UR	M5					NR		NR6	GH		NMU		ZS				MA		RT	CMX	
	Finishing · Schichten		LC		AL				LF		NF			PM2												
	Semi-finishing Schichten-Mittlere Bearbeitung		LC		AL		AL	AL	GP		NF PP	AS											HA	AK	FL SA	
	Medium machining-light roughing Mittlere Bearbeitung- leichtes Schruppbearbeitung		LH		AL			AL	GG-FS MS	HP	NMS													AR		
	S Heat resist. super alloys & Ti- alloys Warmt. Legl. & Ti-Legierung	Finishing · Schichten	NF EF	NF	NGP	MF	MF1		FS	GT-HP	SF PF	PF SM		PF4		NSU							VP1			
Semi-finishing Schichten-Mittlere Bearbeitung		NF NM EM	NF	23	MM	MF1 M1		FS MS	GT-MF	SF PF	PF SM		PF5	MJ	NEX NUP	NSU NSK						VP2	AK			
Medium machining-light roughing Mittlere Bearbeitung- leichte Schruppen				MF	MM UM	M1		MS	MT-LF	PP TF				MS	NMU	NSK						VP3	HMP	SU		
Roughing Schruppbearbeitung		ER		SR		MR3 MR4		RP		TF HTW NR				GJ								VM				



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Coated Cemeted Carbide CVD - beschichtetes Hartmetall CVD

ISO	ZCC-CT	Sandvik	Kennametal	Sumitomo	Mitsubishi	Toshiba Tungaloy	Kyocera	Walter	Iscar	SECO	Korloy	Ingersoll Tague Tec	Widia
P Steel · Stahl	P01-05	GC4205 GC4305	KCP05 KC9105	AC805P	UE6005 UE6105	T9005 T9105	CA5505	WPP01 WPP05	IC8150 IC9150 IC428	TP0500 TP0501			
	P10-15	GC4315 GC4215	KCP10 KC9110	AC810P AC700G	UC6110 MY5015	T9015 T9115	CA510 CA5515 CA510	WPP10 WPP10S	IC8150 IC8250 IC9150 IC9250 IC9015	TP1500 TP1501	NC3010	TT8115 TT8125	WP15CT
	P20-25	GC4325 GC4225 GC4025	KCP25 KC9125	AC820P AC8020P AC900G AC2000	UE6020 MC6025	T9025 T9125	CA5525 CA525 CR9025	WPP20 WPP20S	IC8150 IC8250 IC9250 IC9025	TP2501 TP2500 TP200	NC3220 NC3120	TT8125 TT3500	WP25CT
P30-35	GC4335 GC4235 GC4035	KCP30 KC8050	AC830P AC3000	UE6035 UE6400	T903 T9135	CA530 CA5535 CA535	WPP30 WPP30S	IC8250 IC8350 IC9350 IC9025	TP3500	NC3030 NC5330 NC500H	TT5100 TT8135	WP35CT	
M10	YBM151 YBM153	GC2015 GC1515	KCM15	AC610M	MC7015	T9115		IC8250 IC9250 IC6015			TT9215	WM15CT	
M20	YBM253 YBM251	GC2015 GC2025	KCM25 KC9225	AC610M AC630M	US7020 MC7015 MC7025	T6020 T6120 T9125	CA6515	WAM20	IC8250 IC9350 IC9025 IC6025	TM 2000 TP200 TP2500	NC9025	TT5100 TT9225	WM25CT
M30	YBM351 YBM253	GC2025 GC2035	KCM25 KCM35 KC9225	AC630M AC6030M AC830P AC3000	US735 US7025	T6030 T6130	CA6525	WAM30	IC8350 IC9350 IC9025	TP3500 TM4000		TT5100 TT7100 TT9235	WM35CT
M40	YBM351	GC2035	KCM35 KC9240 KC9245	AC630M AC6030M AC830P AC3000	US735	T6030 T6130	CA6525		IC6025 IC9350	TP40		TT5100 TT7100 TT9235	
K01-05	YBD052	GC3005 GC3205	KCK05	AC405K AC410K	UC5005 UC5105	T5105	CA4505		IC5005 IC9007		NC6205	TT1300 TT7005	WK05CT
K10-15	YB7315 YBD102 YBD152 YBD152C	GC3215	KCK15 KC9315	AC410K AC415K AC420K AC700G	MC5015 UC5115 MY5015	T5105 T5115	CA4010 CA4515 CA4115	WAK10 WAK10S	IC9015 IC9007 IC8150 IC5010 IC428 IC4028 IC9150	TK1001 TK1000	NC6210	TT1300 TT7310 T7015	
K20-25	YB7315 YBD152 YBD152C	GC3225	KCK20 KC9320	AC420K AC900G	MC5015 UE6110 MY5015	T5125 T9125	CA4125	WAK20 WKK20S	IC5010 IC428 IC4028 C9150	TK2000 TK2001	NC5330		WK20CT



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Coated Cemeted Carbide PVD ▪ beschichtetes Hartmetall PVD

