

TYROLIT - YOUR PARTNER FOR
TOOL GRINDING

Premium grinding tools since 1919
www.tyrolit.com



TYROLIT Group

A global company

As one of the world's leading manufacturers of bonded grinding, cutting, sawing, drilling and dressing tools as well as a system supplier of tools and machines for the construction industry, the family-run company TYROLIT has been synonymous with top quality products, innovative spirit and outstanding service since 1919.

On a daily basis, the experts at TYROLIT create tailored solutions for customers around the world, contributing to the success of their businesses. Around 80,000 available products set the standards in a wide variety of industries.



TYROLIT company headquarters in Schwaz, Austria

TYROLIT business units



Metal / Precision

From precision machining in the engine and gearbox industry to the production of cut-off wheels with diameters up to 2,000 mm for the steel industry – the TYROLIT product range in the Metal & Precision business unit includes high-tech tools for a wide variety of applications.



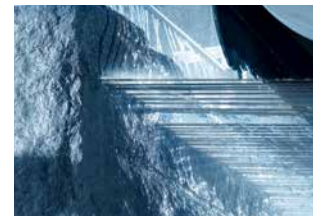
Trade

Thanks to its global sales network, in addition to premium product solutions in the three core areas of cutting, grinding and surface treatment, the trade business unit of TYROLIT guarantees particularly customer-oriented marketing support.



Construction

In the Construction business unit, TYROLIT is a leading system supplier of drilling systems, wall and wire saws, floor saws and tools for the surface grinding of concrete motorways.



Stone–Ceramics–Glass

Our tailored diamond tools and grinding solutions in the Stone – Ceramics – Glass business unit impress through their exceptional performance and quality.

The TYROLIT performance package at a glance

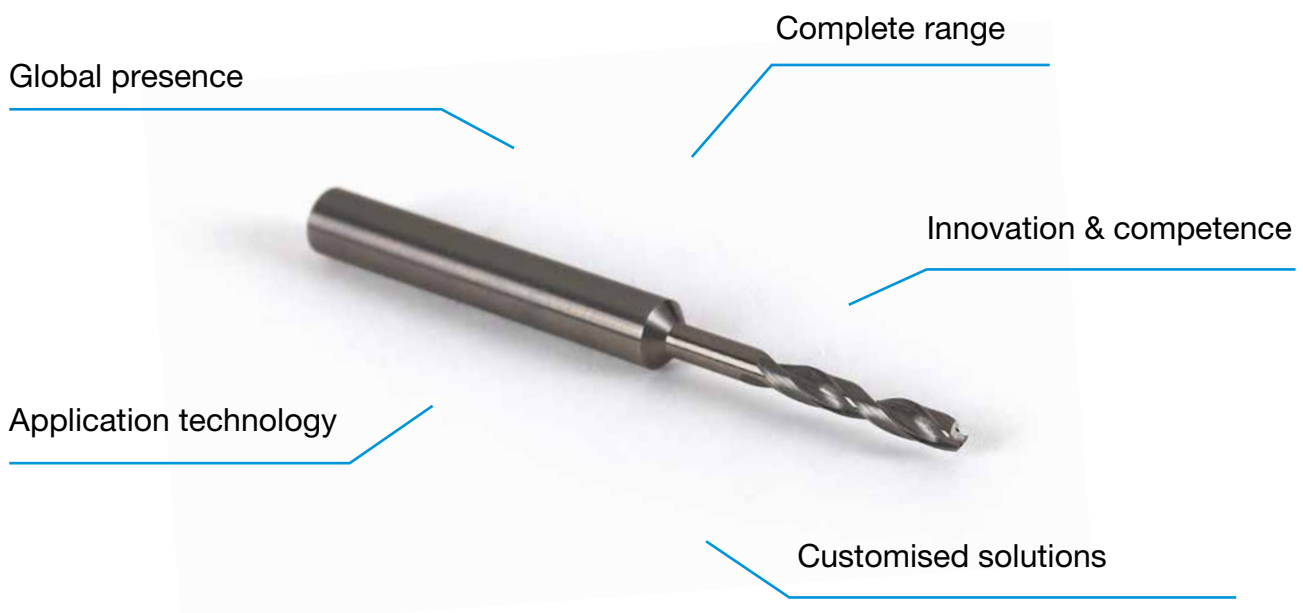
In all business development stages, TYROLIT always places the CUSTOMER at the centre of its activities. TYROLIT therefore offers its customers a first-class service in the form of ongoing advice and support. A team of experienced marketing managers and application engineers with many years of experience support you worldwide – for a perfectly tailored package consisting of a grinding solution and attractive services.

Solutions

Especially for tool grinding, TYROLIT offers first-class solutions for the individual fields of application. Based on your individual requirements, we deliver tailored grinding solutions for the production, but also for the professional regrinding, of shaft tools made from tungsten carbide

or HSS. With our grinding tools, we meet the high expectations regarding process performance and tool quality. For the shortest possible response times, TYROLIT supplies a wide range of grinding tools ex stock.

Your benefits



International presence In your vicinity

Global presence

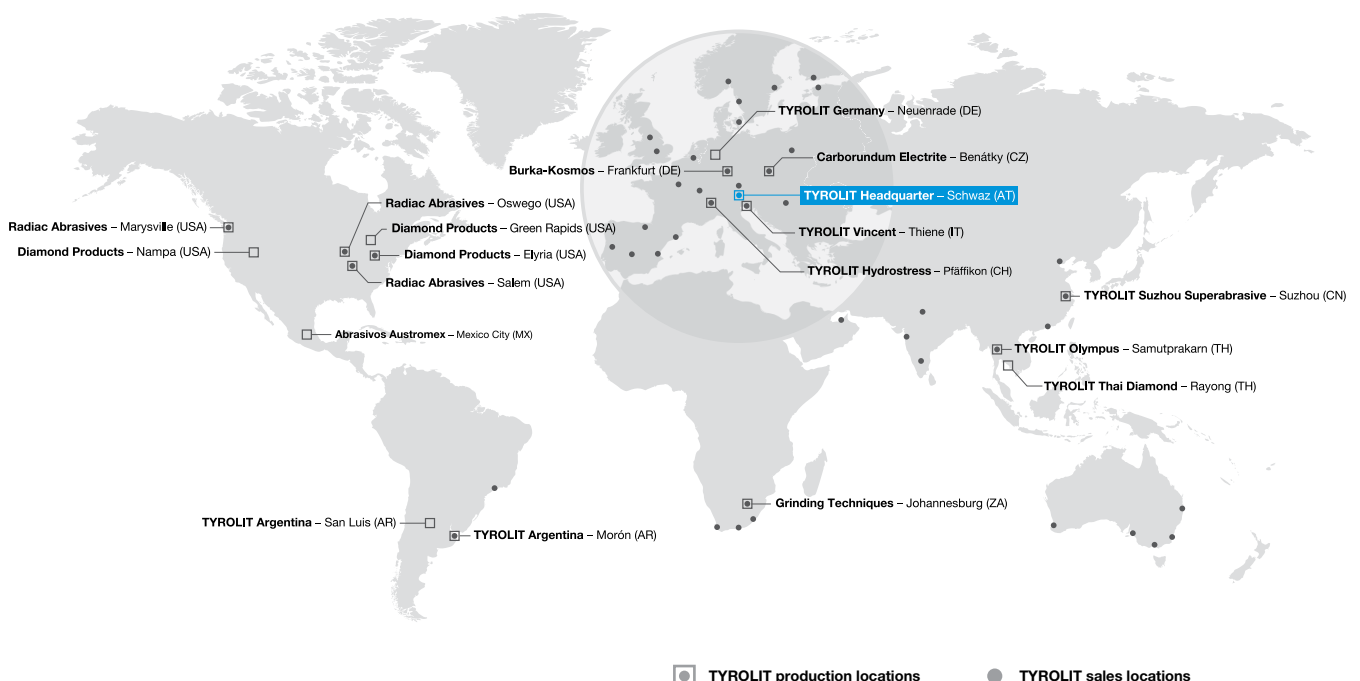
TYROLIT stands for global thinking and activities. With a worldwide sales network currently in 65 countries and with our own production plants in 12 countries on five continents, we offer our customers all the advantages of a globally operating company.

Local availability

Global thinking, local action – in your national language and in your vicinity. This is the principle we follow in dealing with our customers. Local contacts near your premises and a global team of specialist application engineers ensure optimum customer support and first-class service.

Your benefits

- + Global presence with local contacts
- + Short response and service times



Application technology

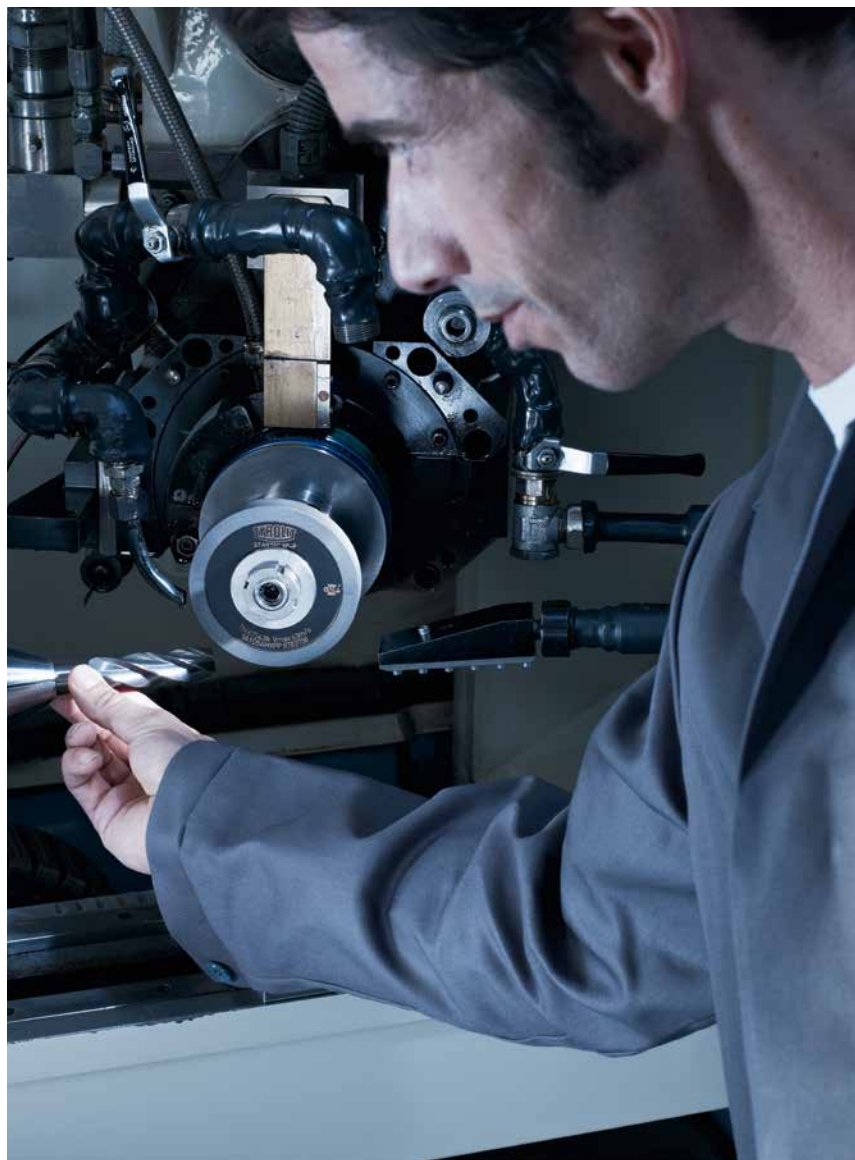
The best grinding solutions for your processes

Expertise in cutting and grinding – this has characterised TYROLIT for nearly one hundred years. With the wealth of process expertise commanded by our specialist application engineers, we are able to provide our customers with sustained solutions in line with their demanding technical and economic expectations.

Our global team of specialist application engineers defines solution proposals individually tailored to your requirements. In many years of cooperation with end users and machine manufacturers, grinding processes have been further developed to the highest level.

Your benefits

- + The global presence of our application engineers
- + Process solutions and optimisation for individual tasks
- + Long-standing cooperation with renowned machine manufacturers
- + Internal and external seminars and training courses



Customised solutions Tailored to your requirements

In tool production and in professional tool service, the focus is on tool quality and the efficiency of the grinding processes.

In order to ensure the best possible solution for your application, TYROLIT offers individually developed products for a wide variety of fields of application.

An overview of the available grinding tools for the production and regrinding of tungsten carbide or HSS shaft tools is provided below.

In the following chapters, you can find detailed descriptions of these tools as well as their fields of application and stock availability.

Production of shaft tools made from tungsten carbide

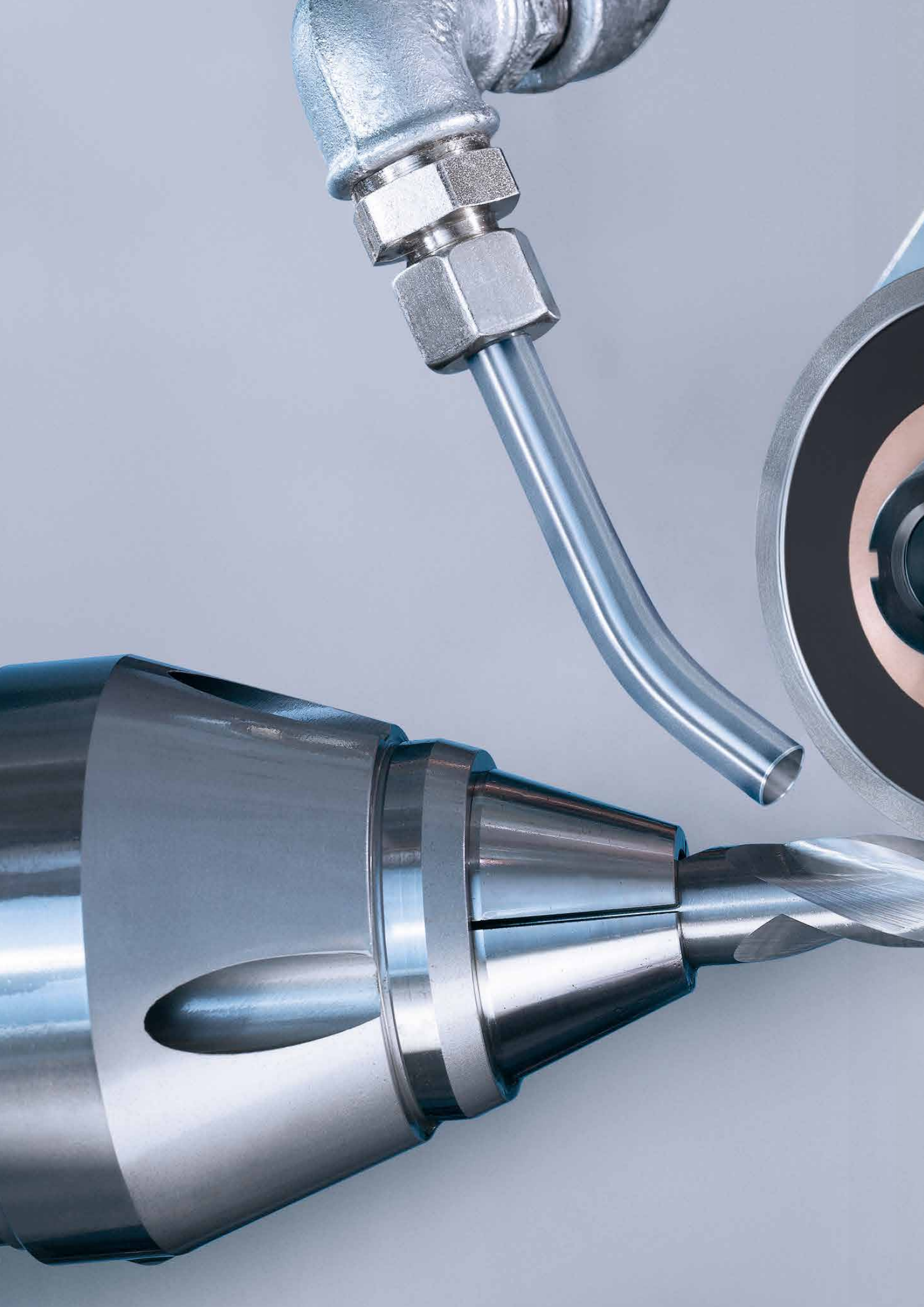
Tool	Grinding application	Our product recommendation
Drilling, cutting and reaming tools, taps	Cut-off grinding	DIAMOND RESIN
	Centreless grinding	DIAMOND RESIN CSS REGULATOR
	Peel grinding	STARTEC PG-1
	Flute grinding	STARTEC XP-P STARTEC RC STARTEC XP-P+ STARTEC HP
	Clearance and face surface grinding	STARTEC XP-F
	Flute, clearance and face surface polishing	STARTEC XP-F
	Roughing teeth grinding	DIAMOND GRINDING TOOLS
	Thread grinding	DIAMOND GRINDING TOOLS
Micro tools	Diameter stepping	STARTEC PG-1
	Flute, clearance and face surface grinding	STARTEC MT-1 STARTEC XP-P

Production of shaft tools made from HSS

Tool	Grinding application	Our product recommendation
Drilling, cutting and reaming tools, taps	Cut-off grinding	DIAMOND RESIN
	Centreless grinding	CSS ULTRA CSS REGULATOR
	Peel grinding	CERAMIC CBN
	Flute grinding	CONVENTIONAL GRINDING TOOLS STARTEC XP-P+
	Clearance and face surface grinding	CONVENTIONAL GRINDING TOOLS STARTEC XP-P+
	Roughing teeth grinding	CBN GRINDING TOOLS
	Thread grinding	CSS ULTRA

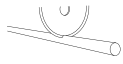
Regrinding of shaft tools

Tool	Material	Grinding application	Our product recommendation
Drills, cutters, reaming tools	Tungsten carbide HSS	Wet regrinding	STARTEC BASIC
	Tungsten carbide	Dry regrinding	DIAGO
	HSS	Dry regrinding	AMIGO
	PCD, PCBN	Regrinding	SKYTEC BASIC+



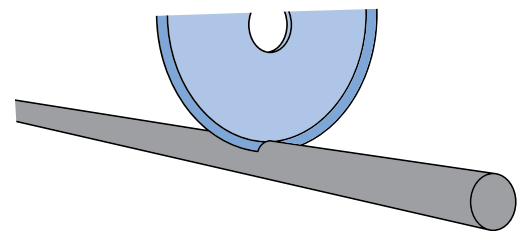
1. PRODUCTION OF SHAFT TOOLS MADE FROM TUNGSTEN CARBIDE

1.1 CUT_OFF GRINDING	10
Cut-off grinding of tungsten carbide blanks	
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on end mills	
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Precision grinding wheels for producing high-precision micro tools	

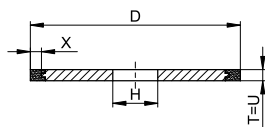


1.1 CUT-OFF GRINDING OF TUNGSTEN CARBIDE BLANKS

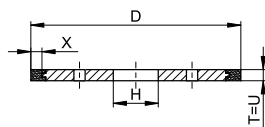
Shaft tools are often manufactured from standardised tungsten carbide blanks. These must be shortened to the individual tool length. The cut-off wheels from TYROLIT impress with cool cutting and optimum wear resistance.