ISO	ZCC-CT	Sandvik	Kennametal	Sumitomo	Mitsubishi	Toshiba Tunggaloy	Kyocera	Walter	Iscar	SECO	Korloy	Ingersoll Tague Tec	Widia
P Steel · Stahl	P01-05	GC1105					PR1005						
	P10-15	GC1515 GC1115 GC1025	KC5010 KC5510 KC7215 KC7315	AC510U	VP10MF VP15TF	AH710	PR930 PR1005 PR930 PR115	WSM10 WXN10	IC520N IC507 IC570 IC807 IC907 IC908				
	P20-25	GC1515 GC1125 GC1025	KC5025 KC5525 KU25T	AC520U	VP20RT VP20MF	AH725 AH120	PR930 PR1025 PR1225	WSM20 WMP20S WSM21	IC228 IC250 IC308 IC328 IC350 IC354 IC507 IC807 IC808 IC907 IC908 IC928 IC1008 IC1028 IC3028	CP200 CP250 TP2000 TS2500		TT8020 TT9020	
M Stainless Steel Rostfreier Stahl	P30-35	GC1125 GC2035	KC7335	AC530U		SH730 J740 GH130 AH740	PR660	WSM30	IC228 IC250 IC328 IC330 IC354 IC528 IC1008 IC1028 IC3028	CP500	PC5300		
	M10	GC1105 GC1115 GC1025 GC1125 GC1515	KCU10 KC5010 KC5510 KC6005 KC6015	EH10Z AC510U AC530U	VP10MF	AH710	PR915 PR1005	WSM10	IC330 IC354 IC507 IC520 IC570 IC807 IC1028 IC3028	CP500 TS2000	PC8110	TT5080	WS10PT
	M20	GC1025 GC1125	KC501 KC25	AC520U AC530U	VP10RT VP15TF VP20RT VP20MF	AH120 AH725 SH730 AH710 AH630 GH330	PR1025 PR1125 PR1225	WSM10 WMP20S WSM20 WSM21	IC228 IC250 IC354 IC808 IC908 IC1008 IC1028 IC3028	TS2000 TS2500 CP200 CP250		TT8020 TT9020 TT9080	WS25PT
S Heat resist. super all. & Ti- alloys Warmt. Legl. & Ti- Legierung	M30	GC2035	KC5025 KC25		VP10RT VP15TF VP20RT VP20MF MP7035	AH12 AH725 SH730 AH710 AH630 GH330 J740	PR1025 PR1125	WSM20 WSM21 WSM30	IC228 IC250 IC328 IC330 IC1008 IC1028 IC3028	CP500 TS2500	PC5300 PC9030		
	S05	S05F		MP9005	MP9005	AH905			IC507 IC907				
	S10	GC1105 GC1115	KG5010 KCU10 KC5510 KCS10	AC510U EH510Z	MP9015 VP10RT	AH905 SH730 AH110 AH120		WSM10	IC507 IC807 IC808 IC806 IC907	CP200 CP250 TS2000 TS2500	PC8110	TT5080	WS10PT
N Nonferrite Mat. Ne-metalle	S20	GC1025 GC1125 GC1515	KC5010 KCU10 KC5025 KC25 KC5525	AC520U EH520Z	MP9015 MT9015 VP20RT	AH120 AH725	PR1125	WSM20 WSM21 WSM30	IC507 IC807 IC907	CP250 TS2500 CP500	PC5300	TT5080 TT8020 TT9080	WS25PT
	S30			AC520U	VP15TF	AH725	PR1125	WSM30	IC3028 IC808 IC830		PC5400	TT8020	
	N10	GC1515	KC5410					WXN10	IC520				



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Cutting material comparison table-Turning - Schneidstoff Vergleichstabelle-Drehen

■ Cermet

ISO	ZCC-CT	Sandvik	Kennametal	Sumitomo	Mitsubishi	Toshiba Tunggaloy	Kyocera	Walter	Iscar	SECO	Korloy	Ingersoll Tague Tec	Widia	
P P01-05 Steel - Stahl		CT5005		T110A T1000A	AP25N VP25N	NS520 AT520 GT520 GT720	TN30 TN6010 PV30 PV7010		IC20N IC520N		CN1000 CC105	CT3000 PV3010		
		CT5015 CT530	KT315 KT125	T1200A T2000Z T1500A T1500Z	NX2525 AP25N VP25N	NS520 NS730 GT730 NS9530 GT9530	TN60 TN6010 PV60 PV6010		IC20N IC520N IC530N	CM TP1020 TP1030 CMP	CN1000 CT10 CN2000 CC115	CT3000 PV3010	TT115	
		GC1525	KT325 KT1120 KT5020	T1200A T2000Z T1500A T1500Z	NX2525 NX3035 AP25N VP25N MP3025	NS530 NS730 GT730 NS9530 GT9530	TN60 TN6020 PV60 PV7020 PV7025		IC20N IC30N IC75T IC520N IC530N	CM TP1020 TP1030 CMP	CN20 CN2000 CC115		TT115	
				T3000Z	MP3025 VP45N	PV7025 PV90		IC75T						
M M10 M20 M30 M40 Stainless Steel Rostfreier Stahl		GC1525	KT125	T110A T1000A T1500Z T2000Z	NX2525 AP25N VP25N	NS520 AT530 GT530 GT720	TN60 TN6020 PV60 PV7020			CM TP1020 TP1030 CMP		CT3000 PV3010	TT115	
		CT5015 CT530	HT2	T110A T1000A T1500Z T2000Z	NX2525 AP25N VP25N	NS530 GT730 NS730	TN90 TN6020 PV90 PV7020 PV7025					CT3000 PV3010	TT115	
				T3000Z										
K K01-05 K10-15 K20-25 Cast Iron Guss				T110A T1000A T2000Z T1500Z	NX2525 AP25N	NS520 GT730 NS730	TN30 TN6010 PV30 PV7005 PV7010					CT3000 PV3010		
		CT5015	KT325 KT125	T1200A T1500A T2000Z T1500Z	NX2525 AP25N	NS520 GT730 NS730	TN60 TN6020 PV60 PV7020 PV7025					CN1000	CT3000 PV3010	TT115
		CT5015		T3000Z	NX2525 AP25N									