Stock range



Shape 1A1R

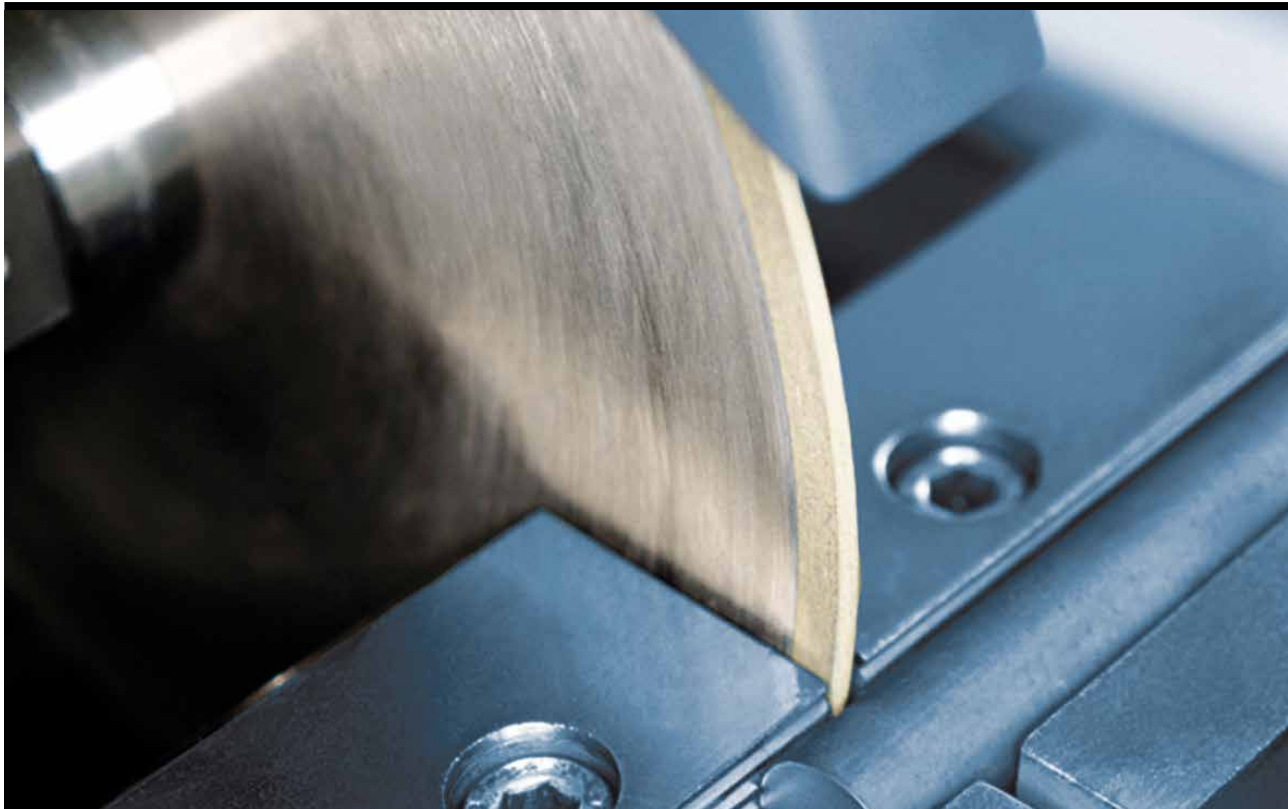


Form 1A1RH

	Shape	Type number	D	T	H	U	X	Specification	Stock	Note
	1A1R	157800	75	0.8	20	0.8	5	D126C75B	●	
	1A1RH	299109	75	1	20	1	5	D151C75B	●	
		119395	100	0.8	20	0.8	5	D126C100B	●	
		100660	100	1	20	1	5	D126C100B	●	
		101000	125	1	20	1	5	D126C100B	●	
		148132	150	1	20	1	5	D126C100B	●	
		278979	150	1	20	1	5	D126C100B	●	
		175978	150	1	20	1	7	D126C100B	●	
		667995	200	1	22	1	5	D126C100B	●	For Ihle machine
		858531	200	1,2	20	1,2	7	D126C100B	●	
		603284	200	1.2	30	1.2	7	D126C100B	●	For Wimmer machine
	708153	250	1.2	30	1.2	5	D126C100B	●	For Wimmer machine	

● ... Available ex stock

TC tool production
HSS tool production
Regrinding
Basics



Standard range

	Shape	Type number	D	T	H	U	X	Specification	Note
	1A1R	618209	75	0.8	10	0.8	5	D126C100B	For EWAG WS11 machine
	1A1RH	187992	150	1	30	1	5	D126C100B	For Wimmer machine
		327616	200	1.2	20	1.2	7	D126C100B	
		145778	200	1.2	22	1.2	7	D126C100B	For Ihle machine
		412224	250	1.2	20	1.2	5	D126C100B	
		403700	300	1.5	20	1.5	7	D126C100B	
		377940	300	1.5	32	1.5	5	D126C100B	

Customer-specific grinding tools can be produced on request.
Delivery times on request.

Application recommendation

a. Application recommendation for dressing

TYROLIT cut-off wheels can be used in delivery condition, without dressing.

b. Application recommendation for cut-off grinding

For the use of our cut-off wheels, the TYROLIT application engineers recommend the following parameters:

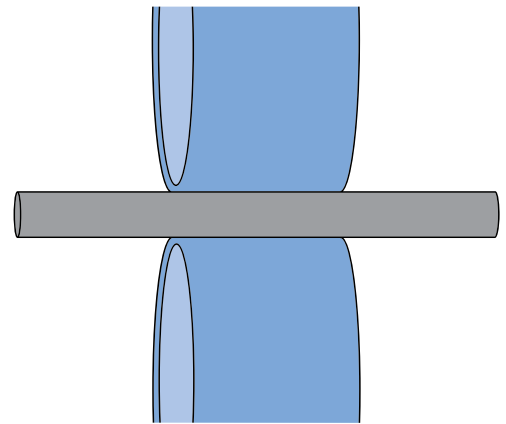
Cutting speed v_c [m/s]	Feed v_t [mm/sec]	Cooling
22 - 25	0.1 - 1	Required

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping.
Please observe the safety information on page 122.



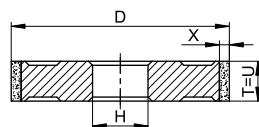
1.2 CENTRELESS THROUGH FEED GRINDING OF TUNGSTEN CARBIDE TOOL BLANKS

For the efficient centreless through feed grinding of tungsten carbide rods, TYROLIT offers powerful grinding tools and adapted regulating wheels. Tailored specifications ensure controlled stock removal and an optimum surface finish on the rods.

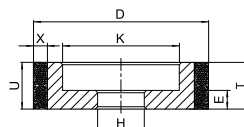


Standard range

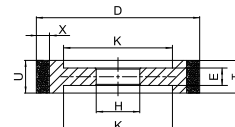
Grinding wheels for all standard external cylindrical grinding machines



Shape 1A1



Shape 6A1



Shape 9A1

	Shapes	D	T=U	H	X	Single coating up to T=U
	1A1	150, 175	50 - 80	31.75 - 60	3, 4, 5, 6	50
	6A1	200	50 - 120	50 - 150	3, 4, 5, 6	
	9A1	250	50 - 150	100 - 170	3, 4, 5, 6	
		300	50 - 205	50 - 230	3, 4, 5, 6, 10	
		350	50 - 205	90 - 254	3, 4, 5, 6, 10	
		400, 450, 500	50 - 250	127 - 305	3, 4, 5, 6, 10	

Customer-specific grinding tools can be produced on request.
Delivery time on request.

TC tool production
HSS tool production
Regrounding
Basics



Application recommendation

a. Application recommendation for dressing

The diamond centreless grinding wheels are dressed in the machine using SiC dressing wheels.

b. Application recommendation for centreless through feed grinding

For centreless through feed grinding, the TYROLIT application engineers recommend the following specifications and parameters:

Grinding process	Recommended specification	Cutting speed v_c [m/s]
Pre-grinding	11D151 C75 B52 BQ	18 – 23
Finish grinding	11D46 C75 B52 BA	18 – 23
Polish grinding	41D15S C50 B52 AL	16 - 20

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping.

Please observe the safety information on page 122.

CSS REGULATOR

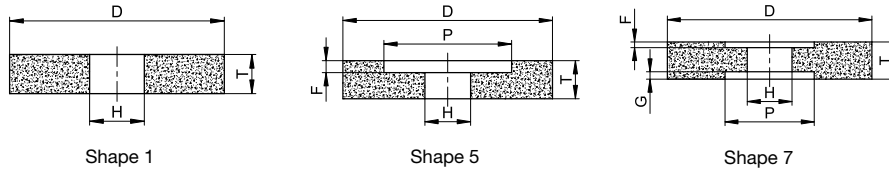
REGULATING WHEELS FOR ALL STANDARD CENTRELESS GRINDING MACHINES

Centreless grinding is a complex grinding process. In addition to a good grinding wheel and the correct setting parameters, a reliable regulating wheel is required to stabilise the grinding process. The regulating wheels from the CSS Regulator product line guarantee a long tool life and an optimum coefficient of friction for reliable control of the workpiece.





Shapes and dimensions for regulating wheels



We produce the dimensions individually, according to customer requirements.
Delivery time on request.

Specification recommendations for regulating wheels

Standard recommendations

Application	Specification
Centerless through feed grinding	CRA 100-BR60
Plunge cut grinding	CRA 100-BR63

Finer grit sizes, 120, 150, 180 and 220, are available for special applications.

Further recommendations

Application	Specification
Regulating/drive wheel for abrasive belts	A240-BE19F
Soft regulating wheel, also for non-metallic workpieces	A80-BE41
Ceramic regulating wheel for special applications	10A809Q2AV56

In order to achieve an optimum grinding process, the TYROLIT application engineers support you in defining your individual grinding solution.

TC tool production

HSS tool production

Regrinding

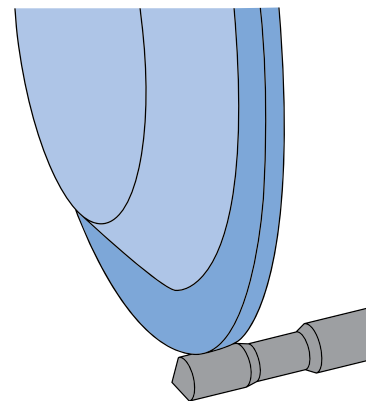
Basics



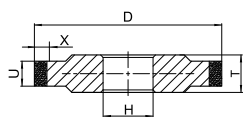
1.3 STARTEC PG-1 GRINDING TOOLS FOR HIGH-SPEED EXTERNAL CYLINDRICAL LONGITUDINAL GRINDING

With the STARTEC PG-1 product line, TYROLIT is for the first time offering innovative roughing and finishing wheels especially for the peel grinding of tungsten carbide tool blanks.

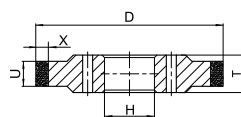
A high-strength metal bond is used for the roughing wheel. This enables especially cost-effective and reliable process control. Long-life ceramic or metal bonds are used for the finishing wheel. This enables even large stock removal fluctuations to be compensated after roughing, and maximum surface quality to be achieved.



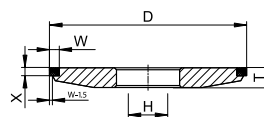
Stock range



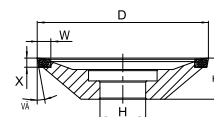
Shape 14A1



Shape 14A1H



Shape 4B9P



Shape 12B9

Reinecker SF40



Shape	Type number	D	T	H	U	X	Specification	v _{max}	Stock	Note
14A1	34077044	350	18	127	5	6	STARTEC PG-1 D91MPG-1	140	●	Rough grinding wheel
14A1H	34042116	250	18	90	5	5	STARTEC PG-1 D46VPG-1	140	●	Vitrified bonded finishing wheel

Reinecker RS500/RS700



Shape	Type number	D	T	H	U	X	Specification for TC	v _{max}	Stock	Note
14A1	34077044	350	18	127	5	6	STARTEC PG-1 D91MPG-1	140	●	Rough grinding wheel
	34025539	350	18	127	5	5	STARTEC PG-1 D46VPG-1	125	●	Vitrified bonded finishing wheel




TC tool production

HSS tool production

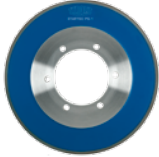
Regrinding

Basics

Junker Quickpoint

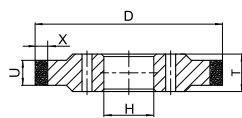
	Shape	Type number	D	T	H	U	X	Specification for TC	vmax	Stock	Note
	14A1	34164238	350	18	126.94	5	6	STARTEC PG-1 D54MPG-1	140	●	JUNKER standard bore ring, central
		34164236	350	25	126.94	5	6	STARTEC PG-1 D54MPG-1	140	●	JUNKER standard bore ring, plane-side coating

Rollomatic NP3/NP4/NP5

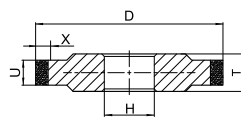
	Shape	Type number	D	T	H	W	X	V°	Specification for TC	vmax	Stock	Note
	4B9P	34077270	200	20	31.75	5	6	11	STARTEC PG-1 D91MPG-1	80	●	Rough grinding wheel
		34159731	250	20	31.75	5	6	11	STARTEC PG-1 D64MPG-1	80	●	D64 rough grinding wheel for tool d < 3 mm
		34058513	250	20	31.75	5	6	11	STARTEC PG-1 D91MPG-1	80	●	D91 rough grinding wheel for tool d ≥ 3 mm
	12B9	34181642	150	24	31.75	6	3	10	STARTEC PG-1 D15BPG-1	63	●	D15 resin-bonded grinding wheel
		34024068	150	24	31.75	6	3	10	STARTEC PG-1 D25VPG-1	80	●	Vitrified bonded finishing wheel
		142891	150	24	31.75	6	3	10	STARTEC PG-1 D46VPG-1	80	●	Vitrified bonded finishing wheel

● ... Available ex stock

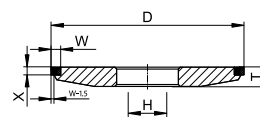
Standard range



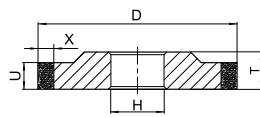
Shape 14A1H



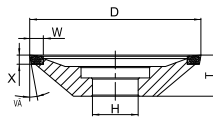
Shape 14A1



Shape 4B9P




Shape 3A1




Shape 12B9


Reinecker SF40

	Shape	Type number	D	T	H	U	X	Specification	vmax	Note
	14A1H	34043145	250	18	90	5	5	STARTEC PG-1 D46MPG-1	140	Metal-bonded finishing wheel

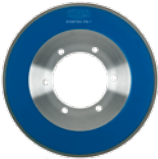
**Reinecker RS500/RS700**

Shape	Type number	D	T	H	U	X	Specification for TC	vmax	Note	
	14A1	34164191	350	18	127	5	6	STARTEC PG-1 D46MPG-1	140	Metal-bonded finishing wheel

Junker Quickpoint

Shape	Type number	D	T	H	U	X	Specification for TC	vmax	Note	
	14A1	34164239	350	18	126.94	5	6	STARTEC PG-1 D54MPG-1	140	JUNKER standard bore ring, plane-side coating

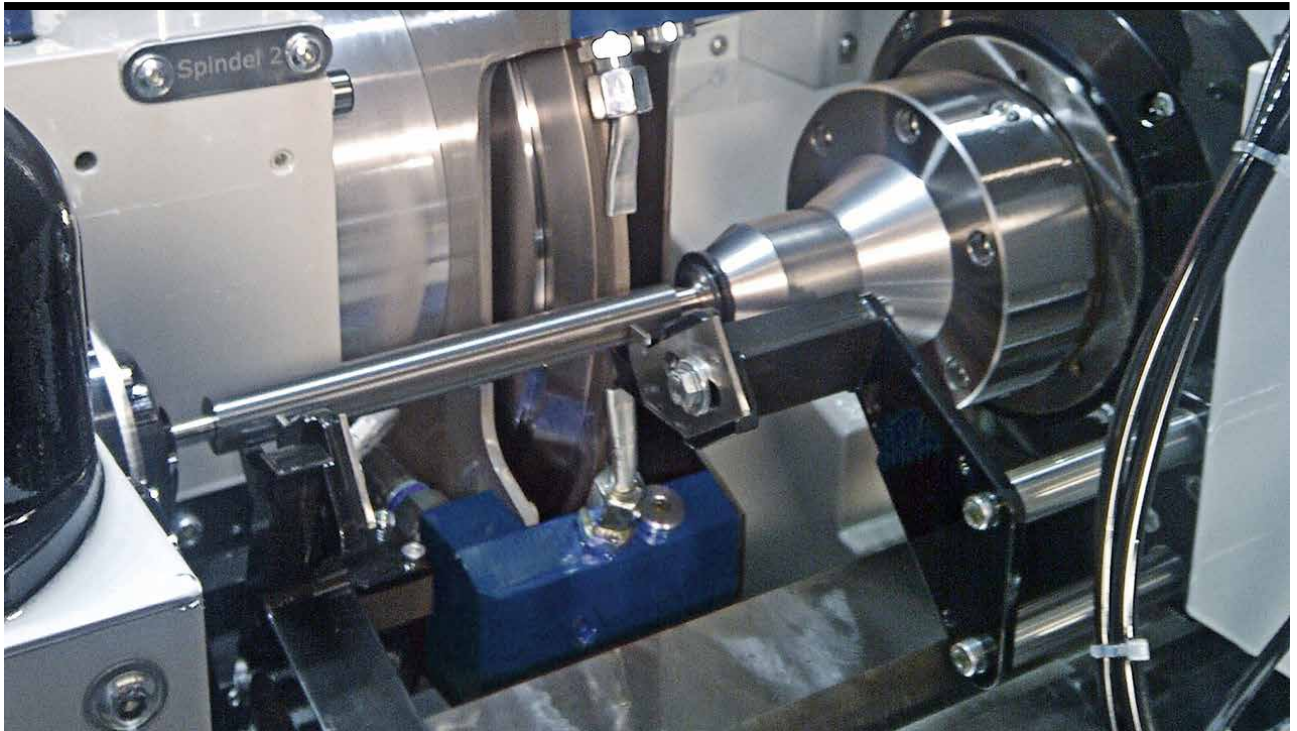
Rollomatic NP3/NP4/NP5

Shape	Type number	D	T	H	U	X	V°	Specification for TC	vmax	Note	
	4B9P	34180315	250	20	31.75	5	6	11	STARTEC PG-1 D54MPG-1	80	D54 rough grinding wheel for tool d < 3 mm
	12B9	34052953	150	24	31.75	6	3	10	STARTEC PG-1 D20BPG-1	63	D20 resin-bonded grinding wheel
	34024511	34024511	150	24	31.75	6	3	10	STARTEC PG-1 D35VPG-1	80	Vitrified bonded finishing wheel

Standard CNC machines

Shape	Type number	D	T	H	U	X	V°	Specification for TC	vmax	Note	
	3A1	34164143	150	15	20	5	5		21D54 C150 M787 ST		
		34203493	150	15	20	5	5		21D54 C125 M787 ST		

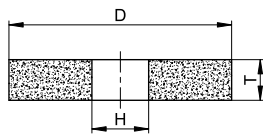
Customer-specific grinding tools can be produced on request.
Delivery times on request.



Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing the grinding wheels.



Shape 1

Dressing wheels

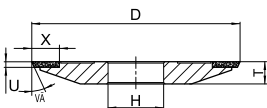
	Shape	Type number	D	T	H	Specification	Stock	Note
	1	7348	200	20	20	C80 j5 V15	●	Dressing D91 rough grinding wheel in the machine
		34163206	200	20	20	C120 j5 V15	●	External dressing of wheel in D54/D46
		619701	250	12	51	C80 j5 V15	●	External dressing of rough grinding wheel in D91
		889495	250	12	51	C120 j5 V15	●	External dressing of wheel in D54/D46
		631579	250	12	51	C240 H5 AV18	●	External dressing of finishing wheel in D46
		34047880	300	10	76.2	C80 j5 V15	●	External dressing of rough grinding wheel in D91
		34066742	300	10	76.2	C120 j5 V15	●	External dressing of rough grinding wheel in D54/D46
		57814	300	10	76.2	C240 H5 AV18	●	External dressing of finishing wheel in D46



Recommended dressing parameters for grinding wheels with metal bond

Dressing process	Grinding wheel cutting speed vc [m/s]	Dressing wheel cutting speed vc [m/s]	Infeed/stroke ae [mm]	Feed vt [mm/min]	Grinding direction		Recommended specification	Note
					Forward	Reverse		
In the machine	10 - 12	22 - 24	0.033	800		x	C80 for D54 to D91 rough grinding wheels C120 for D46 finishing wheels	Rough dressing, approx. 60 strokes
			0.01	575	x			
External on dressing machine	3 - 5	22 - 24	0.033	according to machine		x	C80 for D54 to D91 rough grinding wheels C120 for D46 finishing wheels	Rough dressing, approx. 60 strokes
			0.01	according to machine	x			

Vitrified bonded grinding wheels can only be cost-effectively dressed using diamond dressing wheels.



Shape 3A2H

Diamond dressing wheels for Reinecker machines

Shape	Type number	D	T	H	W	Specification	Note
3A2H	34037195	140	7.5	75	5	D426XG RPX	Dressing of ceramic Wheel
	34033080	175	11	110	5	D426XG RPX	Dressing of ceramic wheel, mounting on C-axis

Recommended dressing parameters for grinding wheels with vitrified bond

Dressing process	Grinding wheel cutting speed vc [m/s]	Dressing wheel cutting speed vc [m/s]	Infeed/stroke ae [mm]	Feed vt [mm/min]	Grinding direction		Recommended specification	Note
					Forward	Reverse		
In the machine	24 - 26	20 - 22	0.003	220 - 230	x		D426 XG RPX	Approx. 30 strokes

**b. Application recommendation for peel grinding**

For the use of our grinding wheels, the TYROLIT application engineers recommend the following parameters:

Reineker SF40

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Plunge feed vt [mm/min]	Feed vt [mm/min]	Grinding direction		Cooling	Note
					Forward	Reverse		
Rough grinding	105 - 120	0.5 - 0.7	7 - 10	100 - 160		x	Required	Workpiece RPM dependent on diameter
Finish grinding	90 - 105	0.02 - 0.04	15 - 35	40 - 70		x	Required	Workpiece RPM dependent on diameter

Reineker RS500/700

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Plunge feed vt [mm/min]	Feed vt [mm/min]	Grinding direction		Cooling	Note
					Forward	Reverse		
Rough grinding	105 - 120	0.5 - 0.7	7 - 10	100 - 160		x	Required	Workpiece RPM dependent on diameter
Finish grinding	90 - 105	0.02 - 0.04	7 - 10	40 - 70		x	Required	Workpiece RPM dependent on diameter

Junker Quickpoint

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Plunge feed vt [mm/min]	Feed vt [mm/min]	Grinding direction		Cooling	Note
					Forward	Reverse		
Rough grinding	105 - 120	0.1 - 1.0	6 - 8	80 - 90		x	Required	Workpiece RPM dependent on diameter

Rollomatic NP3, NP4, NP5

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Plunge feed vt [mm/min]	Feed vt [mm/min]	Grinding direction		Cooling	Note
					Forward	Reverse		
Rough grinding	60 - 90	0.1 - 0.2		0.2 - 0.4		x	Required	Workpiece RPM dependent on diameter
Finish grinding	40 - 60	0.02 - 0.04		0.2 - 0.4		x	Required	Workpiece RPM dependent on diameter

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.

In order to achieve an optimum grinding process, our application engineers support you in defining your individual grinding solution.

TC tool production

HSS tool production

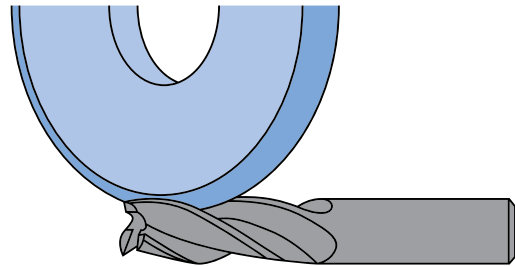
Regrinding

Basics

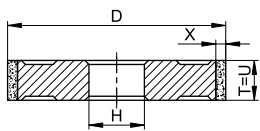
1.4 STARTEC XP-P GRINDING TOOLS FOR FLUTE GRINDING

The high quality requirements for high-tech tungsten carbide stock removal tools and the sustained cost pressure require the efficient use of state-of-the-art CNC tool grinding machines. In order to fully exploit the advantages of CNC tool grinding machines, an innovative grinding tool is required.

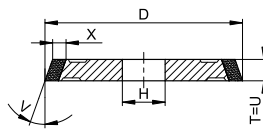
The STARTEC XP-P line now offers improved profile retention and low power consumption. State-of-the-art raw material combinations and tried and tested production sequences ensure optimum tool quality for our customers.



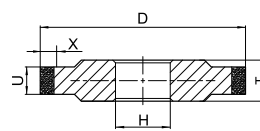
Stock range




Shape 1A1

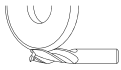


Shape 1V1



Shape 14A1

	Shape	Type number	D	T	H	U	X	V°	Specification	Stock
	1A1	679931	75	6	20	6	6		STARTEC-XP-P D54-3-MXPP	●
		662236	75	6	20	6	10		STARTEC-XP-P D54-3-MXPP	●
		719821	75	8	20	8	10		STARTEC-XP-P D54-3-MXPP	●
		679936	75	10	20	10	6		STARTEC-XP-P D54-3-MXPP	●
		742939	75	10	20	10	10		STARTEC-XP-P D54-3-MXPP	●
		679938	100	6	20	6	6		STARTEC-XP-P D54-3-MXPP	●
		695084	100	6	20	6	10		STARTEC-XP-P D54-3-MXPP	●
		679939	100	10	20	10	6		STARTEC-XP-P D54-3-MXPP	●
		682530	100	10	20	10	10		STARTEC-XP-P D54-3-MXPP	●
		694995	100	10	31.75	10	6		STARTEC-XP-P D54-3-MXPP	●
		711619	100	10	31.75	10	10		STARTEC-XP-P D54-3-MXPP	●
		679940	100	12	20	12	6		STARTEC-XP-P D54-3-MXPP	●
		700297	100	12	20	12	10		STARTEC-XP-P D54-3-MXPP	●
		685346	100	12	31.75	12	6		STARTEC-XP-P D54-3-MXPP	●
		724476	100	12	31.75	12	10		STARTEC-XP-P D54-3-MXPP	●

TC tool
productionHSS tool
production

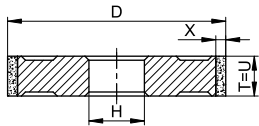
Regrinding

Basics

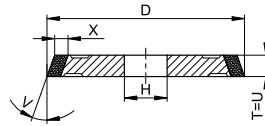
Shape	Type number	D	T	H	U	X	V°	Specification	Stock
	1A1	679942	100	15	20	15	6	STARTEC-XP-P D54-3-MXPP	●
		675436	100	15	20	15	10	STARTEC-XP-P D54-3-MXPP	●
		679945	125	6	20	6	6	STARTEC-XP-P D54-3-MXPP	●
		686906	125	6	20	6	10	STARTEC-XP-P D54-3-MXPP	●
		679947	125	10	20	10	6	STARTEC-XP-P D54-3-MXPP	●
		682527	125	10	20	10	10	STARTEC-XP-P D54-3-MXPP	●
		702678	125	10	31.75	10	6	STARTEC-XP-P D54-3-MXPP	●
		685975	125	10	31.75	10	10	STARTEC-XP-P D54-3-MXPP	●
		679948	125	12	20	12	6	STARTEC-XP-P D54-3-MXPP	●
		682529	125	12	20	12	10	STARTEC-XP-P D54-3-MXPP	●
		712482	125	12	31.75	12	6	STARTEC-XP-P D54-3-MXPP	●
		711866	125	12	31.75	12	10	STARTEC-XP-P D54-3-MXPP	●
		679949	125	15	20	15	6	STARTEC-XP-P D54-3-MXPP	●
		683963	125	15	20	15	10	STARTEC-XP-P D54-3-MXPP	●
		684827	150	8	20	8	10	STARTEC-XP-P D54-3-MXPP	●
		679951	150	10	20	10	10	STARTEC-XP-P D54-3-MXPP	●
	679952	150	12	20	12	10	STARTEC-XP-P D54-3-MXPP	●	
	679953	150	15	20	15	10	STARTEC-XP-P D54-3-MXPP	●	
1V1	680097	75	6	20	6	6	15	STARTEC-XP-P D54-3-MXPP	●
	680098	75	8	20	8	10	15	STARTEC-XP-P D54-3-MXPP	●
	680099	75	10	20	10	10	15	STARTEC-XP-P D54-3-MXPP	●
	680100	100	6	20	6	10	15	STARTEC-XP-P D54-3-MXPP	●
	680102	100	10	20	10	10	15	STARTEC-XP-P D54-3-MXPP	●
	701700	100	10	20	10	10	20	STARTEC-XP-P D54-3-MXPP	●
	680104	100	12	20	12	10	15	STARTEC-XP-P D54-3-MXPP	●
	694778	100	12	20	12	10	20	STARTEC-XP-P D54-3-MXPP	●
	694777	100	12	20	12	10	30	STARTEC-XP-P D54-3-MXPP	●
	680107	100	12	20	12	10	45	STARTEC-XP-P D54-3-MXPP	●
	680110	100	15	20	15	10	15	STARTEC-XP-P D54-3-MXPP	●
	680112	125	6	20	6	10	15	STARTEC-XP-P D54-3-MXPP	●
	680114	125	10	20	10	10	15	STARTEC-XP-P D54-3-MXPP	●
	688961	125	10	20	10	10	20	STARTEC-XP-P D54-3-MXPP	●
	680115	125	10	20	10	10	45	STARTEC-XP-P D54-3-MXPP	●
	680116	125	12	20	12	10	15	STARTEC-XP-P D54-3-MXPP	●
	712126	125	12	20	12	10	30	STARTEC-XP-P D54-3-MXPP	●
	680118	125	12	20	12	10	45	STARTEC-XP-P D54-3-MXPP	●
	680120	125	15	20	15	10	15	STARTEC-XP-P D54-3-MXPP	●
	680123	150	10	20	10	10	10	STARTEC-XP-P D54-3-MXPP	●
	680124	150	12	20	12	10	10	STARTEC-XP-P D54-3-MXPP	●
14A1	680140	75	8	20	4	6		STARTEC-XP-P D54-3-MXPP	●
	680138	100	6	20	4	6		STARTEC-XP-P D54-3-MXPP	●
	680137	125	6	20	4	6		STARTEC-XP-P D54-3-MXPP	●

● ... Available ex stock

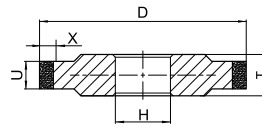
Standard range



Shape 1A1



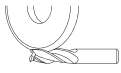
Shape 1V1



Shape 14A1

Shape	Type number	D	T	H	U	X	V°	Specification
1A1	721063	100	6	31.75	6	10		STARTEC-XP-P D54-3-MXPP
	760405	100	10	20	10	15		STARTEC-XP-P D54-3-MXPP
	760408	100	10	31.75	10	15		STARTEC-XP-P D54-3-MXPP
	760411	100	12	20	12	15		STARTEC-XP-P D54-3-MXPP
	749835	100	12	31.75	12	15		STARTEC-XP-P D54-3-MXPP
	760416	100	15	20	15	15		STARTEC-XP-P D54-3-MXPP
	756459	100	15	31.75	15	10		STARTEC-XP-P D54-3-MXPP
	704593	125	6	31.75	6	10		STARTEC-XP-P D54-3-MXPP
	753463	125	10	20	10	15		STARTEC-XP-P D54-3-MXPP
	760422	125	10	31.75	10	15		STARTEC-XP-P D54-3-MXPP
	721382	125	12	20	12	15		STARTEC-XP-P D54-3-MXPP
	715926	125	12	31.75	12	15		STARTEC-XP-P D54-3-MXPP
	743210	125	15	20	15	15		STARTEC-XP-P D54-3-MXPP
	730248	125	15	31.75	15	10		STARTEC-XP-P D54-3-MXPP
	760511	125	15	31.75	15	15		STARTEC-XP-P D54-3-MXPP
	716183	150	12	31.75	12	10		STARTEC-XP-P D54-3-MXPP
713310	150	15	31.75	15	10		STARTEC-XP-P D54-3-MXPP	
1V1	751871	75	6	20	6	6	45	STARTEC-XP-P D54-3-MXPP
	98381	75	8	20	8	6	45	STARTEC-XP-P D54-3-MXPP
	704704	75	15	20	15	10	20	STARTEC-XP-P D54-3-MXPP
	703931	100	6	20	6	10	45	STARTEC-XP-P D54-3-MXPP
	702686	100	10	31.75	10	10	15	STARTEC-XP-P D54-3-MXPP
	703926	100	10	20	10	10	45	STARTEC-XP-P D54-3-MXPP
	712500	100	12	31.75	12	10	15	STARTEC-XP-P D54-3-MXPP
	724675	100	12	31.75	12	10	45	STARTEC-XP-P D54-3-MXPP
	702690	100	15	31.75	15	10	15	STARTEC-XP-P D54-3-MXPP
	702690	100	15	31.75	15	10	15	STARTEC-XP-P D54-3-MXPP
	757435	100	15	20	15	10	45	STARTEC-XP-P D54-3-MXPP
	724677	125	6	31.75	6	10	15	STARTEC-XP-P D54-3-MXPP
	666189	125	6	20	6	10	45	STARTEC-XP-P D54-3-MXPP
	702693	125	10	31.75	10	10	15	STARTEC-XP-P D54-3-MXPP
	699444	125	10	20	10	10	30	STARTEC-XP-P D54-3-MXPP
	703409	125	10	31.75	10	10	45	STARTEC-XP-P D54-3-MXPP
	700882	125	12	31.75	12	10	15	STARTEC-XP-P D54-3-MXPP
	708987	125	12	31.75	12	10	45	STARTEC-XP-P D54-3-MXPP





TC tool production

HSS tool production

Regrinding

Basics



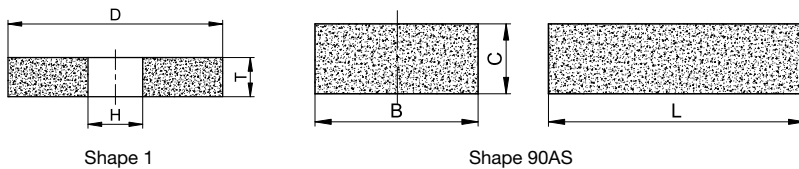
	Shape	Type number	D	T	H	U	X	V°	Specification
	1V1	702694	125	15	31.75	15	10	15	STARTEC-XP-P D54-3-MXPP
		735986	125	15	20	15	10	20	STARTEC-XP-P D54-3-MXPP
		717345	125	15	20	15	10	45	STARTEC-XP-P D54-3-MXPP
		714967	150	10	31.75	10	10	10	STARTEC-XP-P D54-3-MXPP
		724684	150	12	31.75	12	10	10	STARTEC-XP-P D54-3-MXPP
	14A1	655674	75	6	20	4	6		STARTEC-XP-P D54-3-MXPP
		723430	100	6	31.75	4	6		STARTEC-XP-P D54-3-MXPP
		704589	125	6	31.75	4	6		STARTEC-XP-P D54-3-MXPP
		714347	150	10	20	6	10		STARTEC-XP-P D54-3-MXPP



Customer-specific grinding tools can be produced on request.
Delivery times on request.

Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing. Roughening with the sharpening stick before initial use is required, as the product is delivered in the unsharpened condition.



	Shape	Type number	D	T	H	Specification for TC	Stock	Note
	1	7348	200	20	20	C80J5V15	●	For grit sizes > D64
		3135	200	20	32	C80J5V15	●	For grit sizes > D64
		34163206	200	20	20	C120J5V15	●	For grit sizes ≤ D54
		250491	250	12	51	C80H8V15	●	For grit sizes > D64
		619701	250	12	51	C80J8V15	●	Harder, for grit sizes > D64
		413027	250	12	51	C120H5V15	●	For grit sizes ≤ D54
		708196	250	12	51	89A120M5AV217	●	Alternative to SiC, for grit sizes ≤ D54
		34047880	300	10	76.2	C80J5V15	●	For grit sizes > D64
		34066742	300	10	76.2	C120J5V15	●	For grit sizes ≤ D54
	Shape	Type number	B	C	L	Specification	Stock	Note
	90AS	845594	24	13	100	A120J7V	●	For grit sizes ≥ 126
		395773	50	25	200	A120H7V	●	For grit sizes ≥ 126
		460976	50	25	200	A120J7V	●	For grit sizes ≥ 126
		112055	50	25	200	C220 C4 B	●	For grit sizes > 46 and < 126, resinoid bond
		678952	24	13	100	A240H5V	●	For grit sizes > 46 and < 126
		678953	24	13	200	A240H5V	●	For grit sizes > 46 and < 126
		464290	50	25	200	A240J7V	●	For grit sizes > 46 and < 126
		33531	25	13	100	A600-25V	●	For grit sizes ≤ 46
		251584	50	25	200	A600-25V	●	For grit sizes ≤ 46

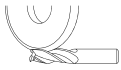
● ... Available ex stock
 Customer-specific grinding tools can be produced on request. Delivery times on request.

b. Application recommendation for flute grinding

For the use of our STARTEC XP-P flute grinding wheels, the TYROLIT application engineers recommend the following parameters:

Flute grinding with diamond grinding wheels STARTEC XP-P

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Flute grinding	16 - 22	see Q'w table		x		Required	
Face grinding	20 - 24	Full depth	60 - 150			Required	Shape 1V1



TC tool production

HSS tool production

Regrinding

Basics

Q'w table

The values in the following table provide information on performance during the Q'w grinding process. Via the infeed a_e (profile depth), you can find the optimum feed v_t for use with the STARTEC XP-P flute grinding wheels. The achieved feed values depend on the workpiece diameter, the spiral angle of the flutes, the cooling lubricant used and the machine-tool output available.

Standard values for flute grinding

Product line	vc [m/s]	Q'w [mm ³ /s.mm]	
		Standard	TOP PERFORMANCE
STARTEC XP-P	16-22	3 to 6	7 to 10

		Feed v_t [mm/min]												
		30	40	50	60	70	80	100	120	140	160	180	200	220
Profile depth a_e [mm]	2.6								5.2	6.1	6.9	7.8	8.7	9.5
	2.8								5.6	6.5	7.5	8.4	9.3	10.3
	3.0							5.0	6.0	7.0	8.0	9.0	10.0	
	3.2							5.3	6.4	7.5	8.5	9.6	10.7	
	3.4							5.7	6.8	7.9	9.1	10.2	11.3	
	3.6						4.8	6.0	7.2	8.4	9.6	10.8		
	3.8						5.1	6.3	7.6	8.9	10.1	11.4		
	4.0						5.3	6.7	8.0	9.3	10.7	12.0		
	4.2					4.9	5.6	7.0	8.4	9.8	11.2			
	4.4					5.1	5.9	7.3	8.8	10.3	11.7			
	4.6				4.6	5.4	6.1	7.7	9.2	10.7				
	4.8				4.8	5.6	6.4	8.0	9.6	11.2				
	5.0				5.0	5.8	6.7	8.3	10.0	11.7				
	5.5			4.6	5.5	6.4	7.3	9.2	11.0					
	6.0			5.0	6.0	7.0	8.0	10.0	12.0					
	6.5		4.3	5.4	6.5	7.6	8.7	10.8						
	7.0		4.7	5.8	7.0	8.2	9.3	11.7						
	7.5	3.8	5.0	6.3	7.5	8.8	10.0							
	8.0	4.0	5.3	6.7	8.0	9.3	10.7							
8.5	4.3	5.7	7.1	8.5	9.9	11.3								

Calculation of values

$$Q'w = a_e \times v_t / 60$$

$$v_t = Q'w \times 60 / a_e$$

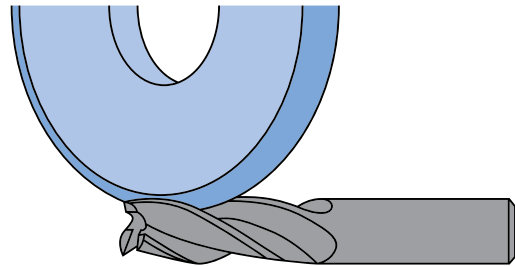
- v_t standard STARTEC XP-P
- v_t optimisation potential

Resin-bonded diamond grinding wheels for flute grinding are listed in Chapter 3.1.