Cutting material comparison table-Turning · Schneidstoff Vergleichstabelle-Drehen

■ Carbide uncoated · Hartmetall Unbeschichtet

ISO	ZCC-CT	Sandvik	Kennametal	Sumitomo	Mitsubishi	Toshiba Tungaloy	Kyocera	Walter	Iscar	SECO	Korloy	Ingersoll Tague Tec	Widia
N Nonferriete Mat. Ne-metalle	N01	H10 H13A	KF1	H1		KS05F				883 890			
	N10	H10 H13A	K313 K68 KF1 THM-F	H1	HT10	KS15F	KW10	WK01 WK10	IC20	890 KX HX	H01	K10	THM
	N20	H10 H13A	K313 K68 KF1 THM-F			KS15F	KW15		IC20	KX HX			

CVD milling grades - CVD Fräsen Klasse

Material / Class	ZCC-CT	Sandvik	Kennametal	Sumitomo	Mitsubishi	Toshiba Tungaloy	Kyocera	Walter	Iscar	SECO	Korloy	Ingersoll Tague Tec
P Steel - Stahl	P05	K20W GC4220			F7010							
	P10	K20W GC3040 GC4220 GC4230		ACP100	F7010				IC4100 IC5100	MP1500	NC5330 NCM325	IN6505 IN6520
	P20	GC3040 GC4230		CS3000	FH7020	T3130		WKP25 WKP25S	IC4050 IC4100 IC5100 IC5400	MP1500 MP2500 MS2500 T25M	NC5330 NCM325	IN6505 IN6520 IN7035
	P30	GC2040 GC4240	KC930M KC935M	CS3000	F7030	T3130		WKP35 WKP35S WTP35	IC4050 IC5400	MK3000 T25M T350M	NCM325	IN7035 IN6530
P40	GC2040 GC4240								T350M			IN6530
M Stainless Steel Rostfreier Stahl	M10	GC4230			F7010					MP1500	NCM325 NC5330	IN6520
	M20	GC4230			F7020	T3130			IC4050	MP1500 MP2500 MS2500 T25M	NCM325 NCM335	IN7035 IN6520 IN6505
	M30	GC2040 GC4240	KC930M KC935M		F7030	T3130		WTP35		MP2500 MS2500 T25M T350M	NCM335	IN6530 IN7035 IN6505
	M40	GC2040 GC4240								T350M		IN6530
K Cast Iron - Guss	K05		KCK15		F7010 MC5020				DT7150 IC4100			
	K10	K20W	KCK15	ACK200	F7010 MC5020	T1115		WAK15	DT7150 IC4100 IC4010	MP1500 MK1500	NC5330	IN6520
	K20	K20W		ACK200		T1115		WKP25 WKP25S	DT7150 IC4100	MP1500 MP2500 MS2500 T25M MK1500	NC5330	IN6530 IN6515 IN6520
	K30		KC930M KC935M					WKP35 WKP35S	IC4050	MK3000 MP2500 MS2500		IN6530 IN6515



General Technical Inform ▪ Allgemeine Technische Info

CVD milling grades ▪ CVD Fräsen Klasse

Material / Class	ZCC-CT	Sandvik	Kennametal	Sumitomo	Mitsubishi	Toshiba Tungaloy	Kyocera	Walter	Iscar	SECO	Korloy	Ingersoll Tague Tec
S Super alloys Ti-Legierung	S05									MK3000		
	S10											
	S20									MP2500 MS2500 T25M		IN7035 IN6520
N Nonferrite materials Ne-metalle	S30							WTP35		MM4500 T350M		
	N05											
	N10											
H Hd-metalle	N20									MP2500 25M		
	H05											
	H10											
	H20											