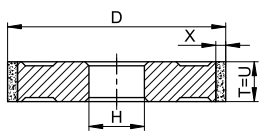
1.5 STARTEC RC GRINDING TOOLS FOR FLUTE GRINDING

Tyrolit is setting new standards in high performance flute grinding with the STARTEC RC product line. The new specifications feature impressively low grinding forces and maximum stock removal rates with little profile wear.

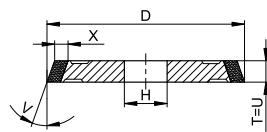
The STARTEC RC grinding tools guarantee maximum precision for your tools and an optimum surface finish. This is all down to a tailored diamond quality, a new bond system and innovative production processes.



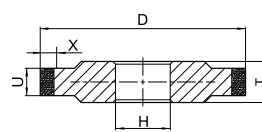
Stock range




Shape 1A1




Shape 1V1



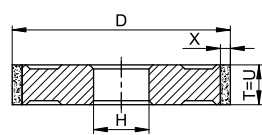
Shape 14A1

	Shape	Type number	D	T	H	U	X	V°	Specification	Stock
	1A1	34263891	75	6	20	6	10		STARTEC RC D54-28-M-1	●
		34263892	75	8	20	8	10		STARTEC RC D54-28-M-1	●
		34263894	75	10	20	10	10		STARTEC RC D54-28-M-1	●
		34263898	100	6	20	6	10		STARTEC RC D54-28-M-1	●
		34266405	100	8	20	8	10		STARTEC RC D54-28-M-1	●
		34257797	100	10	20	10	10		STARTEC RC D54-28-M-1	●
		34264111	100	10	31,75	10	10		STARTEC RC D54-28-M-1	●
		34264115	100	12	20	12	10		STARTEC RC D54-28-M-1	●
		34264159	100	12	31,75	12	10		STARTEC RC D54-28-M-1	●
		34241206	100	15	20	15	10		STARTEC RC D54-28-M-1	●
		34264172	125	6	20	6	10		STARTEC RC D54-28-M-1	●
		34266407	125	8	20	8	10		STARTEC RC D54-28-M-1	●
		34248994	125	10	20	10	10		STARTEC RC D54-28-M-1	●
		34264180	125	10	31,75	10	10		STARTEC RC D54-28-M-1	●
		34264195	125	12	20	12	10		STARTEC RC D54-28-M-1	●
		34264198	125	12	31,75	12	10		STARTEC RC D54-28-M-1	●
		34249863	125	15	20	15	10		STARTEC RC D54-28-M-1	●
		34264210	150	8	20	8	10		STARTEC RC D54-28-M-1	●
		34256267	150	10	20	10	10		STARTEC RC D54-28-M-1	●

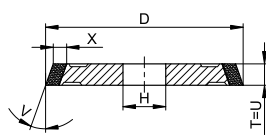
	Shape	Type number	D	T	H	U	X	V°	Specification	Stock
	1A1	34264213	150	12	20	12	10		STARTEC RC D54-28-M-1	●
		34264216	150	15	20	15	10		STARTEC RC D54-28-M-1	●
	1V1	34264818	150	10	20	10	10	10	STARTEC RC D54-28-M-1	●
		34264823	150	12	20	12	10	10	STARTEC RC D54-28-M-1	●
	14A1	34264849	75	6	20	4	6		STARTEC RC D54-28-M-1	●
		34266308	100	6	20	4	6		STARTEC RC D54-28-M-1	●
		34266361	125	6	20	4	6		STARTEC RC D54-28-M-1	●

● ... Available ex stock

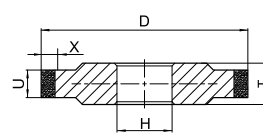
Standard range




Shape 1A1

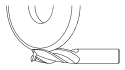



Shape 1V1



Shape 14A1

	Shape	Type number	D	T	H	U	X	V°	Specification	Note
	1A1	34263879	75	6	20	6	6		STARTEC RC D54-28-M-1	
		34263893	75	10	20	10	6		STARTEC RC D54-28-M-1	
		34263895	100	6	20	6	6		STARTEC RC D54-28-M-1	
		34263899	100	6	31,75	6	6		STARTEC RC D54-28-M-1	
		34263900	100	6	31,75	6	10		STARTEC RC D54-28-M-1	
		34264098	100	6	32	6	6		STARTEC RC D54-28-M-1	
		34259993	100	10	20	10	6		STARTEC RC D54-28-M-1	
		34264099	100	10	20	10	15		STARTEC RC D54-28-M-1	
		34264100	100	10	31,75	10	6		STARTEC RC D54-28-M-1	
		34264112	100	10	31,75	10	15		STARTEC RC D54-28-M-1	
		34264113	100	10	32	10	6		STARTEC RC D54-28-M-1	
		34264114	100	12	20	12	6		STARTEC RC D54-28-M-1	
		207854	100	12	20	12	15		STARTEC RC D54-28-M-1	
		34264116	100	12	31,75	12	6		STARTEC RC D54-28-M-1	
		34264161	100	12	31,75	12	15		STARTEC RC D54-28-M-1	
		34264164	100	12	32	12	6		STARTEC RC D54-28-M-1	
		34219293	100	15	20	15	6		STARTEC RC D54-28-M-1	
		34264168	100	15	20	15	15		STARTEC RC D54-28-M-1	
		34264169	100	15	31,75	15	6		STARTEC RC D54-28-M-1	
		34264170	100	15	31,75	15	10		STARTEC RC D54-28-M-1	
		34264171	125	6	20	6	6		STARTEC RC D54-28-M-1	
		34264173	125	6	31,75	6	6		STARTEC RC D54-28-M-1	
		34264174	125	6	32	6	6		STARTEC RC D54-28-M-1	
		34264176	125	10	20	10	6		STARTEC RC D54-28-M-1	
		34264178	125	10	20	10	15		STARTEC RC D54-28-M-1	
		34264179	125	10	31,75	10	6		STARTEC RC D54-28-M-1	
		34264192	125	10	31,75	10	15		STARTEC RC D54-28-M-1	
		34264193	125	12	20	12	6		STARTEC RC D54-28-M-1	
		34264196	125	12	20	12	15		STARTEC RC D54-28-M-1	

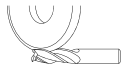


Shape	Type number	D	T	H	U	X	V°	Specification	Note	
	34264197	125	12	31,75	12	6		STARTEC RC D54-28-M-1		
	34264199	125	12	31,75	12	15		STARTEC RC D54-28-M-1		
	34264201	125	12	32	12	6		STARTEC RC D54-28-M-1		
	34264202	125	15	20	15	6		STARTEC RC D54-28-M-1		
	34264203	125	15	20	15	15		STARTEC RC D54-28-M-1		
	34264205	125	15	31,75	15	6		STARTEC RC D54-28-M-1		
	34264206	125	15	31,75	15	10		STARTEC RC D54-28-M-1		
	34264208	125	15	31,75	15	15		STARTEC RC D54-28-M-1		
	34264211	150	12	20	12	6		STARTEC RC D54-28-M-1		
	34264214	150	12	31,75	12	10		STARTEC RC D54-28-M-1		
	34264215	150	12	32	12	10		STARTEC RC D54-28-M-1		
	34264217	150	15	31,75	15	10		STARTEC RC D54-28-M-1		
	34264218	150	15	32	15	10		STARTEC RC D54-28-M-1		
	1V1	34264221	75	6	20	6	6	15	STARTEC RC D54-28-M-1	
		34264223	75	6	20	6	6	20	STARTEC RC D54-28-M-1	
		34264224	75	6	20	6	6	45	STARTEC RC D54-29-M-2	Long life
		34264226	75	8	20	8	6	15	STARTEC RC D54-28-M-1	
		34264227	75	8	20	8	10	15	STARTEC RC D54-28-M-1	
	34264228	75	10	20	10	10	15	STARTEC RC D54-28-M-1		
	34264484	75	15	20	15	10	20	STARTEC RC D54-28-M-1		
	34264485	100	6	20	6	10	15	STARTEC RC D54-28-M-1		
	34264486	100	6	31,75	6	6	15	STARTEC RC D54-28-M-1		
	34264487	100	6	20	6	6	20	STARTEC RC D54-28-M-1		
	34264488	100	6	31,75	6	6	20	STARTEC RC D54-28-M-1		
	34264489	100	6	20	6	6	45	STARTEC RC D54-28-M-1		
	34266409	100	8	20	8	10	15	STARTEC RC D54-28-M-1		
	34264490	100	10	20	10	6	15	STARTEC RC D54-28-M-1		
	34264491	100	10	31,75	10	6	15	STARTEC RC D54-28-M-1		
	34264492	100	10	20	10	6	20	STARTEC RC D54-28-M-1		
	34264493	100	10	31,75	10	6	20	STARTEC RC D54-28-M-1		
	34264494	100	10	20	10	10	15	STARTEC RC D54-28-M-1		
	34264495	100	10	31,75	10	10	15	STARTEC RC D54-28-M-1		
	34264496	100	10	32	10	10	15	STARTEC RC D54-28-M-1		
	34264497	100	10	20	10	10	20	STARTEC RC D54-28-M-1		
	34264499	100	10	31,75	10	10	20	STARTEC RC D54-28-M-1		
	34264500	100	10	32	10	10	20	STARTEC RC D54-28-M-1		
	34264502	100	10	20	10	10	45	STARTEC RC D54-29-M-2	Long life	
	34264641	100	12	20	12	10	15	STARTEC RC D54-28-M-1		
	34264642	100	12	31,75	12	10	15	STARTEC RC D54-28-M-1		
	34264643	100	12	32	12	10	15	STARTEC RC D54-28-M-1		
	34264644	100	12	20	12	10	20	STARTEC RC D54-28-M-1		
	34264645	100	12	31,75	12	10	20	STARTEC RC D54-28-M-1		
	34264734	100	12	32	12	10	20	STARTEC RC D54-28-M-1		
	34264735	100	12	20	12	10	30	STARTEC RC D54-28-M-1		
	34264736	100	12	31,75	12	10	30	STARTEC RC D54-28-M-1		
	34264737	100	12	32	12	10	30	STARTEC RC D54-28-M-1		

TC tool
productionHSS tool
production

Regrinding

Basics





TC tool
production

HSS tool
production

Regrinding

Basics

Shape	Type number	D	T	H	U	X	V°	Specification	Note	
	34264738	100	12	20	12	10	45	STARTEC RC D54-29-M-2	Long life	
	34264739	100	12	31,75	12	10	45	STARTEC RC D54-28-M-1		
	1V1	34264740	100	12	32	12	10	45	STARTEC RC D54-28-M-1	
	34264761	100	15	20	15	10	15	STARTEC RC D54-28-M-1		
	34264762	100	15	31,75	15	10	15	STARTEC RC D54-28-M-1		
	34264763	100	15	32	15	10	15	STARTEC RC D54-28-M-1		
	34264764	100	15	20	15	10	20	STARTEC RC D54-28-M-1		
	34264765	100	15	31,75	15	10	20	STARTEC RC D54-28-M-1		
	34264766	100	15	32	15	10	20	STARTEC RC D54-28-M-1		
	34264767	100	15	20	15	10	45	STARTEC RC D54-28-M-1		
	34264768	125	6	20	6	10	15	STARTEC RC D54-28-M-1		
	34264769	125	6	31,75	6	10	15	STARTEC RC D54-28-M-1		
	34264770	125	6	20	6	6	20	STARTEC RC D54-28-M-1		
	34264771	125	6	31,75	6	6	20	STARTEC RC D54-28-M-1		
	34266411	125	8	20	8	10	15	STARTEC RC D54-28-M-1		
	34264772	125	10	20	10	10	15	STARTEC RC D54-28-M-1		
	34264774	125	10	31,75	10	10	15	STARTEC RC D54-28-M-1		
	34264775	125	10	20	10	10	20	STARTEC RC D54-28-M-1		
	34264776	125	10	31,75	10	10	20	STARTEC RC D54-28-M-1		
	34264777	125	10	32	10	10	15	STARTEC RC D54-28-M-1		
	34264778	125	10	32	10	10	20	STARTEC RC D54-28-M-1		
	34264779	125	10	20	10	10	30	STARTEC RC D54-28-M-1		
	34264780	125	10	31,75	10	10	30	STARTEC RC D54-28-M-1		
	34264791	125	10	32	10	10	30	STARTEC RC D54-28-M-1		
	34264796	125	10	20	10	10	45	STARTEC RC D54-29-M-2	Long life	
	34264797	125	10	31,75	10	10	45	STARTEC RC D54-28-M-1		
	34264800	125	10	32	10	10	45	STARTEC RC D54-28-M-1		
	34264802	125	12	20	12	10	15	STARTEC RC D54-28-M-1		
	34264803	125	12	31,75	12	10	15	STARTEC RC D54-28-M-1		
	34264805	125	12	32	12	10	15	STARTEC RC D54-28-M-1		
	34264806	125	12	20	12	10	30	STARTEC RC D54-28-M-1		
	34264807	125	12	31,75	12	10	30	STARTEC RC D54-28-M-1		
	34264808	125	12	32	12	10	30	STARTEC RC D54-28-M-1		
	34264809	125	12	20	12	10	45	STARTEC RC D54-29-M-2	Long life	
34264810	125	12	31,75	12	10	45	STARTEC RC D54-28-M-1			
34264811	125	12	32	12	10	45	STARTEC RC D54-28-M-1			
34241339	125	15	20	15	10	15	STARTEC RC D54-28-M-1			
34264812	125	15	31,75	15	10	15	STARTEC RC D54-28-M-1			
34264813	125	15	20	15	10	20	STARTEC RC D54-28-M-1			
34264814	125	15	31,75	15	10	20	STARTEC RC D54-28-M-1			
34264812	125	15	31,75	15	10	15	STARTEC RC D54-28-M-1			
34264815	125	15	20	15	10	45	STARTEC RC D54-28-M-1			
34264820	150	10	20	10	10	45	STARTEC RC D54-29-M-2	Long life		
34264821	150	10	31,75	10	10	10	STARTEC RC D54-28-M-1			
34264822	150	10	32	10	10	10	STARTEC RC D54-28-M-1			
34264847	150	12	31,75	12	10	10	STARTEC RC D54-28-M-1			

Shape	Type number	D	T	H	U	X	V°	Specification	Note
	34264848	150	12	32	12	10	10	STARTEC RC D54-28-M-1	
	34266413	150	15	20	15	10	10	STARTEC RC D54-28-M-1	
	14A1	34264850	75	8	20	4	6	STARTEC RC D54-28-M-1	
	34266309	100	6	31,75	4	6		STARTEC RC D54-28-M-1	
	34266310	100	6	32	4	6		STARTEC RC D54-28-M-1	
	34266362	125	6	31,75	4	6		STARTEC RC D54-28-M-1	
	34266363	125	6	32	4	6		STARTEC RC D54-28-M-1	
	34264851	150	10	20	6	10		STARTEC RC D54-28-M-1	

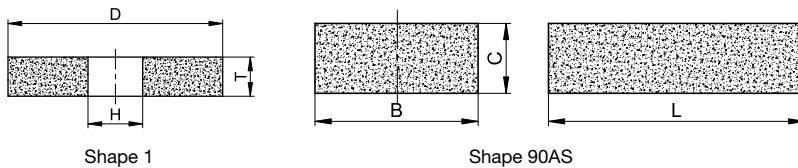
Customer-specific grinding tools can be produced on request.
Delivery times on request.




Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing. Roughening with the sharpening stick before initial use is required, as the product is delivered in the unsharpened condition.

ATTENTION: Exert only slight pressure when sharpening the STARTEC RC grinding tools!



Shape	Type number	D	T	H	Specification for TC	Stock	Note
 	1	7348	200	20	20	C80J5V15	● For grit sizes > D64
	3135	200	20	32	C80J5V15	● For grit sizes > D64	
	34163206	200	20	20	C120J5V15	● For grit sizes ≤ D54	
	250491	250	12	51	C80H8V15	● For grit sizes > D64	
	619701	250	12	51	C80J8V15	● Harder, for grit sizes > D64	
	413027	250	12	51	C120H5V15	● For grit sizes ≤ D54	
	708196	250	12	51	89A120M5AV217	● Alternative to SiC, for grit sizes ≤ D54	
	34047880	300	10	76.2	C80J5V15	● For grit sizes > D64	
	34066742	300	10	76.2	C120J5V15	● For grit sizes ≤ D54	
Shape	Type number	B	C	L	Specification	Stock	Note
	90AS	845594	24	13	100	A120J7V	● For grit sizes ≥ 126
	395773	50	25	200	A120H7V	● For grit sizes ≥ 126	
	460976	50	25	200	A120J7V	● For grit sizes ≥ 126	
	112055	50	25	200	C220 C4 B	● For grit sizes > 46 and < 126, resinoid bond	
	678952	24	13	100	A240H5V	● For grit sizes > 46 and < 126	
	678953	24	13	200	A240H5V	● For grit sizes > 46 and < 126	
	464290	50	25	200	A240J7V	● For grit sizes > 46 and < 126	
	33531	25	13	100	A600-25V	● For grit sizes ≤ 46	
	251584	50	25	200	A600-25V	● For grit sizes ≤ 46	

● ... Available ex stock

Customer-specific grinding tools can be produced on request. Delivery times on request.

b. Application recommendation for flute grinding

For the use of our STARTEC RC flute grinding wheels, the TYROLIT application engineers recommend the following parameters:

Flute grinding with diamond grinding wheels STARTEC RC

Dressing process	Cutting speed vc [m/s]	Infeed ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Flute grinding	16 - 22	see Q'w table		x		Required	

Q'w table

The values in the following table provide information on performance during the Q'w grinding process. Via the infeed ae (profile depth), you can find the optimum feed vt for use with the STARTEC RC flute grinding wheels. The achieved feed values depend on the workpiece diameter, the spiral angle of the chip flutes, the cooling lubricant used and the machine-tool output available.

Standard values for flute grinding



Product line	vc [m/s]	Q'w [mm ³ /s.mm]	
		Standard	TOP PERFORMANCE
STARTEC RC	16-22	6 to 8	8 to 12

		Feed vt [mm/min]												
		50	60	70	80	100	120	140	160	180	200	220	240	250
Profile depth ae [mm]	2,6								6,9	7,8	8,7	9,5	10,4	10,8
	2,8								7,5	8,4	9,3	10,3	11,2	11,7
	3,0							7,0	8,0	9,0	10,0	11,0	12,0	
	3,2							7,5	8,5	9,6	10,7	11,7	12,8	
	3,4							7,9	9,1	10,2	11,3	12,5	13,6	
	3,6						7,2	8,4	9,6	10,8	12,0	13,2		
	3,8						7,6	8,9	10,1	11,4	12,7	13,9		
	4,0						8,0	9,3	10,7	12,0	13,3	14,7		
	4,2					7,0	8,4	9,8	11,2	12,6	14,0			
	4,4					7,3	8,8	10,3	11,7	13,2	14,7			
	4,6				6,1	7,7	9,2	10,7	12,3	13,8				
	4,8				6,4	8,0	9,6	11,2	12,8	14,4				
	5,0				6,7	8,3	10,0	11,7	13,3	15,0				
	5,5			6,4	7,3	9,2	11,0	12,8	14,7					
	6,0			7,0	8,0	10,0	12,0	14,0	16,0					
	6,5		6,5	7,6	8,7	10,8	13,0	15,2						
	7,0		7,0	8,2	9,3	11,7	14,0	16,3						
	7,5	6,3	7,5	8,8	10,0	12,5	15,0							
	8,0	6,7	8,0	9,3	10,7	13,3	16,0							
8,5	7,1	8,5	9,9	11,3	14,2	17,0								

Calculation of values

$$Q'w = ae \times vt / 60$$

$$vt = Q'w \times 60 / ae$$

 vt standard STARTEC RC
 vt optimisation potential

Resin-bonded diamond grinding wheels for flute grinding are listed in Chapter 3.1.

TC tool production

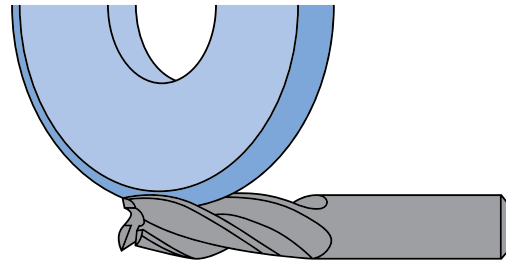
HSS tool production

Regrounding

Basics

1.6 STARTEC XP-P+ GRINDING TOOLS FOR FLUTE GRINDING

With the STARTEC XP-P+ product line, TYROLIT defines a new performance level for the flute grinding of tungsten carbide cutting tools. Two different diamond qualities and the innovative bond structure result in either significantly reduced grinding forces or to a major increase in profile retention. The precision of the machined tools remains at the familiar high level.

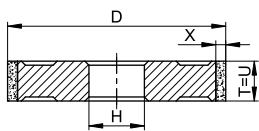


Overview of STARTEC XP-P+ diamond qualities:

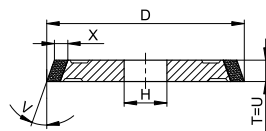
- DC – for reduced grinding forces
- DP – for use with water-based cooling lubricants

Both diamond qualities are available in grit sizes 35 to 181 µm.

Standard range

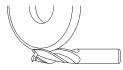


Shape 1A1



Shape 1V1

	Shape	Type number	D	T	H	U	X	Specification	Note
	1A1	34181068	50	15	20	15	6	STARTEC-XP-P+ DC54-4-MXPP+	
		34236951	75	10	20	10	10	STARTEC-XP-P+ DC54-4-MXPP+	
		34236953	100	6	20	6	10	STARTEC-XP-P+ DC54-4-MXPP+	
		34061166	100	6	20	6	10	STARTEC-XP-P+ DP54-3-MXPP+	DP diamond grit
		34200198	100	10	20	10	10	STARTEC-XP-P+ DC54-4-MXPP+	
		34042086	100	10	20	10	10	STARTEC-XP-P+ DP54-3-MXPP+	DP diamond grit
		34225156	100	15	20	15	10	STARTEC-XP-P+ DC54-4-MXPP+	
		34051340	100	15	20	15	10	STARTEC-XP-P+ DP54-4-MXPP+	DP diamond grit
		34236955	125	12	20	12	10	STARTEC-XP-P+ DC54-4-MXPP+	
		34188415	125	15	20	15	10	STARTEC-XP-P+ DC54-4-MXPP+	
	34236392	150	12	20	12	10	STARTEC-XP-P+ DC54-4-MXPP+		




TC tool production

HSS tool production

Regrinding

Basics

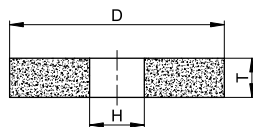
	Shape	Type number	D	T	H	U	X	V°	Specification for TC	Note
	1V1	34236956	100	8	20	8	10	15	STARTEC-XP-P+ DC54-4-MXPP+	
		34163378	100	8	20	8	10	20	STARTEC-XP-P+ DP54-3-MXPP+	DP diamond grit
		34181111	100	12	20	12	10	45	STARTEC-XP-P+ DC54-4-MXPP+	
		34052783	125	10	20	10	10	45	STARTEC-XP-P+ DP54-3-MXPP+	DP diamond grit
		34198878	125	12	20	12	10	45	STARTEC-XP-P+ DC54-4-MXPP+	
		34236399	150	12	20	12	10	10	STARTEC-XP-P+ DC54-4-MXPP+	
		34192749	150	12	20	12	10	30	STARTEC-XP-P+ DP54-4-MXPP+	DP diamond grit

Customer-specific grinding tools can be produced on request. Delivery times on request.

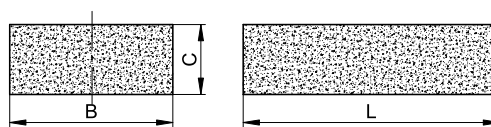
Application recommendation

a. Application recommendation for dressing



Specially adapted dressing wheels are available ex stock for dressing. Roughening with the sharpening stick before initial use is required, as the product is delivered in the unsharpened condition.




Shape 1



Shape 90AS

	Shape	Type number	D	T	H	Specification for TC	Stock	Note
 	1	7348	200	20	20	C80J5V15	●	For grit sizes > D64
		3135	200	20	32	C80J5V15	●	For grit sizes > D64
		34163206	200	20	20	C120J5V15	●	For grit sizes ≤ D54
		250491	250	12	51	C80H8V15	●	For grit sizes > D64
		619701	250	12	51	C80J8V15	●	Harder, for grit sizes > D64
		413027	250	12	51	C120H5V15	●	For grit sizes ≤ D54
		708196	250	12	51	89A120M5AV217	●	Alternative to SiC, for grit sizes ≤ D54
		34047880	300	10	76.2	C80J5V15	●	For grit sizes > D64
		34066742	300	10	76.2	C120J5V15	●	For grit sizes ≤ D54

	Shape	Type number	B	C	L	Specification	Stock	Note
	90AS	845594	24	13	100	A120J7V	●	For grit sizes ≥ 126
		395773	50	25	200	A120H7V	●	For grit sizes ≥ 126
		460976	50	25	200	A120J7V	●	For grit sizes ≥ 126
		112055	50	25	200	C220 C4 B	●	For grit sizes > 46 and < 126, resinoid bond
		678952	24	13	100	A240H5V	●	For grit sizes > 46 and < 126
		678953	24	13	200	A240H5V	●	For grit sizes > 46 and < 126
		464290	50	25	200	A240J7V	●	For grit sizes > 46 and < 126
		33531	25	13	100	A600-25V	●	For grit sizes ≤ 46
		251584	50	25	200	A600-25V	●	For grit sizes ≤ 46

● ... Available ex stock

Customer-specific grinding tools can be produced on request. Delivery times on request.

b. Application recommendation for flute grinding

For the use of our STARTEC XP-P+ flute grinding wheels, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Flute grinding	16 - 22	see Q'w table		x		Required	
Face grinding	20 - 24	Full depth	80 - 160			Required	Shape 1V1

Q'w table

The values in the following table provide information on performance during the Q'w grinding process. Via the infeed ae (profile depth), you can find the optimum feed vt for use with the STARTEC XP-P+ flute grinding wheels. The

achieved feed values depend on the workpiece diameter, the spiral angle of the flutes, the cooling lubricant used and the machine-tool output available.

Standard values for flute grinding



Product line	vc [m/s]	Q'w [mm ³ /s.mm]	
		Standard	TOP PERFORMANCE
STARTEC XP-P+	16-22	6 to 8	8 to 12

		Feed vt [mm/min]												
		50	60	70	80	100	120	140	160	180	200	220	240	250
Profile depth ae [mm]	2.6								6.9	7.8	8.7	9.5	10.4	10.8
	2.8								7.5	8.4	9.3	10.3	11.2	11.7
	3.0							7.0	8.0	9.0	10.0	11.0	12.0	
	3.2							7.5	8.5	9.6	10.7	11.7	12.8	
	3.4							7.9	9.1	10.2	11.3	12.5	13.6	
	3.6						7.2	8.4	9.6	10.8	12.0	13.2		
	3.8						7.6	8.9	10.1	11.4	12.7	13.9		
	4.0						8.0	9.3	10.7	12.0	13.3	14.7		
	4.2					7.0	8.4	9.8	11.2	12.6	14.0			
	4.4					7.3	8.8	10.3	11.7	13.2	14.7			
	4.6				6.1	7.7	9.2	10.7	12.3	13.8				
	4.8				6.4	8.0	9.6	11.2	12.8	14.4				
	5.0				6.7	8.3	10.0	11.7	13.3	15.0				
	5.5			6.4	7.3	9.2	11.0	12.8	14.7					
	6.0			7.0	8.0	10.0	12.0	14.0	16.0					
	6.5		6.5	7.6	8.7	10.8	13.0	15.2						
	7.0		7.0	8.2	9.3	11.7	14.0	16.3						
	7.5	6.3	7.5	8.8	10.0	12.5	15.0							
8.0	6.7	8.0	9.3	10.7	13.3	16.0								
8.5	7.1	8.5	9.9	11.3	14.2	17.0								

Calculation of values

$$Q'w = ae \times vt / 60$$

$$vt = Q'w \times 60 / ae$$

-  vt standard STARTEC XP-P+
-  vt optimisation potential

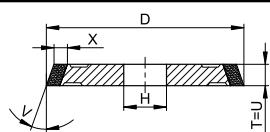
Resin-bonded diamond grinding wheels for flute grinding are listed in Chapter 3.1.

1.7 STARTEC HP GRINDING WHEELS FOR GASHING


The STARTEC HP grinding wheels have been especially developed for gashing shaft tools made of tungsten carbide. The STARTEC HP diamond grinding tools are characterised by a high stock removal rate and excellent profile retention. This results in the highest shape accuracy, optimum cutting edge quality and an outstanding surface finish of the ground tools.



Stock range



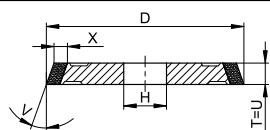
Shape 1V1

	Shape	Type number	D	T	H	W	X	V°	Specification	Stock
	1V1	34223498	100	6	20	6	10	45	STARTEC-HP DN54-4-M-1HP	●
		34223802	100	10	20	10	10	45	STARTEC-HP DN64-4-M-1HP	●
		34223806	125	6	20	6	10	45	STARTEC-HP DN54-4-M-1HP	●
		34223808	125	10	20	10	10	45	STARTEC-HP DN54-4-M-1HP	●
		34184537	125	12	20	12	10	45	STARTEC-HP DN54-4-M-1HP	●
		34223899	150	10	20	10	10	45	STARTEC-HP DN54-4-M1-HP	●
		34223900	150	13	20	13	10	45	STARTEC-HP DN54-4-M-1HP	●


● ... Available ex stock

Customer-specific grinding tools can be produced on request. Delivery times on request.

Standard range



Shape 1V1

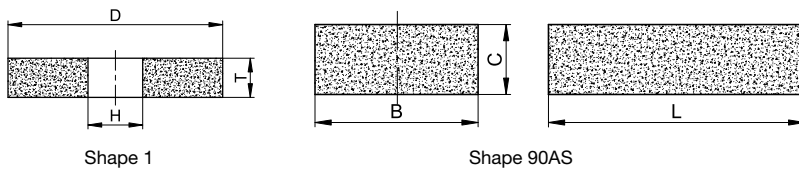
	Shape	Type number	D	T	H	W	X	V°	Specification
	1V1	637608	100	6	20	6	10	60	STARTEC-HP DN54-4-M-1HP
		34223801	100	8	20	8	10	45	STARTEC-HP DN54-4-M-1HP
		34223804	100	12	20	12	10	45	STARTEC-HP DN64-4-M-1HP
		34223807	125	8	20	8	10	45	STARTEC-HP DN64-4-M-1HP



Customer-specific grinding tools can be produced on request. Delivery times on request.

Application recommendation

a. Application recommendation for dressing

ATTENTION: Exert only slight pressure when sharpening the STARTEC HP grinding tools and sharpen in the direction of the tip!



Shape	Type number	D	T	H	Specification for TC	Stock	Note
	1	7348	200	20	20	C80J5V15	● For grit sizes > D64
	3135	200	20	32	C80J5V15	● For grit sizes > D64	
	34163206	200	20	20	C120J5V15	● For grit sizes ≤ D54	
	250491	250	12	51	C80H8V15	● For grit sizes > D64	
	619701	250	12	51	C80J8V15	● Harder, for grit sizes > D64	
	413027	250	12	51	C120H5V15	● For grit sizes ≤ D54	
	708196	250	12	51	89A120M5AV217	● Alternative to SiC, for grit sizes ≤ D54	
	34047880	300	10	76.2	C80J5V15	● For grit sizes > D64	
	34066742	300	10	76.2	C120J5V15	● For grit sizes ≤ D54	
Shape	Type number	B	C	L	Specification	Stock	Note
	90AS	845594	24	13	100	A120J7V	● For grit sizes ≥ 126
	395773	50	25	200	A120H7V	● For grit sizes ≥ 126	
	460976	50	25	200	A120J7V	● For grit sizes ≥ 126	
	112055	50	25	200	C220 C4 B	● For grit sizes > 46 and < 126, resinoid bond	
	678952	24	13	100	A240H5V	● For grit sizes > 46 and < 126	
	678953	24	13	200	A240H5V	● For grit sizes > 46 and < 126	
	464290	50	25	200	A240J7V	● For grit sizes > 46 and < 126	
	33531	25	13	100	A600-25V	● For grit sizes ≤ 46	
	251584	50	25	200	A600-25V	● For grit sizes ≤ 46	

● ... Available ex stock
 Customer-specific grinding tools can be produced on request. Delivery times on request.

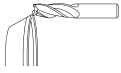
b. Application recommendation for gashing

For the use of our STARTEC HP grinding wheels for gashing, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Gashing	20 - 24	Full infeed	Select as appropriate to workpiece stability	x		Recommended	Wheel must be well dressed

Resin-bonded diamond cup wheels for face grinding are listed in Chapter 3.1.

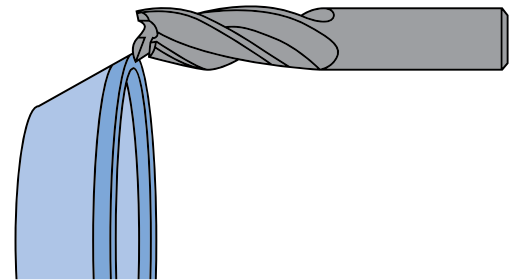
Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.



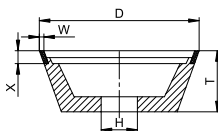
1.7 STARTEC XP-P CUP WHEELS FOR GRINDING OF FACE AND CLEARANCE SURFACES

STARTEC XP-P from TYROLIT stands for maximum efficiency and optimum tool quality in flute grinding. This high performance level is also achievable with the cup wheels for machining clearance surfaces and face geometries on tungsten carbide stock removal tools.

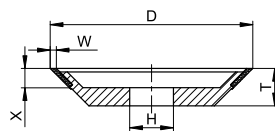
An innovative bond system, tailored diamond qualities and new manufacturing technologies guarantee extremely high edge stability, low cutting forces and the best surface finish on the ground tool.



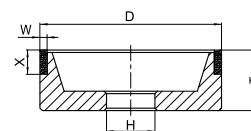
Stock range



Shape 11V9

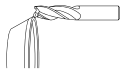



Shape 12V9



Shape 6A9

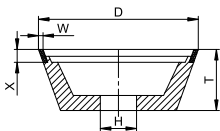
	Shape	Type number	D	T	H	W	X	V°	Specification	Stock
	11V9	34065405	75	30	20	3	10	20	STARTEC-XP-P D46-BXPP	●
		34039198	75	30	20	3	10	20	STARTEC-XP-P D64-BXPP	●
		34065406	75	30	20	3	10	20	STARTEC-XP-P D91-BXPP	●
		34065402	100	35	20	3	10	20	STARTEC-XP-P D46-BXPP	●
		34039199	100	35	20	3	10	20	STARTEC-XP-P D64-BXPP	●
		34065403	100	35	20	3	10	20	STARTEC-XP-P D91-BXPP	●
		34065409	125	40	20	3	10	20	STARTEC-XP-P D46-BXPP	●
		34065410	125	40	20	3	10	20	STARTEC-XP-P D64-BXPP	●
		34065411	125	40	20	3	10	20	STARTEC-XP-P D91-BXPP	●
		34044242	150	50	20	3	10	20	STARTEC-XP-P D64-BXPP	●
		34065413	150	50	20	3	10	20	STARTEC-XP-P D91-BXPP	●



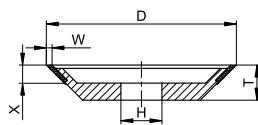
Shape	Type number	D	T	H	W	X	V°	Specification for TC	Stock	
	12V9	34065204	100	20	20	3	10	45	STARTEC-XP-P D46-BXPP	●
		34044248	100	20	20	3	10	45	STARTEC-XP-P D64-BXPP	●
		34044247	100	20	20	3	10	45	STARTEC-XP-P D91-BXPP	●
		34065415	125	25	20	3	10	45	STARTEC-XP-P D46-BXPP	●
		34056064	125	25	20	3	10	45	STARTEC-XP-P D64-BXPP	●
		34065416	125	25	20	3	10	45	STARTEC-XP-P D91-BXPP	●
		34065456	150	25	20	3	10	45	STARTEC-XP-P D91-BXPP	●
6A9	34065417	100	30	20	3	10		STARTEC-XP-P D64-BXPP	●	

● ... Available ex stock

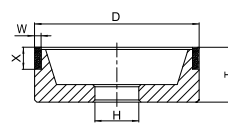
Standard range



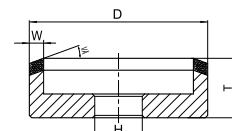
Shape 11V9



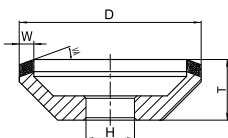
Shape 12V9




Shape 6A9



Shape 6V5



Shape 12V5

Shape	Type number	D	T	H	W	X	V°	Specification for TC	Note	
	11V9	34065404	75	30	20	2	10	20	STARTEC-XP-P D46-BXPP	
		34044241	75	30	20	2	10	20	STARTEC-XP-P D64-BXPP	
		34044230	75	30	20	2	10	20	STARTEC-XP-P D91-BXPP	
		34044225	100	35	20	2	10	20	STARTEC-XP-P D64-BXPP	
		34044224	100	35	20	2	10	20	STARTEC-XP-P D91-BXPP	
		34028411	100	35	20	3	10	20	STARTEC-XP-P D91-B-1XPP	soft
		34065407	125	40	20	2	10	20	STARTEC-XP-P D64-BXP-P	
		34065408	125	40	20	2	10	20	STARTEC-XP-P D91-BXPP	
		34211868	125	40	20	3	10	20	STARTEC-XP-P D91-B-1XPP	soft
		34065412	150	50	20	3	10	20	STARTEC-XP-P D46-BXPP	
12V9		34044245	100	20	20	2	10	45	STARTEC-XP-P D64-BXPP	
		34044244	100	20	20	2	10	45	STARTEC-XP-P D91-BXPP	
		34056062	125	25	20	2	10	45	STARTEC-XP-P D64-BXPP	
		34065414	125	25	20	2	10	45	STARTEC-XP-P D91-B-1XPP	soft
		34059014	150	25	20	3	10	45	STARTEC-XP-P D64-BXPP	

TC tool production

HSS tool production

Regrinding

Basics



TC tool production

HSS tool production

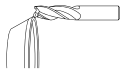
Regrinding

Basics



	Shape	Type number	D	T	H	W	X	V°	Specification for TC	Note
	6A9	34065419	100	20	20	2	10		STARTEC-XP-P D64-BXPP	
		34065420	100	20	20	2	10		STARTEC-XP-P D91-BXPP	
		34065418	125	25	20	2	10		STARTEC-XP-P D91-BXPP	
		34065421	125	25	20	2	10		STARTEC-XP-P D64-BXPP	
		34065422	150	25	20	3	10		STARTEC-XP-P D91-BXPP	
	6V5	34223179	100	34	20	5	10	30	STARTEC-XP-P D46-BXPP	
		34201572	100	30	20	6	4	30	STARTEC-XP-P D46-BXPP	
	12V5	34223180	100	25	20	10	6	10	STARTEC-XP-P B46-BXPP	

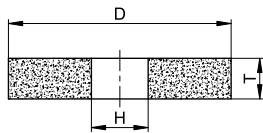
Customer-specific grinding tools can be produced on request.
Delivery times on request.



Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing.