General Technical Inform - Allgemeine Technische Info

PVD milling grades - PVD Fräsen Klasse

Material / Class	ZCC-CT	Sandvik	Kennametal	Sumitomo	Mitsubishi	Toshiba Tungaloy	Kyocera	Walter	Iscar	SECO	Korloy	Ingersoll Tague Tec
P Steel - Stahl	P05			ACZ120	VP05HT	GH130			IC903			IN2004 IN2006
	P10	GC1010 GC1025 GC1020	KC522M KC525M KC610M KC643M KC715M	ACZ10M ACZ20W	VP10H	AH120 GH130	PR730 PR1225 PR1525	WHX15 WHH15 WXM15	IC903 IC950 IC1008	F15M		
	P20	GC1020 GC1025 GC1010 GC2030	KC522M KC525M KC643M KC715M KC725M	ACP200 ACZ330 ACX70 ACW30 AC350 ACZ50M	VP15TF VP20M VP20RT	AH725 AH120 AH130 AH330 AH725 AH730 GH330	PR630 PR830 PR730 PR1225 PR1230 PR1525	WXM15	IC810 IC380 IC830 IC900 IC908 IC910 IC950 IC1008	F25M MP3000	PC3500 PC3600 PC5300 PC3545 PC9570T	IN2006 IN1030 IN2004 IN2005 IN2015 IN2030 IN2505 IN2540
	P30	GC1030 GC2030	KC530M KC725M KC735M	ACP200 ACP300 ACZ50M ACZ330 ACZ350 ACX70 ACW30 AC350	VP30RT	AH740 AH130 AH140	PR630 PR660 PR830 PR1230	WXM35	IC300 IC328 IC830 IC900 IC928 IC350 IC808 IC908	F30M MP3000	PC3500 PC3600 PC5300 PC3545 PC9570T	IN1030 IN2005 IN2015 IN2030 IN2035 IN2040 IN2505 IN2530 IN4035
	P40	GC1030	KC735M	ACP300 ACZ350		AH140 AH750		WXP45 WSP45 WSP46	IC300 IC328 IC928	F40M	PC5300 PC3545	IN2035 IN2040
	M10	GC1020	KC522M KC610M KC643M KC715M	ACZ20W ACZ350 EH20Z		AH330 GH110 GH130	PR730 PR1225 PR680 PR1525		PR730 PR660 PR1225 PR1525	F15M	PC8110	IN2505
	M20	GC1020 GC1025 GC1030 GC203	KC522M KC525M KC610M KC715M KC725M	ACP200 ACZ50M ACZ20M ACZ350 EH20Z AC350	VP15TF VP20RT	AH725 AH730 GH110	PR730 PR1025 PR680 PR1225 PR1525	WXM15	PR730 PR660 PR1025 PR1225 PR1525	F25M MP3000	PC5300 PC8110 PC9530	IN2005 IN2015 IN2505
	M30	GC1040 GC203	KC525M KC530M KC725M KC735M	ACP300 ACZ50M ACX80 AC350	VP30RT	AH740 AH120 AH130 GH330 GH340				F30M MP3000	PC9530 PC3545 PC9570T	IN1030 IN2015 IN2030 IN2035 IN2530 IN4035
	M40	GC1040	KC530M KC735M	ACP300 ACX80		AH140 AH750 GH330 GH340		WSM35 WSM36 WXM35		F40M	PC3545	IN1030 IN2030 IN2035 IN2530 IN4035
	K05	GC1010	KC510M	ACZ10M ACZ120 ACZ310		AH330	PR905 PR1210 PR1510			MH1000	PC8110	IN2510
	K10	GC1010	KC510M KC520M KC620M KC643M	EH20Z ACZ310		AH120 AH330 AH725	PR905 PR1210 PR1510	WXH15 WHH15 WXM15	IC810 IC950 IC1008	F15M MK2000	PC6510	IN2004 IN2010 IN2510
	K20	GC1020	KC520M KC620M KC725M	ACK300 EH20Z ACX80 ACW30	VP15TF	GH130		WKK25	IC328 IC830 IC950 IC350 IC908 IC908 IC1008	F25M MK2000 MO3000	PC6510 PC5300	IN1030 IN2004 IN2010 IN2015 IN2030 IN2505
	K30	GC1020	KC620M KC725M	ACK300 ACZ50M					IC328 IC830 IC900 IC908 IC350 IC808 IC908	F30M F40M MP3000	PC5300 PC9570T	IN2005 IN2015 IN2030 IN2505
		K Cast Iron - Guss										
		M Stainless Steel Rostfreier Stahl										



General Technical Inform ▪ Allgemeine Technische Info

PVD milling grades · PVD Fräsen Klasse

Material / Class	ZCC-CT	Sandvik	Kennametal	Sumitomo	Mitsubishi	Toshiba Tungaloy	Kyocera	Walter	Iscar	SECO	Korloy	Ingersoll Tague Tec
S Super alloys Ti-Legierung	S05									MH1000 F15M	PC8110	
	S10	YBG102 YBG202 YBG205		ACZ20W	VP15TF		PR905 PR1210 PR1510		IC808	NH1000 F15M F25M	PC5300	
	S20	YBG202 YBG205	S30T GC1025 GC1030 GC2030	ACZ20W			PR905 PR1210 PR1510		IC908 IC380 IC900 IC903 IC908 IC928 IC830 IC808	F25M F30M	PC5300 PC3545	IN2005 IN2505
S30		GC2030	KC725M KC735M	ACZ50M				WSM35 WSM36 WSP45 WSP46 WXM35 WXP45	IC328 IC928 IC830	F40M	PC3545	IN1030 IN2030 IN2035 IN2530 IN4035
N05			KC510M							MH1000 F15M		
N Nonferite materials Ne-metalle	N10		KC510M KC620M KC522M	EH20Z				WXN15		MH1000 F15M		
	N20		KC620M KC522M KC525M KC651M							F25M F30M F40M MP3000		
	H05				VP05HT				IC903	MH1000 F15M	PC210F	IN2004 IN2006
H Hadened materiel Hd-metalle	H10	YBG102	KC643M		VP10MF			WXH15 WHH15	IC900 IC808	MK2000 F30M MP3000	PC210F	IN2004 IN2005 IN2006
	H20	YBG202	GC1010 GC1025 GC1030		VP15TF				IC810 IC908	F30M F40M MK2000 MP3000		



Uncoated milling grades - Unbeschichtet Fräsen Klasse

ISO	ZCC-CT	Sandvik	Kennametal	Sumitomo	Mitsubishi	Toshiba Tungaloy	Walter	Kyocera	Iscar	SECO	Korloy	Ingersoll Tague Tec
N Nonferriete Mat. Ne-metalle	N01	H10	K115M K110M				WK10		IC20N		H01	IN04S
	N10		K313	EH520	HTi10		WKM	GW25	IC08	H15	G10	IN10K IN05S
	N20	H13A H10F	KMF	EH520	TF15		KMG40		IC28	H25		IN15K



1

175.32-22	A103
175.32-24	A103
175.32-25	A103
175.32-28	A103

A

APKT-ALH	B205
APKT-APF	B205
APKT-APM	B205
APKT-KM/PM	B207
APKT-LH	B205
APKT-PF	B205
APKT-PM	B205
APKT-PR	B205
ANGX*PNR-GM	B204
ANGX*PNR-LH	B204
APMT_PDER	B206
APMT_PDR	B206