Shape 1

	Shape	Type number	D	T	H	Specification for TC	Stock	Note
	1	7348	200	20	20	C80J5V15	●	For grit sizes > D64
		3135	200	20	32	C80J5V15	●	For grit sizes > D64
		34163206	200	20	20	C120J5V15	●	For grit sizes ≤ D54
		250491	250	12	51	C80H8V15	●	For grit sizes > D64
		619701	250	12	51	C80J8V15	●	Harder, for grit sizes > D64
		413027	250	12	51	C120H5V15	●	For grit sizes ≤ D54
		708196	250	12	51	89A120M5AV217	●	Alternative to SiC, for grit sizes ≤ D54
		34047880	300	10	76.2	C80J5V15	●	For grit sizes > D64
		34066742	300	10	76.2	C120J5V15	●	For grit sizes ≤ D54

● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

b. Application recommendation for grinding clearance and face surfaces

For the use of our grinding tools for clearance and face grinding, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Clearance surfaces	28 - 32	0.5 - 2.0	150 - 250	x		Required	
Face geometry	26 - 30	max. 1.5	120 - 180	x		Required	
Face gap	26 - 30	Full depth	60 - 120	x		Required	

Resin-bonded diamond grinding wheels for flute grinding are listed in Chapter 3.1.

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.



TC tool production

HSS tool production

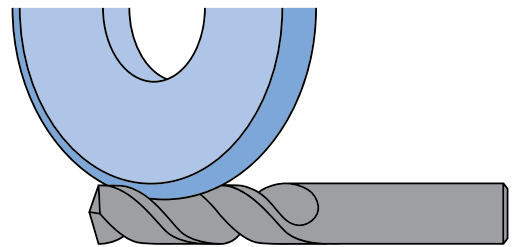
Regrinding

Basics

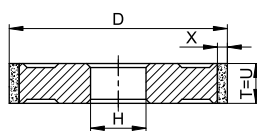
1.8 STARTEC XP-F GRINDING WHEELS FOR POLISHING SHAFT TOOLS

Polished functional surfaces on shaft tools reduce the friction between tool and material, which results in easier removal of the chippings and lower tool wear.

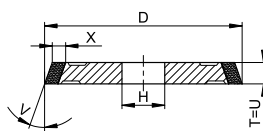
The STARTEC XP-F polishing wheels from TYROLIT guarantee the highest precision in the polished tools through complete stock removal up to 0.2 mm. Complete stock removal is guaranteed, even in the case of stock removal fluctuations. The high surface quality of the polished tool and low wear characterise these polishing wheels.



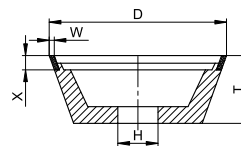
Stock range



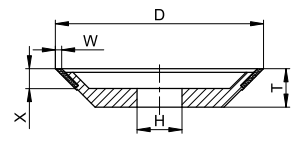
Shape 1A1



Shape 1V1

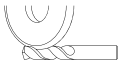


Shape 11V9




Shape 12V9

	Shape	Type number	D	T	H	U	X	V°	Specification	Stock	
	1A1	34245254	100	10	20	10	10		STARTEC XP-F D15-3-BXPF	●	
		34244283	100	12	20	12	10		STARTEC XP-F D15-3-BXPF	●	
		34245256	125	10	20	10	10		STARTEC XP-F D15-3-BXPF	●	
		34245257	125	12	20	12	10		STARTEC XP-F D15-3-BXPF	●	
		34245258	125	15	20	15	10		STARTEC XP-F D15-3-BXPF	●	
	1V1	34245260	100	10	20	10	10	15		STARTEC XP-F D15-3-BXPF	●
		34245261	100	12	20	12	10	15		STARTEC XP-F D15-3-BXPF	●
		34245264	125	10	20	10	10	15		STARTEC XP-F D15-3-BXPF	●
		34245265	125	12	20	12	10	15		STARTEC XP-F D15-3-BXPF	●
		34245266	125	15	20	15	10	15		STARTEC XP-F D15-3-BXPF	●



TC tool production
HSS tool production
Regrinding
Basics

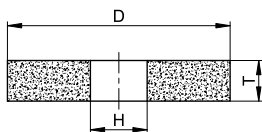
	Shape	Type number	D	T	H	W	X	V°	Specification	Stock
	11V9	34245273	75	30	20	3	10	20	STARTEC XP-F D15-3-BXPF	●
		34245275	100	35	20	3	10	20	STARTEC XP-F D15-3-BXPF	●
		34245277	125	40	20	3	10	20	STARTEC XP-F D15-3-BXPF	●
	12V9	34245279	100	20	20	3	10	45	STARTEC XP-F D15-3-BXPF	●
		34245291	125	25	20	3	10	45	STARTEC XP-F D15-3-BXPF	●

Customer-specific grinding tools can be produced on request. Delivery times on request.


Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available for dressing the polishing wheels.



Shape 1

	Shape	Type number	D	T	H	Specification	Stock	Note
	1	520149	200	10	32	89A240M5AV217		For grit sizes D35-D20, Kirner machine
		34049397	200	10	32	89A400H5AV83		For grit sizes D20-D10, Kirner machine
		34061809	250	10	51	89A400H5AV83	●	Standard recommendation for grit sizes D20-D10
		34033629	250	10	51	89A240M5AV217		For grit sizes D35-D20

● ... Available ex stock.

Customer-specific grinding tools can be produced on request. Delivery times on request.

**b. Application recommendation for polishing****RECOMMENDED PROCEDURE**

1. Grinding of the flute out of the full material
Recommended specification and parameters: STARTEC XP-P, RC or XP-P+
(see chapter 1.4 and 1.6)
Residual stock to be removed for polishing: 0.01 bis 0.2 mm
2. Polishing of the flute with of contouring grinding wheel
Recommended specification: STARTEC XP-F D15-3-BXPF

Drill flute insufficiently polished
Rz = 0.45 µm



Drill flute polished using STARTEC XP-F
Rz = 0.20 µm



For the use of our grinding tools for clearance and face surface grinding, the TYROLIT application engineers recommend the following parameters:

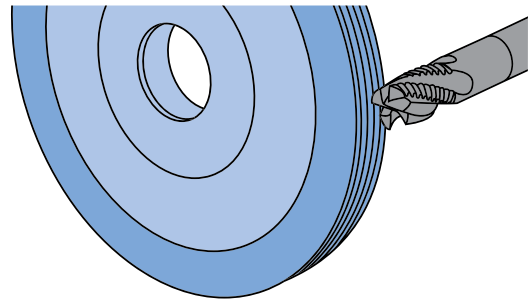
Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Chip flute	28 - 40	0.01 - 0.20	150 - 200	x		Required	
Clearance surface	35 - 40	0.01 - 0.10	100 - 150	x		Required	Observe grinding direction

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.



1.9 ROUGHING TEETH GRINDING ON END MILLS

For the production of roughing teeth on end mills, TYROLIT offers pre-profiled grinding wheels with adapted specifications. Various bond systems guarantee high profile retention and a good stock removal rate with low heat generation, in order to prevent damage to the cutting edges of the tools.



Range

We manufacture the grinding tools for roughing teeth grinding according to individual requirements. Please send us a detailed workpiece drawing and information on your grinding tool for this purpose.

Grinding process	Recommended specification	Cutting speed v_c [m/s]	Use	Benefits
Profile grinding	STARTEC XP-P D46-4-MXPP	18 - 23	Single-profile	Metal bond, high profile retention, high stock removal rate
	11D64C100B42	22 - 28	Single-profile	Resin bond, low cutting-edge chipping, good surface finish
	115D64 XG36	22 - 28	Multi-profile	Electroplated bond, very high profile retention
	321D35 C150 R37 V700	22 - 28	Multi-profile	Ceramic bond, high profile retention

In addition, we offer individual specifications tailored to your requirements. Please send us a data sheet with information on your grinding process for this purpose.

Application recommendation

a. Application recommendation for dressing

Truing of the metal or resin-bonded grinding wheels is performed using a diamond forming roller or a suitable crushing roller in flange-mounted version, externally or in the machine. If truing is not possible, it is recommended to use an electroplated grinding wheel.

**b. Application recommendation for profile grinding**

For the use of our grinding wheels for the production of roughing teeth, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ ae [mm]	Feed vt [mm/min]	Grinding direction	Cooling	Notes
Roughing teeth	18 - 28	Full profile depth	160 - 800	Against the cutting edge	Required	Cutting speed dependent on the selected bond system; feed dependent on control of A-axis

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.

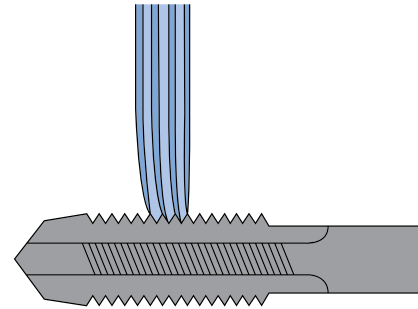
In order to achieve an optimum grinding process, our application engineers support you in defining your individual grinding solution.






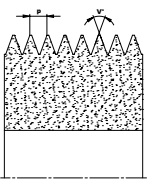
1.10 THREAD GRINDING

For the grinding of high-precision thread profiles, TYROLIT offers optimally adapted grinding tools with high profile retention, which generate low cutting forces during grinding. These can be used to produce high-quality thread-cutting tools in a stable process.



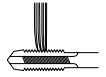
Range

We manufacture the grinding tools for thread grinding according to individual requirements. Please send us a detailed workpiece drawing and information on your grinding tool for this purpose.

	Grinding process	Recommended specification	Benefits	Note
	Thread grinding with single-profile wheels	321D35 C150 R37 V700	<ul style="list-style-type: none"> - Ceramic bond - Low grinding forces - High profile retention - Good dressability 	<p>The grit size must be selected depending on the thread pitch</p> <p>Grit size D35 recommended for thread pitch $p = 0.5$ to 0.8 mm</p>
		STARTEC HP DP35-3-MC	<ul style="list-style-type: none"> - Metal bond - High profile retention 	
	Thread grinding with multi-profile wheels	21D35C80Y48V640	<ul style="list-style-type: none"> - Ceramic bond - Low grinding forces - High profile retention - Good dressability 	<p>The grit size must be selected depending on the thread pitch</p> <p>Grit size D35 recommended for thread pitch $p = 0.5$ to 0.8 mm</p>

In addition, we offer individual specifications tailored to your requirements. Please send us a data sheet with information on your grinding process for this purpose.





Application recommendation

a. Application recommendation for dressing

Single-profile wheels:

Metal-bonded thread grinding wheels are trued using suitable conventional SiC wheels on dressing machines. Vitrified-bonded grinding tools are trued in the machine using a diamond forming roller.

Vitrified-bonded multi-profile wheels:

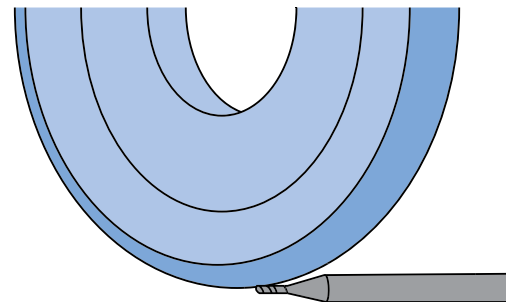
With vitrified-bonded multi-profile wheels, the profile is applied to the grinding wheel using crushing rollers or diamond profile rollers.

b. Application recommendation for thread grinding

Thread grinding is a very complex grinding process. The grinding parameters depend on numerous influencing factors. For this reason, no specific parameter recommendations can be made at this point. In order to achieve an optimum grinding process, our application engineers support you in defining your individual grinding solution.

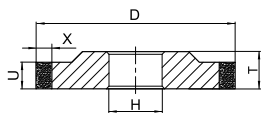
1.11 STARTEC MT-1 PRECISION GRINDING WHEELS FOR PRODUCING HIGH-PRECISION MICRO TOOLS

With the STARTEC MT-1 product line, TYROLIT offers system solutions consisting of high-precision grinding tools and specially designed dressing wheels. Bespoke diamond qualities and an innovative bond structure ensure low grinding forces and particularly high cutting efficiency during the grinding process. Minimal reject-part rates and optimum ground tool quality are the result.

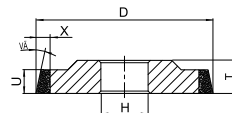


Stock range

Grinding tools for tool diameters $2 < d \leq 5 \text{ mm}$



Shape 3A1

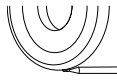
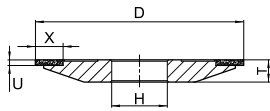


Shape 3B1

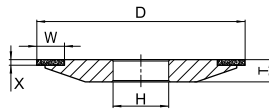
Flute grinding



	Shape	Type number	D	T	H	U	X	Specification	Stock	Note
	3A1	118823	100	6	20	4	6	STARTEC XP-P D35MXPP	●	
		34053784	125	6	20	4	6	STARTEC XP-P D35MXPP	●	
		34053786	150	6	20	4	6	STARTEC XP-P D35MXPP	●	
	3B1	34061806	100	6	20	4	6	10 STARTEC XP-P D35MXPP	●	
		34061805	125	6	20	4	6	10 STARTEC XP-P D35MXPP	●	
		34061807	150	6	20	4	6	10 STARTEC XP-P D35MXPP	●	


Grinding tools for tool diameters $1 < d \leq 2$ mm

Shape 4A1P




Shape 4A9



Flute grinding

	Shape	Type number	D	T	H	U	X	Specification	Stock	Note
	4A1P	205026	125	8	50	2	6	STARTEC MT-1 D20MMT-1	●	For Rollomatic machines
		34027252	125	8	20	2	6	STARTEC MT-1 D20MMT-1	●	

Point thinning


	Shape	Type number	D	T	H	U	X	Specification	Stock	Note
	4A1P	34027166	100	6	35	2	6	STARTEC MT-1 D15MMT-1	●	For Rollomatic machines
		34027237	100	6	20	2	6	STARTEC MT-1 D15MMT-1	●	

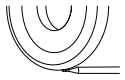
Peripheral grinding (relief grinding)

	Shape	Type number	D	T	H	U/W	X	Specification	Stock	Note
	4A1P	34053788	80	6	25	2	6	STARTEC MT-1 D15MMT-1	●	For Rollomatic machines, relief grinding
		34027240	80	6	20	2	6	STARTEC MT-1 D15MMT-1	●	Peripheral and radial relief grinding
	4A9	34053664	80	6	25	10	2	STARTEC MT-1 D15BMT-1	●	For Rollomatic machines, relief grinding
		34053663	80	6	20	10	2	STARTEC MT-1 D15BMT-1	●	Peripheral and radial relief grinding


Grinding tools for tool diameters $0.1 < d \leq 1$ mm

Flute grinding


	Shape	Type number	D	T	H	U	X	Specification	Stock	Note
	4A1P	746906	100	6	40	2	6	STARTEC MT-1 D15MMT-1	●	For Rollomatic machines
		34027237	100	6	20	2	6	STARTEC MT-1 D15MMT-1	●	



Point thinning


	Shape	Type number	D	T	H	U	X	Specification	Stock	Note
	4A1P	197600	80	6	32	2	6	STARTEC MT-1 D15MMT-1	●	For Rollomatic machines
		34027240	80	6	20	2	6	STARTEC MT-1 D15MMT-1	●	

Peripheral grinding (relief grinding)


	Shape	Type number	D	T	H	W	X	Specification	Stock	Note
	4A9	196414	80	6	20	2	10	STARTEC MT-1 D9BMT-1	●	Peripheral and radial relief grinding

Grinding tools for tool diameters $d \leq 0.1$ mm

Flute grinding

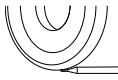
	Shape	Type number	D	T	H	W	X	Specification	Stock	Note
	4A9	34053789	80	6	40	10	2	STARTEC MT-1 D9BMT-1	●	For Rollomatic machines
		196414	80	6	20	10	2	STARTEC MT-1 D9BMT-1	●	Also suitable for point thinning

Point thinning

	Shape	Type number	D	T	H	U	X	Specification	Stock	Note
	4A9	201627	80	6	32	10	6	STARTEC MT-1 D9BMT-1	●	For Rollomatic machines

● ... Available ex stock.

Customer-specific grinding tools can be produced on request.
Delivery times on request.



TC tool production

HSS tool production

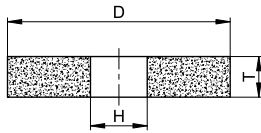
Regrinding

Basics


Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing the grinding wheels.



Shape 1

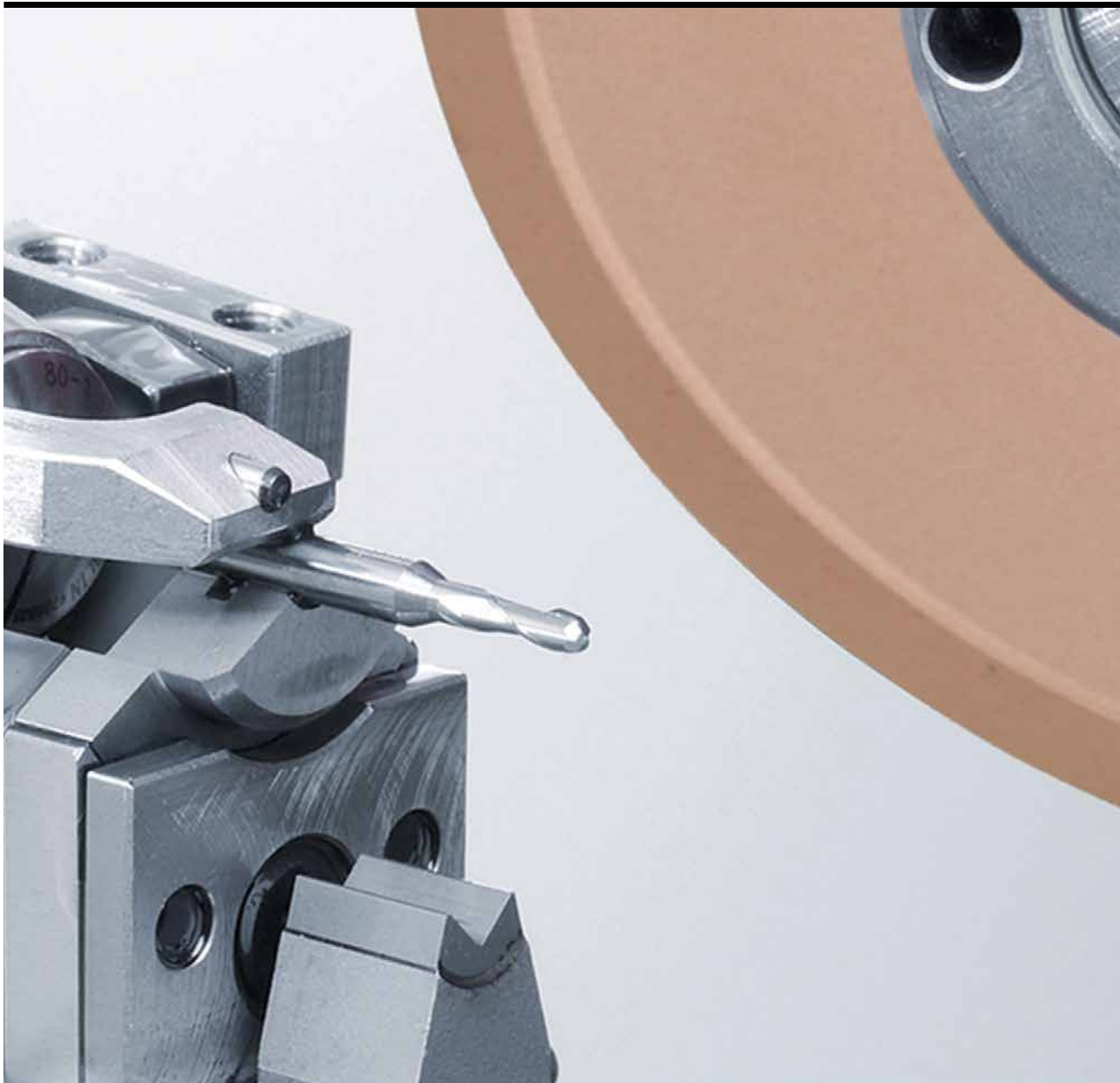
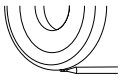
	Shape	Type number	D	T	H	J	U	Vs	Specification	Stock	Note
	1	34061809	250	10	51			35	A400 H5 AV	●	For grit sizes KG > 15 µm
		34157690	250	10	51			20	A800 G5 AV	●	For grit sizes KG ≤ 15 µm
		34023726	300	10	76.2			35	A240M5AV217	●	
		34023728	300	10	76.2			35	A400 H5 AV	●	For grit sizes KG > 15 µm
		34157689	300	10	76.2			20	A800 G5 AV	●	For grit sizes KG ≤ 15 µm
		34023732	300	10	76.2	140	6	20	A400 H5 AV83		For grit sizes KG > 15 µm
		34173471	300	10	76.2	140	6	20	A800 G5 AV83	●	For grit sizes KG ≤ 15 µm



Recommended dressing parameters for STARTEC MT-1 grinding wheels

Dressing process	Grinding wheel grit size	Grinding wheel cutting speed v_c [m/s]	Dressing wheel cutting speed v_c [m/s]	Infeed/stroke a_e [mm]	Feed v_t [mm/min]	Grinding direction		Recommended specification
						Forward	Reverse	
In the machine	≤ D10	2 - 5	16 - 25	0.003 - 0.005	200 - 500	x		A 800 V
	D12 - D20	2 - 5	16 - 25	0.005 - 0.008	200 - 500	x		A 400 V
	> D20	2 - 5	16 - 25	0.007 - 0.012	200 - 500	x		A 240 V

Note: Always dress grinding wheels on the spindle. Balance the spindle.