C

CCGT	A149
CCGT-SF	A105
CCGT-USF	A105
CCGW	A142
CCGW(PCD)	A150
CCGX-LC	A108
CCGX-LH	A108
CCMT-AHF	A106
CCMT-EF	A107
CCMT-EM	A107
CCMT-HF	A106
CCMT-HM	A107
CCMT-HR	A108
CCMT-TC	A108
CCMW	A108
CNE-A	B207
CNE-B	B207
CNEG-NF	A67
CNGA	A137
CNGA	A160
CNGN	A161
CNGN(CBN)	A146
CNGX	A162
CNMA	A72
CNMG	A72
CNMG-ADF	A66
CNMG-DF	A66
CNMG-DM	A68
CNMG-DR	A69
CNMG-EF	A66
CNMG-EG	A68
CNMG-EM	A68
CNMG-ER	A70

CNMG-NM	A69
CNMG-PM	A67
CNMG-SF	A66
CNMG-SNR	A69
CNMG-TC	A69
CNMG-WG	A66
CNMG-ZM	A68
CNMM	A71
CNMM-DR	A70
CNMM-ER	A70
CNMM-HDR	A71
CNMM-HPR	A71
CNMM-LR	A70
CPGT	A106
CPGT-SF	A109
CPGW	A109
CPMT-HF	A109
CPMT-HM	A109

D

DCGT-SF	A110
DCGT-USF	A110
DCGW	A143
DCGX-LC	A112
DCGX-LH	A112
DCGT	A151
DCGT-SF	A110
DCGT-USF	A110
DCMT-AHF	A110
DCMT-EF	A111
DCMT-EM	A111
DCMT-HF	A111
DCMT-HM	A111
DCMT-HR	A112
DCMW	A112
DCGW(PCD)	A152
DNEG-NF	A74
DNEG-NGF	A74
DNGA	A138
DNGA	A162
DNGN	A163
DNGN(CBN)	A146
DNGX	A163
DNMA	A77
DNMG	A78
DNMG-ADF	A73
DNMG-DF	A73
DNMG-DM	A75
DNMG-DR	A76
DNMG-EF	A74
DNMG-EG	A76
DNMG-EM	A76
DNMG-ER	A77
DNMG-FM	A74
DNMG-NM	A76
DNMG-PM	A75
DNMG-SF	A73

DNMG-SNR	A76
DNMG-TC	A76
DNMG-ZM	A75
DNMM-DR	A78
DNMM-ER	A78
DNMM-HDR	A78
DNMM-LR	A78
DNMX-WG	A73
DPGT-SF	A113
DPGT-USF	A113
DPMW	A113

H

HNEX-DF	B208
HNEX-DM	B208
HNEX-DR	B208
HNGX-MR	B208
HNGX-HDR	B208

K

KNUX	A102
------	------

L

LNCX	B210
LNE32.534	B209
LNE32:302	B209
LNKT-ZR	B209
LT****N-A(G)	A337
LT****N-BSPT	A340
LT****N-GM	A336
LT****N-NPT	A341
LT****N-UN	A339
LT****N-W	A338
LT****W-A(G)	A337
LT****W-BSPT	A340
LT****W-GM	A335
LT****W-NPT	A341
LT****W-UN	A339
LT****W-W	A338

M

MPHT	B210
------	------

O

OFKR-DF	B211
OFKR-DM	B211
OFKR-LH	B211
OFKT-DF	B211
OFKT-DM	B211
OFKT-LH	B211
ONHU-PF	B212
ONHU-PM	B212

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Insert / WSP

ONHU-GM B212
ONHU-W B212

P

PNEG-CF B213
PNEG-CM B213
PNEG-CR B213
PNEG-PF B213
PNEG-PM B213
PNEG-PR B213

Q

QC**R/L B214/215
QC**R/L A300
QC**R/L***R A304

R

RCGT A114
RCGX-LH A114
RCKT-DM B216
RCKT-DR B216
RCKT-ER B216
RCKT-NM B216
RCMG A101
RCMT A114
RCMX A115
RDKW B217
RNGN A168
RNGN(CBN) A148
RNMG A101
ROHX B218
RT****N-A(G) A337
RT****N-A(G)B A352
RT****N-AC A346
RT****N-AP A348
RT****N-BSPT A340
RT****N-BSPTB A355
RT****N-BUT A350
RT****N-GM A336
RT****N-GMB A351
RT****N-NPT A341
RT****N-NPTB A356
RT****N-NPTF A342
RT****N-R A343
RT****N-RD A349
RT****N-STAC A347
RT****N-TR A345
RT****N-UN A339
RT****N-UNB A354
RT****N-W A338
RT****N-WB A353
RT****W-A(G) A337
RT****W-A(G)B A352
RT****W-AC A346
RT****W-AP A348

RT****W-BSPT A340
RT****W-BSPTB A355
RT****W-BUT A350
RT****W-GM A335
RT****W-GMB A351
RT****W-MJ A344
RT****W-NPT A341
RT****W-NPTB A356
RT****W-NPTF A342
RT****W-R A343
RT****W-RD A349
RT****W-STAC A347
RT****W-TR A345
RT****W-UN A339
RT****W-UNB A354
RT****W-UNJ A344
RT****W-W A338
RT****W-WB A353

S

SCGX-LC A117
SCGX-LH A117
SCMT A116
SCMT-AHF A116
SCMT-EF A116
SCMT-EM A116
SCMT-HF A116
SCMT-HM A117
SCMT-HR A117
SCMW B218
SDMT B219
SDMT-DM B219
SDMT-PM B222
SEEN B220
SEET-CF B220
SEET-CM B220
SEET-CR B220
SEET-DF B220
SEET-DM B220
SEET-DR B220
SEET-EF B220
SEET-EM B220
SEET-LH B221
SEET-LH B221
SEET_PER-* B220
SEET-W B222
SEKN B222
SEKR B223
SNEG-GM/GR B223
SNEG-E B223
SNEG-W A139
SNGA A164
SNGA A165
SNGN A147
SNGN(CBN) A164
SNGX B223
SNKN A86

SNMA A85
SNMG A79
SNMG-ADF A79
SNMG-DF A81
SNMG-DM A82
SNMG-DR A80
SNMG-EF A81
SNMG-EM A81
SNMG-EG A82
SNMG-ER A82
SNMG-NM A80
SNMG-PM A79
SNMG-SF A81
SNMG-TC A85
SNMM A83
SNMM-DR A84
SNMM-ER A84
SNMM-HDR A84
SNMM-HPR A83
SNMM-LR A87
SNUN B224
SPAN B224
SPCN B227
SPEX B229
SPGN C134
SPGT-EM C134
SPGT-PM B225
SPKN B226
SPKR-GM B228
SPKT B226
SPKW B228
SPMR B228
SPMT B228
SPMT-HT B228
SPMT-KM B228
SPMT-KT B228
SPMT-PM A118
SPMW B229
SPUN

T

TBGH-L A118
TCGT A153
TCGT A119
TCGT-SF A119
TCGT-USF A144
TCGW A154
TCGW(PCD) A123
TCGX-LC A123
TCGX-LH A122
TCMT A120
TCMT-AHF A121
TCMT-EF A121
TCMT-EM A120
TCMT-HF A122
TCMT-HM A122
TCMT-HR A122
TCMW A140

TNGA A166
 TNGA A167
 TNGN A94
 TNMA A93
 TNMG A88
 TNMG-ADF A88
 TNMG-DF A90
 TNMG-DM A91
 TNMG-DR A89
 TNMG-EF A91
 TNMG-EM A91
 TNMG-EG A92
 TNMG-ER A89
 TNMG-FM A90
 TNMG-PM A88
 TNMG-SF A91
 TNMG-TC A90
 TNMG-ZM A94
 TNMM A92
 TNMM-DR A93
 TNMM-HDR A92
 TNMM-LR A104
 TNMX A88
 TNMX-WG B230
 TPAN B230
 TPCN A124
 TPGH-L A124
 TPGT-SF B231
 TPKN B232
 TPMR B232
 TPUN

V

A127
 VBET-NF A128
 VBET-NGF A155
 VBGT A127
 VBGT-SF A145
 VBGW A155
 VBGW(PCD) A127
 VBMT-AHF A127
 VBMT-EF A128
 VBMT-EM A127
 VBMT-HF A128
 VBMT-HM A128
 VBMT-HR A128
 VBMT-SNR A128
 VBMW A125
 VCGT A156
 VCGT(PCD) A125
 VCGT-HF A125
 VCGT-NF A125
 VCGT-SF A125
 VCGT-USF A145
 VCGW A156
 VCGW(PCD) A126
 VCGX-LC A126

VCGX-LH A129
 VCMT-EM A129
 VCMT-EF A129
 VPGT-USF A95
 VNEG-NF A95
 VNEG-NGF A141
 VNGA A96
 VNMG A95
 VNMG-ADF A95
 VNMG-DF A96
 VNMG-DM A95
 VNMG-EF A96
 VNMG-EM A96
 VNMG-NM A96
 VNMG-PM A95
 VNMG-SF A96
 VNMG-SNR A96
 VNMG-TC A96
 VNMG-ZM

W

C135
 WCMX A130
 WCMX-53 C135
 WCMX-53 C135
 WCMX-PG A98
 WNEG-NF A141
 WNGA A168
 WNGA A147
 WNGN(CBN) A100
 WNMA A97
 WNMG-ADF A97
 WNMG-DF A99
 WNMG-DM A100
 WNMG-DR A98
 WNMG-EF A99
 WNMG-EM A99
 WNMG-EG A98
 WNMG-NF A100
 WNMG-NM A99
 WNMG-PM A97
 WNMG-SF A99
 WNMG-TC A98
 WNMG-WG A99
 WNMG-ZM B233
 WPGT B233
 WPGT-PM

X

B233
 XPHT-GM B234
 XSEQ

Y

A104
 YNMX A104
 YNUX

Z

B234
 ZDET A297
 ZIGQ-NM A298
 ZILD-LC A297
 ZIMF-NM B235
 ZOHX-GF B235
 ZOHX-GM A292
 ZP*D-MG A293
 ZP*D-MG-* A292
 ZP*S-MG B235
 ZPNT A296
 ZR*D-EG A298
 ZR*D-LH A296
 ZR*D-MG A295
 ZT*D-EG A294
 ZT*D-MG A291
 ZT*D-MM A294
 ZT*S-MG

1

1101SC05	C84-C87
1105SC03	C84-C87
1143SC120	C94
1143SC90	C94
1165PA03	C88-C90
1534SH03	C83
1534SP03C	C63-C66
1534ST03C	C66-C81
1534SU03	C10-C50
1534SU03C	C10-C50
1536ST05C	C66-C81
1536SU05	C06-C50
1536SU05C	C06-C50
1538SU08C	C06-C50
1557SU03	C51
1576PC05	C91-C93
1576PC05C	C91-C93
1579PC15C	C91-C93
1588SL10C	C52-C62
1588SL12C	C52-C62
1588SL15C	C52-C62
1588SL20C	C52-C62
1588SL30C	C52-C62
1634SU03C	C06-C50
1636SU05C	C06-C50
1734SU03C	C06-C50
1636ST05C	C70-C81
1736SU05C	C06-C50