TC tool
productionHSS tool
production

Regrinding

Basics

b. Application recommendation for grinding of micro tools

For the use of our grinding wheels, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed v_c [m/s]	Infeed/ae [mm]	Feed v_t [mm/min]	Grinding direction		Cooling	Notes
				Forward	Reverse		
Flute grinding	10 - 40	Full depth	10 - 35	x		Required	v_c depending on tool type
Relief grinding	16 - 25	Full depth	10 - 25	x		Required	
Face geometry	8 - 18	Full depth	6 - 15	x		Required	

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.

In order to achieve an optimum grinding process, our application engineers support you in defining your individual grinding solution.





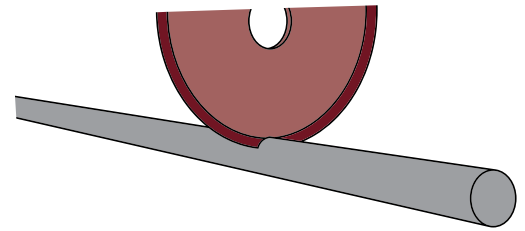
2. PRODUCTION OF HSS SHAFT TOOLS

2.1 CUT-OFF GRINDING Cut-off grinding of HSS blanks	56
2.2 CSS-ULTRA Centreless grinding wheels	58
2.3 GRINDING TOOLS for high-speed external cylindrical longitudinal grinding	61
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2.5 STARTEC XP-P grinding tools for flute grinding	68
2.6 STARTEC XP-P CUP WHEELS Grinding of face and clearance surfaces	71
2.7 GRINDING OF ROUGHING TEETH on end mills	74
2.8 CSS-ULTRA Grinding tools for thread grinding	76

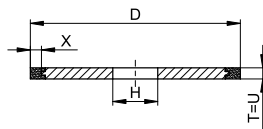


2.1 CUT-OFF GRINDING OF HSS BLANKS

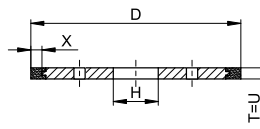
Shaft tools are often manufactured from standardised HSS blanks. These must be shortened to the individual tool length. The cut-off wheels from TYROLIT impress with cool cutting and optimum wear resistance.




Stock range



Shape 1A1R




Shape 1A1RH

	Shape	Type number	D	T	H	U	X	Specification	Stock
	1A1R	788700	125	1	20	1	5	B126C75B	●
	1A1RH	164485	125	1	20	1	5	B151C100B	●
		494701	150	1	20	1	7	B151C100B	●

● ... Available ex stock

Standard range

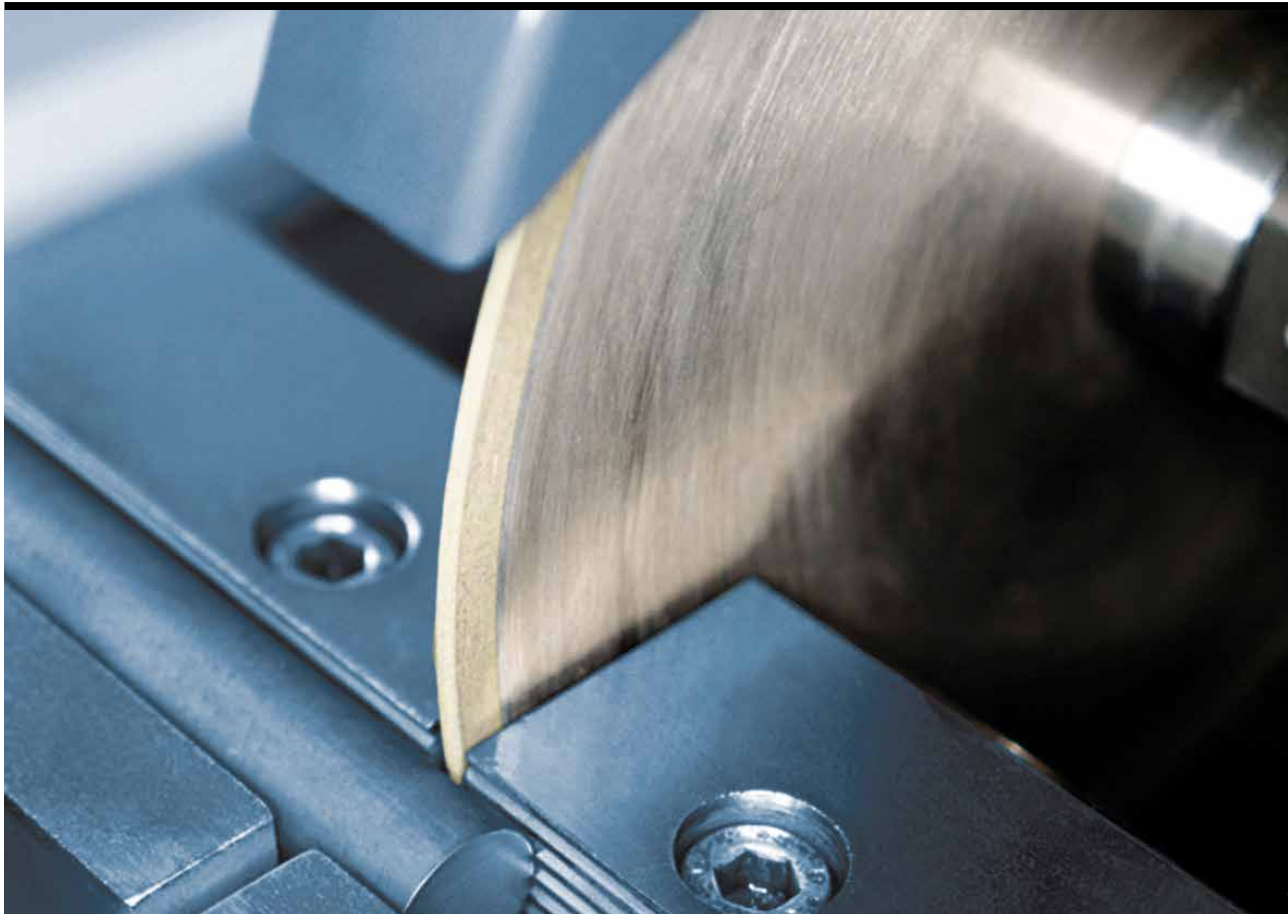
	Shape	Type number	D	T	H	U	X	Specification	Note
	1A1R	695876	75	0.8	10	0.8	5	213C100B	For EWAG WS11 machine
	1A1RH	244691	75	1	20	1	5	B151C75B	
		486834	100	1	20	1	5	B126C100B	
		786578	150	1	20	1	5	B126C100B	
		513947	150	1	20	1	5	B151C100B	
		34197167	150	1	30	1	5	B151C100B	For Wimmer machine
		39880	200	1.2	20	1.2	7	B151C100B	

TC tool production

HSS tool production

Regrinding

Basics



	Shape	Type number	D	T	H	U	X	Specification	Note
	1A1R	444901	200	1.2	22	1.2	7	B151C100B	For Ihle machine
	1A1RH	708158	200	1.2	30	1.2	7	B151C100B	For Wimmer machine
		494715	250	1.2	20	1.2	5	B151C100B	
	708159	250	1.2	30	1.2	5	B151C100B	For Wimmer machine	
	494716	300	1.5	20	1.5	5	B151C100B		
	34230073	300	1.5	32	1.5	5	B151C100B		

Customer-specific grinding tools can be produced on request.
Delivery times on request.

Application recommendation

a. Application recommendation for dressing

TYROLIT cut-off wheels can be used in delivery condition, without dressing.

b. Application recommendation for cut-off grinding

For the use of our cut-off wheels, the TYROLIT application engineers recommend the following parameters:

Cutting speed v_c [m/s]	Feed v_t [mm/sec]	Cooling
24 - 32	0.1 - 1	Required

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.



TC tool production

HSS tool production

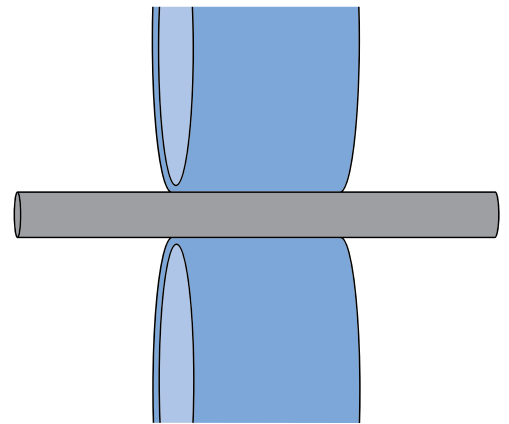
Regrinding

Basics

2.2 CSS ULTRA CENTRELESS GRINDING WHEELS

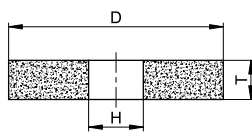
For the production of HSS tool blanks, TYROLIT offers proven grinding tools from the CSS-ULTRA product line for the centreless grinding process.

With CSS ULTRA, TYROLIT has created a sustainable grinding wheel micro-architecture using new high-quality components and innovative sintering technology. In addition to thermal load, particularly high wearing forces affect the grain and bond during centreless grinding. Furthermore, the boundary layer between both components becomes heavily eroded due to the increased stock removal rate. Thanks to the innovative bond system, a significant increase in grinding performance is possible.

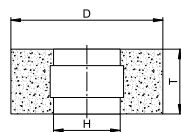


Standard range

Grinding wheels for all standard external cylindrical grinding machines



Shape 1



Shape 1 CES

	Shapes	D	T max.	H
	1	300	200	Bore according to customer requirement
	1 CES	up to 350	160	
		up to 406	205	
		up to 450	225	
		up to 508	305	
		> 508	400	

Multi-part version from width T=U > 150 mm.

Customer-specific grinding tools can be produced on request. Delivery time on request.



Application recommendation

a. Application recommendation for dressing

The CSS-Ultra grinding tools for centreless grinding are dressed in the machine using diamond tools. Single-grain or multi-grain dressers as well as diamond profile rollers are used.

b. Application recommendation for centreless grinding

Centreless grinding is a very complex grinding process. The grinding parameters depend on numerous influencing factors. For this reason, no specific parameter recommendations can be made at this point. Please send us a data sheet with information on your grinding process for this purpose.

Specification selection

Grain type	Grit size	Hardness	Structure	Bond	Note
CS33A, CS65A, CS66A, CS81A, CS83A, CS85A	80 - 150	JJ - LL	3 - 5	VB1, VB3, VK3, VK8	Definition of specification according to data sheet

In order to achieve an optimum grinding process, our application engineers support you in defining your individual grinding solution.

CSS REGULATOR REGULATING WHEELS FOR ALL STANDARD CENTRELESS GRINDING MACHINES

Centreless grinding is a complex grinding process. In addition to a good grinding wheel and the correct setting parameters, a reliable regulating wheel is required to stabilise the grinding process. The regulating wheels from the CSS Regulator product line guarantee a long tool life and an optimum coefficient of friction for reliable control of the workpiece.



TC tool production

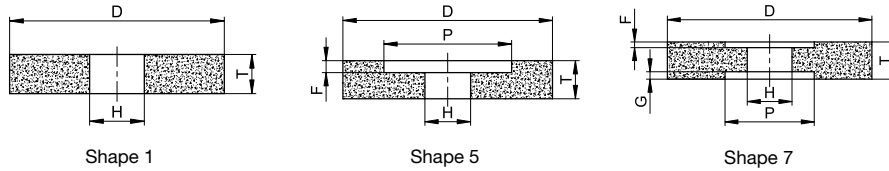
HSS tool production

Regrinding

Basics



Shapes and dimensions for regulating wheels



We produce the dimensions individually, according to customer requirements.
Delivery time on request.

Specification recommendations for regulating wheels

Standard recommendations

Application	Specification
Centerless through feed grinding	CRA 100-BR60
Plunge cut grinding	CRA 100-BR63

Finer grit sizes, 120, 150, 180 and 220, are available for special applications.

Further recommendations

Application	Specification
Regulating/drive wheel for abrasive belts	A240-BE19F
Soft regulating wheel, also for non-metallic workpieces	A80-BE41
Ceramic regulating wheel for special applications	10A809Q2AV56

In order to achieve an optimum grinding process, the TYROLIT application engineers support you in defining your individual grinding solution.

TC tool production

HSS tool production

Regrinding

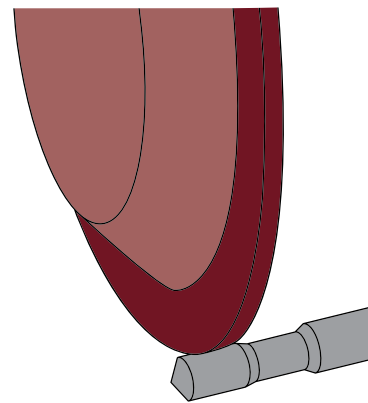
Basics



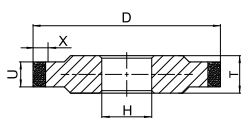
2.3 GRINDING TOOLS FOR HIGH-SPEED EXTERNAL CYLINDRICAL LONGITUDINAL GRINDING

TYROLIT offers innovative roughing and finishing wheels especially for the peel grinding of HSS tool blanks.

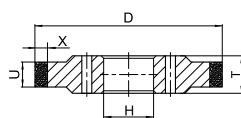
A high-strength vitrified bond is used for the roughing wheel and, in certain cases, a metal bond. This enables especially cost-effective and reliable process control. Long-life vitrified bonds are used for the finishing wheel. This enables even large stock removal fluctuations to be compensated after roughing, and maximum surface quality to be achieved.



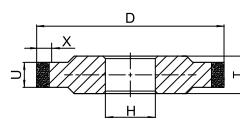
Standard range



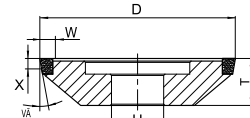
Shape 14A1S



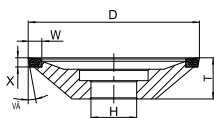
Shape 14A1H



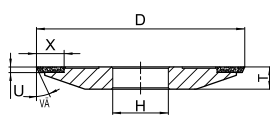
Shape 14A1



Shape 4B9P



Shape 12B9



Shape 3A2H

Reinecker SF40

Shape	Type number	D	T	H	U	X	Specification	v _{max}	Note
14A1S	34035118	350	18	127	5	5	B91 C150 V 41 V	140	Vitrified bonded roughing wheel
14A1H	34181745	250	18	90	5	5	B64 C150 T 41 V	125	Vitrified bonded finishing wheel






TC tool
production

HSS tool
production


Regrounding

Basics

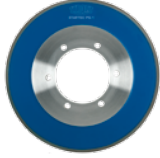
Reinecker RS500/RS700

	Shape	Type number	D	T	H	U	X	Specification	vmax	Note
	14A1S	34035118	350	18	127	5	5	B91 C150 V41 V	140	Vitrified-bonded roughing wheel

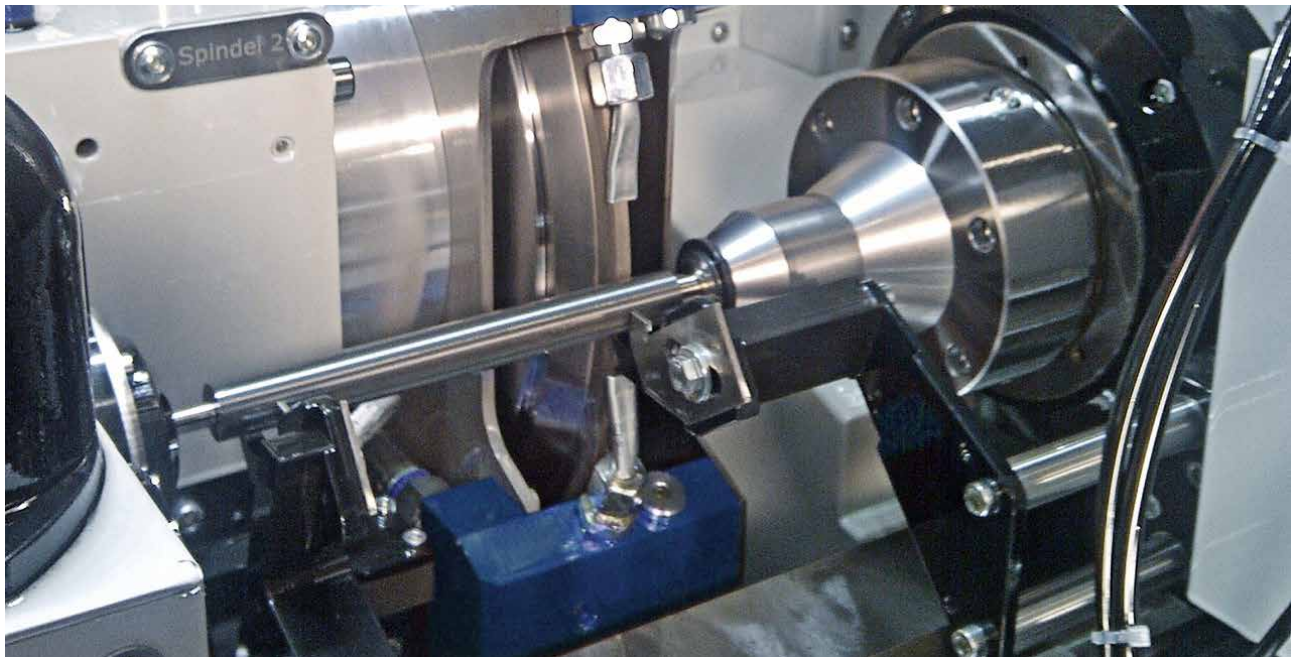
Junker Quickpoint

	Shape	Type number	D	T	H	U	X	Specification	vmax	Note
	14A1	34219043	350	25	126.94	5	5	B91 C150 V41 V	140	JUNKER standard bore ring, plane-side coating

Rollomatic NP3/NP4/NP5

	Shape	Type number	D	T	H	U	X	V°	Specification	vmax	Note
	4B9P	34057429	250	20	31.75	5	6	11	B126 C150 M	80	Metal-bonded roughing wheel
	12B9	34228013	150	24	31.75	6	3	10	B54 R 33 V	80	Vitrified-bonded finishing wheel

Customer-specific grinding tools can be produced on request.
Delivery times on request.

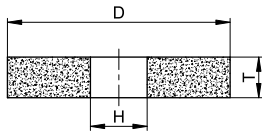




Application recommendation


a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing the grinding wheels.