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3101H7	C144
3102H7	C145
3103H7	C147
3112H7	C146

4

4111	C169
4122A	C156
4122M	C158
4222A	C157
4222M	C158
4201A	C164
4201C	C160
4202A	C166
4202C	C162

5501/5601	B529
5601	B530
5501R302GM	B304
5501R303GM	B330
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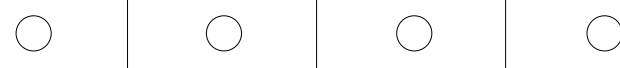
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Test Report Versuchsprotokoll		ZCC Cutting Tools Europe GmbH			
Date					
General	Allgemein	End User / Anwender		Distributor / Händler	
Company	Firma				
Contact person	Gesprächspartner				
Machine	Maschine				
Type	Typ				
Producer	Hersteller				
Power (kW)	Leistung (kW)				
Adaptor / Tooling System	Werkzeugaufnahme				
Workpiece	Werkstück				
Material	Werkstoff				
Hardness / Tensile Strength	Härte / Zugfestigkeit N / mm ²				
Heatreatment / Surface	Wärmebeh. / Oberfläche				
Interrupt cutting	Schnittunterbrechungen				
Cutting tools	Werkzeug				
Producer / Supplier	Hersteller (Halter)				
Toolholder / Milling body	Halter Bezeichnung				
Teeth Z	Zähnezahl Z				
Producer / Soppier	Hersteller (Werkzeug)				
Insert type / Tool Nr.	Platten-Typ / Werkzeug Nr.				
Grade	Schneidstoff Sorte				
Solid carbide tools art	Vollhartmetallwerkzeug Nr.				
Cooling	Kühlmittel int. / ext.				
Cutting Data	Schnittdaten				
RPM $n = U / \text{min}$	Drehzahl $n = U / \text{min}$				
Cutting speed $V_c = m / \text{min}$	Schnittgeschw. $V_c = m / \text{min}$				
Feed rate $f = \text{mm} / r$	Vorschub $f = \text{mm} / U$				
Feed rate $V_f = \text{mm} / \text{min}$	Vorschubgeschw. $V_f = \text{mm} / \text{min}$				
Depth of cut a_p mm	Schnitttiefe $a_p = \text{mm}$				
Depth of cut a_e mm	Schnittbreite $a_e = \text{mm}$				
Machining length mm	Eingriffslänge mm				
Cutting time T min	Eingriffszeit T mm				
Results	Ergebnis				
Machined pieces / Edge	Anzahl Werkst. / Schneidkante				
Surface quality	Oberfläche Werkstück				
Flankwear VB	Freiflächenverschleiß VB				
Criteria	Kriterium				
Notch Wear	Kerbverschleiß				
Crater Wear	Kolkverschleiß				
Plastic deformation	Plastische Verformung				
Built-up edge	Aufbauschneidenbildung				
Insert breakage	Plattenbruch				
Cutting edge breakage	Schneidkantenbruch				
Chipforms	Spanformen				
<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="margin-bottom: 10px;">1 </div> <div style="margin-bottom: 10px;">2 </div> <div style="margin-bottom: 10px;">3 </div> <div style="margin-bottom: 10px;">4 </div> </div> <div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="margin-bottom: 10px;">5 </div> <div style="margin-bottom: 10px;">6 </div> <div style="margin-bottom: 10px;">7 </div> <div style="margin-bottom: 10px;">8 </div> <div style="margin-bottom: 10px;">9 </div> </div>			Conclusion / Zusammenfassung		
Fax: 0049-211-989240-111 E-mail: info@zccct-europe.com		Sign / Unterschrift _____			

NOTES / NOTIZEN :

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Zhuzhou Cemented Carbide Cutting Tools Co., Ltd. (ZCC-CT) is located in Zhuzhou, Hunan province, China and is the largest supplier of carbide tools into the Chinese market. The ZCC-CT cutting tool company is part of the "Zhuzhou cemented carbide Group" who manufacture carbide materials and powders. Both of these companies are part of the "Minmetals Corporation" who mine and produce raw tungsten carbide materials.

Since its foundation in 1953 ZCC-CT has developed rapidly by progressively using highly advanced modern production technology as well as having a highly qualified and committed workforce. With over 2,000 employees the company is now the largest producer of carbide cutting tools in China and one of the leading carbide manufacturers worldwide.

Using this advanced production technology, ZCC-CT products are manufactured to the highest quality standards to maintain a constant quality and high performance. The wide range of products contains indexable carbide inserts (coated and uncoated), inserts of Cermets, CBN, PCD and ceramics, solid carbide cutting tools as well as tool holders and milling bodies. The products are produced to various international standards such as ISO DIN, ANSI, JIS and BSI. Furthermore customised and special carbide product are also offered.

Research and development plays a major and significant role at ZCC-CT. The production facilities use the most sophisticated and advanced equipment available and this is supplied by the leading machine and equipment manufacturers in Germany and Switzerland. A highly qualified and skilled team of engineers in the R&D departments are constantly developing new and improved cutting tools. There is a constant desire to continually enhance the quality, to fulfill the ever increasing market requirements for new and initiative products and to achieve the best possible result for the customers.

The production and administration facilities in China are certified to ISO 9001:2000 and they maintain strict environmental management to ISO 14001:2004 standards.

Since 2003 ZCC Cutting Tools has operated a sales organisation in Europe. This sales and warehousing subsidiary of ZCC-CT is based in Düsseldorf (Germany) and has been progressively build up and expanded by Mr. Quanliang Zhao the European Managing Director.

Sales to all European countries, as well as Russia and Turkey, are controlled and managed from this European central warehouse in Düsseldorf, with the majority of the products being dispatched on the same day of ordering. The business operates under the quality management system for "Distribution and Logistics of Metal Cutting Tools" and is certified with DIN EN ISO 9001:2008.

ZCC Cutting Tools Europe has a constantly growing number of employees covering sales, marketing, warehouse and distribution, technical support, IT, HR and accounting. Our external sales team and our partners from around Europe are there to support you on-site in your production facilities or distribution operations. Our internal, highly qualified, technical application engineering staff are always available to give the customer technical advice and support via telephone, by email or in person. The internal sales team takes care of your enquiries and orders and together with dedicated warehouse staff they ensure that products are dispatched to you as quickly as possible.

The complete team at ZCC Cutting Tools Europe are there to support you and be your competent and efficient partner in the global Cutting Tool Industry.

Zhuzhou Cemented Carbide Cutting Tools Co., Ltd. (ZCC-CT) mit Sitz in Zhuzhou, Hunan, in der Volksrepublik China ist der größte Lieferant von Hartmetallwerkzeugen im chinesischen Markt. ZCC-CT gehört zur „Zhuzhou cemented carbide Group“, die Hartmetall-Produkte und Hartmetall-Pulver herstellt. Beide Unternehmen sind Teil der „Minmetals Corporation“, die Metalle und Mineralien abbaut und mit diesen handelt.

Seit der Gründung 1953 hat sich ZCC Cutting Tools auf dem Gebiet der Hartmetallproduktion durch neueste Technologien sowie hochqualifiziertes Personal zu einem der weltweit führenden Hartmetallhersteller mit mehr als 2.000 Mitarbeitern entwickelt.

Auf Basis der neuesten Produktionstechnologien produziert ZCC-CT Produkte gleichbleibender Qualität auf höchstem Niveau. Die umfangreiche Produktpalette beinhaltet Hartmetallwendeschneidplatten (beschichtet und unbeschichtet), Wendeschneidplatten aus Cermet, CBN, PKD und Keramik, Vollhartmetallwerkzeuge sowie Werkzeughalter und Fräskörper. Die Produkte werden nach verschiedenen internationalen Standards produziert wie z.B. ISO DIN, ANSI, JIS und BSI. Des Weiteren werden auch kundenspezifische Lösungen und spezielle Hartmetallprodukte angeboten.

Forschung und Entwicklung haben bei ZCC-CT einen besonders hohen Stellenwert. Für diesen Bereich werden die weltweit modernsten Anlagen und fortschrittlichsten Maschinen aus Deutschland und der Schweiz genutzt und überdurchschnittlich hohe Investitionen getätigt. Mit gut ausgebildeten Ingenieuren und einem kompetenten Team forscht und entwickelt ZCC Cutting Tools stetig neue und verbesserte Produkte. Das Unternehmen strebt kontinuierlich danach die Qualität zu verbessern, den gestiegenen Anforderungen nach neuen und innovativen Produkten gerecht zu werden und ein bestmögliches Ergebnis für den Kunden zu erreichen.

Die Produktion und Verwaltung in China unterliegt qualitativ der ISO Normen 9001:2008 und im Bereich Umwelt-Management der ISO 14001:2004.

Seit 2003 hat ZCC Cutting Tools eine Vertriebszentrale in Europa. Der Sitz der Niederlassung befindet sich in Düsseldorf (Deutschland) und wurde kontinuierlich vom Geschäftsführer Quanliang Zhao aufgebaut.

Mittlerweile werden von dort alle europäischen Länder und Russland sowie die Türkei betreut. Auch das europäische Zentrallager befindet sich in Düsseldorf, so dass die meisten Artikel noch am Tag der Bestellung an den Kunden verschickt werden. Das Qualitätsmanagementsystem des Unternehmens ist im Bereich „Vertrieb und Logistik von Werkzeugen für die Metallverarbeitung“ nach der DIN EN ISO 9001:2008 zertifiziert.

Die Anzahl der Mitarbeiter im Vertrieb, im technischen Support und in den Bereichen Lager, Marketing, IT, Personal und Buchhaltung wächst bei ZCC Cutting Tools Europe stetig. Unsere Außendienstmitarbeiter und unsere Partner in Europe betreuen Sie vor Ort und unsere Anwendungstechniker stehen Ihnen telefonisch, per E-mail oder auch persönlich mit Rat und Tat beiseite. Das Team im Vertriebsinnendienst kümmert sich um Ihre Anfragen und sorgt zusammen mit den Mitarbeitern im Lager dafür, dass die Bestellungen so schnell wie möglich auf den Weg zum Kunden gebracht werden.

Alle gemeinsam sind wir als ZCC Cutting Tools Europe für Sie da und stehen Ihnen als kompetenter Partner in der globalen Zerspanungsindustrie zur Seite!





Sales center in Europe:
Vertriebszentrale in Europa:

ZCC Cutting Tools Europe GmbH

www.zccct-europe.com

Heltorfer Straße 12 40472 Düsseldorf, Germany

Tel.: +49(0)211-989240-0

Fax: +49(0)211-989240-111

E-mail: Info@zccct-europe.com



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Vertretung