Shape 1

Dressing wheels

	Shape	Type number	D	T	H	Specification	Stock	Note
	1	7348	200	20	20	C80 j5 V15	●	Dressing D91 rough grinding wheel in the machine
		34163206	200	20	20	C120 j5 V15	●	External dressing of wheel in D54/D46
		619701	250	12	51	C80 j5 V15	●	External dressing of rough grinding wheel in D91
		889495	250	12	51	C120 j5 V15	●	External dressing of wheel in D54/D46
		631579	250	12	51	C240 H5 AV18	●	External dressing of finishing wheel in D46
		34047880	300	10	76.2	C80 j5 V15	●	External dressing of rough grinding wheel in D91
		34066742	300	10	76.2	C120 j5 V15	●	External dressing of rough grinding wheel in D54/D46
		57814	300	10	76.2	C240 H5 AV18	●	External dressing of finishing wheel in D46

Recommended dressing parameters for metal-bonded wheels

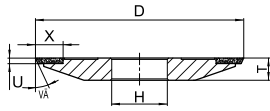
Dressing process	Grinding wheel cutting speed vc [m/s]	Dressing wheel cutting speed vc [m/s]	Infeed/stroke ae [mm]	Feed vt [mm/min]	Grinding direction		Recommended specification	Note
					Forward	Reverse		
In the machine	10 - 12	22 - 24	0.033	800		x	C80 for D54 to D91 rough grinding wheels C120 for D46 finishing wheels	Rough dressing, approx. 60 strokes
			0.01	575	x			
External on dressing machine	3 - 5	22 - 24	0.033	according to machine		x	C80 for D54 to D91 rough grinding wheels C120 for D46 finishing wheels	Rough dressing, approx. 60 strokes
			0.01	according to machine	x			



TC tool
production

Vitrified bonded grinding wheels can only be cost-effectively dressed using diamond dressing wheels.

HSS tool
production



Shape 3A2H

Regrounding

Diamond dressing wheels for Reinecker machines

Shape	Type number	D	T	H	W	Specification	Note
3A2H	34037195	140	7.5	75	5	D426XG RPX	Dressing of ceramic Wheel
	34033080	175	11	110	5	D426XG RPX	Dressing of ceramic wheel, mounting on C-axis

Basics

Recommended dressing parameters for grinding wheels with vitrified bond

Dressing process	Grinding wheel cutting speed vc [m/s]	Dressing wheel cutting speed vc [m/s]	Infeed/stroke ae [mm]	Feed vt [mm/min]	Grinding direction		Recommended specification	Note
					Forward	Reverse		
In the machine	24 - 26	20 - 22	0.003	220 - 230	x		D426 XG RPX	Approx. 30 strokes



b. Application recommendation for peel grinding

For the use of our grinding wheels, the TYROLIT application engineers recommend the following parameters:

Peel grinding, Reinecker SF40

Grinding process	Cutting speed v_c [m/s]	Infeed/ae [mm]	Plunge feed v_t [mm/min]	Feed v_t [mm/min]	Grinding direction		Cooling	Note
					Forward	Reverse		
Rough grinding	105 - 120	0.5 - 0.7	7 - 10	100 - 160		x	Required	Workpiece RPM dependent on diameter
Finish grinding	90 - 105	0.02 - 0.04	15 - 35	40 - 70		x	Required	Workpiece RPM dependent on diameter

Peel grinding, Reinecker RS500/700

Grinding process	Cutting speed v_c [m/s]	Infeed/ae [mm]	Plunge feed v_t [mm/min]	Feed v_t [mm/min]	Grinding direction		Cooling	Note
					Forward	Reverse		
Rough grinding	105 - 120	0.5 - 0.7	7 - 10	100 - 160		x	Required	Workpiece RPM dependent on diameter
Finish grinding	90 - 105	0.02 - 0.04	7 - 10	40 - 70		x	Required	Workpiece RPM dependent on diameter

Rollomatic NP3, NP4, NP5

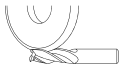
Grinding process	Cutting speed v_c [m/s]	Infeed/ae [mm]	Plunge feed v_t [mm/min]	Feed v_t [mm/min]	Grinding direction		Cooling	Note
					Forward	Reverse		
Rough grinding	60 - 90	0.1 - 0.2		0.2 - 0.4		x	Required	Workpiece RPM dependent on diameter
Finish grinding	40 - 60	0.02 - 0.04		0.2 - 0.4		x	Required	Workpiece RPM dependent on diameter

Junker Quickpoint

Grinding process	Cutting speed v_c [m/s]	Infeed/ae [mm]	Plunge feed v_t [mm/min]	Feed v_t [mm/min]	Grinding direction		Cooling	Note
					Forward	Reverse		
Rough grinding	105 - 120	0.1 - 1.0	6 - 8	80 - 90		x	Required	Workpiece RPM dependent on diameter

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.

In order to achieve an optimum grinding process, our application engineers support you in defining your individual grinding solution.



TC tool production

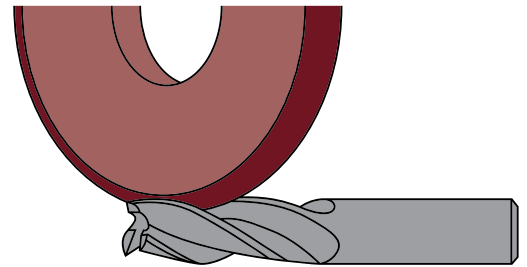
HSS tool production

Regrinding

Basics

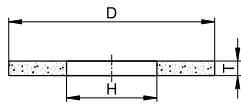
2.4 CONVENTIONAL GRINDING TOOLS FOR FLUTE GRINDING

For grinding the chip flute, the focus is on precise geometry and a high stock removal rate with minimal heat generation. With the proven TYROLIT flute grinding wheels, these requirements are optimally met through maximum stock removal rates as well as cool grinding. The benefits are significantly reduced machining costs as well as an increase in workpiece quality.

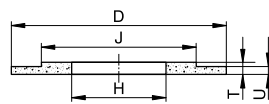


Standard range



Grinding wheels for standard flute grinding machines



Shape 1 FLUTE

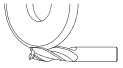


Shape 38 FLUTE

	Shapes	D	T = U	H	
	1 FLUTE	≤ 180	2 - 20	20 - 76.2	
		$180 < D \leq 250$	2.5 - 20	20 - 76.2	
		$250 < D \leq 305$	3 - 25	31.75 - 203.2	
		$305 < D \leq 350$	3 - 25	31.75 - 203.2	
		$350 < D \leq 406$	4 - 50	127 - 305	
		$406 < D \leq 460$	5 - 30	127 - 305	
		$460 < D \leq 508$	6 - 30	127 - 305	
	38 FLUTE	≤ 180	3.5	1.5 - 2	20 - 76.2
		$180 < D \leq 250$	4 - 9	1.5 - 6	20 - 76.2
		$250 < D \leq 305$	4 - 9	1.5 - 6	31.75 - 203.2
		$305 < D \leq 350$	4 - 9	1.6 - 6	31.75 - 203.2
		$350 < D \leq 406$	3.8 - 9	1.6 - 6	127 - 305
		$406 < D \leq 460$	3.8 - 9	2.4 - 6	127 - 305

U in 0.1 mm increments

Customer-specific grinding tools can be produced on request.
Delivery time on request.



Specification recommendation for flute grinding wheels

The specifications for flute grinding should be selected taking into account a number of factors. In addition to the workpiece to be ground, the material and machine used must be taken into account together with the cooling lubricant and grinding strategy.

Specification selection

Grain type	Grit size	Hardness	Structure	Bond	Note	Grain material
10A 52A 85A	80 100	P Q R S	4 5 6 8	B25	Standard vc max. = 80 m/s	Fused aluminium oxide
451A 454A 455A	80 100	Q R	4 5 6 8	B25	Standard vc max. = 80 m/s	Sintered aluminium oxide mixtures
10A 52A 69A 85A	80 90 100	P Q R	3 5 7	B16	Good cutting ability, ground flat, vc max. = 80 m/s	Fused aluminium oxide
451A 454A 455A	60 80 90 100	P Q R	3 4 5 7	B16	Good cutting ability, ground flat, vc max. = 80 m/s	Sintered aluminium oxide mixtures
707A	100	P Q R	3 4 5 7	B16	Good cutting ability, ground flat, vc max. = 80 m/s	Sintered aluminium oxide mixtures

In addition, we offer individual specifications tailored to your requirements. Please send us a data sheet with information on your grinding process for this purpose.

Application recommendation

a. Application recommendation for dressing

The grinding tools for flute grinding are dressed in the machine using diamond tools. Single-grain or multi-grain dressers as well as diamond profile rollers are used.

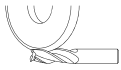
b. Application recommendation for flute grinding

For the use of our flute grinding wheels, the TYROLIT application engineers recommend the following parameters:

Cutting speed vc [m/s]	Infeed/ ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
			Forward	Reverse		
63 - 80	Full depth	500 - 2.000	x		Required	The feed depends on the profile depth

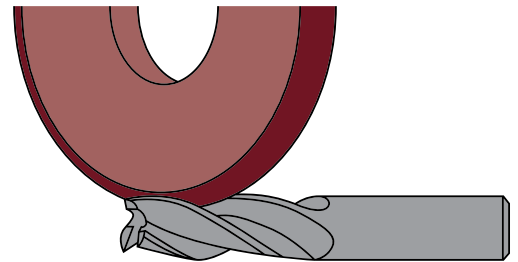
Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.

In order to achieve an optimum grinding process, our application engineers support you in defining your individual grinding solution.

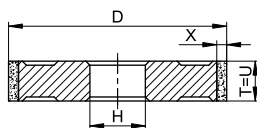


2.5 STARTEC XP-P+ GRINDING TOOLS FOR FLUTE GRINDING

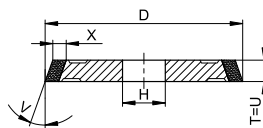
The high quality requirements for high-tech stock removal tools made from HSS and the sustained cost pressures require the efficient use of state-of-the-art CNC tool grinding machines. In order to fully exploit the advantages of CNC tool grinding machines, an innovative grinding tool is required. The STARTEC XP-P+ line now offers improved profile retention and low power consumption. The latest raw material combinations and tried and tested production sequences guarantee optimum tool quality for our customers.



Standard range




Shape 1A1



Shape 1V1

	Shape	Type number	D	T	H	U	X	V°	Specification
	1A1	34230222	100	6	20	6	10		STARTEC XP-P+ BC107-4-MXPP+
		34185752	100	10	20	10	10		STARTEC XP-P+ BC107-4-MXPP+
		34230239	100	15	20	15	10		STARTEC XP-P+ BC107-4-MXPP+
		34230226	125	6	20	6	10		STARTEC XP-P+ BC107-4-MXPP+
		34227454	125	10	20	10	10		STARTEC XP-P+ BC107-4-MXPP+
		34181263	125	15	20	15	10		STARTEC XP-P+ BC107-4-MXPP+
		34230230	150	8	20	8	10		STARTEC XP-P+ BC107-4-MXPP+
		34230240	150	15	20	15	10		STARTEC XP-P+ BC107-4-MXPP+
	1V1	34230255	100	10	20	10	10	15	STARTEC XP-P+ BC107-4-MXPP+
		34230256	100	10	20	10	10	45	STARTEC XP-P+ BC107-4-MXPP+
		34230254	100	15	20	15	10	15	STARTEC XP-P+ BC107-4-MXPP+

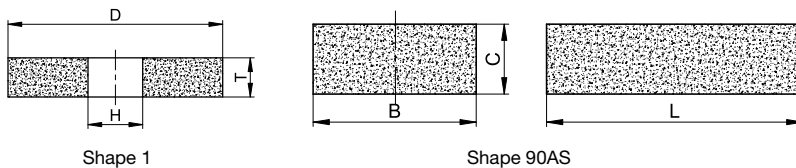
Shape	Type number	D	T	H	U	X	V°	Specification	
	1V1	34230253	100	15	20	15	10	45	STARTEC XP-P+ BC107-4-MXPP+
		34230234	125	10	20	10	10	15	STARTEC XP-P+ BC107-4-MXPP+
		34230235	125	10	20	10	10	45	STARTEC XP-P+ BC107-4-MXPP+
		34230236	125	15	20	15	10	15	STARTEC XP-P+ BC107-4-MXPP+
		34230251	125	15	20	15	10	45	STARTEC XP-P+ BC107-4-MXPP+
		34230252	150	15	20	15	10	10	STARTEC XP-P+ BC107-4-MXPP+

Customer-specific grinding tools can be produced on request.
Delivery times on request.

Application recommendation



a. Application recommendation for dressing

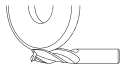
Specially adapted dressing wheels are available ex stock for dressing.
Roughening using a sharpening stick is necessary prior to initial use.



● ... Available ex stock

Customer-specific grinding tools
can be produced on request.
Delivery times on request.

Shape	Type number	D	T	H	Specification for TC	Stock	Note
	1	7348	200	20	20	C80J5V15	● For grit sizes > B64
		3135	200	20	32	C80J5V15	● For grit sizes > B64
		34163206	200	20	20	C120J5V15	● For grit sizes ≤ B54
		250491	250	12	51	C80H8V15	● For grit sizes > B64
		619701	250	12	51	C80J8V15	● Harder, for grit sizes ≥ B64
		413027	250	12	51	C120H5V15	● For grit sizes ≤ B54
		708196	250	12	51	89A120M5AV217	● Alternative to SiC, for grit sizes ≤ B54
		34047880	300	10	76.2	C80J5V15	● For grit sizes > B64
	34066742	300	10	76.2	C120J5V15	● For grit sizes ≤ B54	
Shape	Type number	B	C	L	Specification	Stock	Note
	90AS	845594	24	13	100	A120J7V	● For grit sizes ≥ 126
		395773	50	25	200	A120H7V	● For grit sizes ≥ 126
		460976	50	25	200	A120J7V	● For grit sizes ≥ 126
		112055	50	25	200	C220 C4 B	● For grit sizes > 46 and < 126, resinoid bond
		678952	24	13	100	A240H5V	● For grit sizes > 46 and < 126
		678953	24	13	200	A240H5V	● For grit sizes > 46 and < 126
		464290	50	25	200	A240J7V	● For grit sizes > 46 and < 126
		33531	25	13	100	A600-25V	● For grit sizes ≤ 46
		251584	50	25	200	A600-25V	● For grit sizes ≤ 46



TC tool production

HSS tool production

Regrinding

Basics

b. Application recommendation for flute grinding

For the use of our STARTEC XP-P+ flute grinding wheels, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Flute grinding	26 - 32	see Q'w table		x		Required	
Face grinding	28 - 35	Full depth	100 - 200			Required	

Q'w table

The values in the following table provide information on performance during the Q'w grinding process. Via the infeed ae (profile depth), you can find the optimum feed vt for use with the STARTEC XP-P+ flute grinding

wheels. The achieved feed values depend on the workpiece diameter, the spiral angle of the flutes, the cooling lubricant used and the machine-tool output available.

Standard values for flute grinding

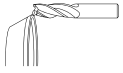
Product line	vc [m/s]	Q'w [mm3/s.mm]	
		Standard	TOP PERFORMANCE
STARTEC XP-P+ CBN	26-32	6 to 10	14 to 18

Profile depth ae [mm]	Feed vt [mm/min]															
	100	120	140	160	180	200	220	240	260	280	300	320	340	380	400	420
2.6											13.9	14.7	16.5	17.3	18.2	
2.8										14.0	14.9	15.9	17.7	18.7	19.6	
3.0									14.0	15.0	16.0	17.0	19.0	20.0		
3.2								13.9	14.9	16.0	17.1	18.1	20.3			
3.4							13.6	14.7	15.9	17.0	18.1	19.3				
3.6							14.4	15.6	16.8	18.0	19.2	20.4				
3.8						13.9	15.2	16.5	17.7	19.0	20.3					
4.0					13.3	14.7	16.0	17.3	18.7	20.0						
4.2					14.0	15.4	16.8	18.2	19.6	21.0						
4.4				13.2	14.7	16.1	17.6	19.1	20.5							
4.6				13.8	15.3	16.9	18.4	19.9	21.5							
4.8			12.8	14.4	16.0	17.6	19.2	20.8								
5.0			13.3	15.0	16.7	18.3	20.0	21.7								
5.5		12.8	14.7	16.5	18.3	20.2	22.0									
6.0		14.0	16.0	18.0	20.0	22.0	24.0									
6.5	13.0	15.2	17.3	19.5	21.7	23.8										
7.0	14.0	16.3	18.7	21.0	23.3	25.7										
7.5	12.5	15.0	17.5	20.0	22.5	25.0										
8.0	13.3	16.0	18.7	21.3	24.0	26.7										
8.5	14.2	17.0	19.8	22.7	25.5											

Calculation of values

$Q'w = ae \times vt / 60$
 $vt = Q'w \times 60 / ae$

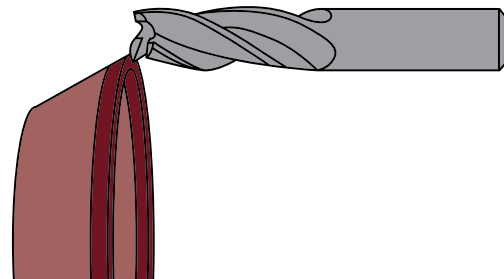
vt standard STARTEC XP-P+ CBN
 vt optimisation potential



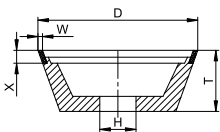
2.6 STARTEC XP-P CUP WHEELS FOR GRINDING OF FACE AND CLEARANCE SURFACES

STARTEC XP-P from TYROLIT stands for maximum efficiency and optimum tool quality in flute grinding. This high performance level is also achievable with the new cup wheels for machining clearance surfaces and face geometries on HSS stock removal tools.

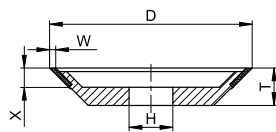
An innovative bond system, tailored CBN qualities and new manufacturing technologies guarantee extremely high edge stability, low cutting forces and the best surface finish on the ground tool.



Stock range



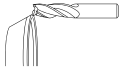
Shape 11V9



Shape 12V9

	Shape	Type number	D	T	H	W	X	V°	Specification for TC	Stock
	11V9	34211869	75	30	20	3	10	20	STARTEC-XP-P B107-BXPP	●
		34205432	100	35	20	3	10	20	STARTEC-XP-P B107-BXPP	●
		34184813	125	40	40	3	10	20	STARTEC-XP-P B107-BXPP	●
		34161553	150	50	20	3	10	20	STARTEC-XP-P B107-BXPP	●
	12V9	34163104	100	20	20	3	10	45	STARTEC-XP-P B107-BXPP	●
		34163105	125	25	20	3	10	45	STARTEC-XP-P B107-BXPP	●
		34211873	150	25	20	3	10	45	STARTEC-XP-P B107-BXPP	●

● ... Available ex stock



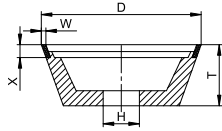
TC tool production

HSS tool production

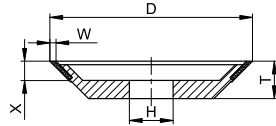
Regrinding

Basics

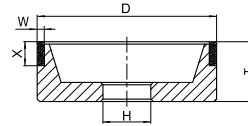
Standard range



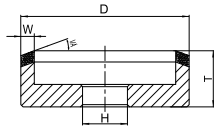
Shape 11V9



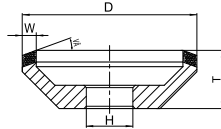
Shape 12V9



Shape 6A9



Shape 6V5



Shape 12V5

Shape	Type number	D	T	H	W	X	V°	Specification for TC
11V9	34203567	75	30	20	2	10	20	STARTEC-XP-P B107-BXPP
	34199311	100	35	20	2	10	20	STARTEC-XP-P B107-BXPP
12V9	34207564	100	20	20	2	10	45	STARTEC-XP-P B107-BXPP
6A9	34223700	75	30	20	3	10		STARTEC-XP-P B76-BXPP
	34223201	75	30	20	3	10		STARTEC-XP-P B107-BXPP
	34223771	100	30	20	3	10		STARTEC-XP-P B76-BXPP
	34223772	125	30	20	3	10		STARTEC-XP-P B76-BXPP
	34223178	125	30	20	3	10		STARTEC-XP-P B107-BXPP
6V5	34223774	100	34	20	5	10	30	STARTEC-XP-P B76-BXPP
12V5	34223775	100	25	20	10	6	20	STARTEC-XP-P B76-BXPP



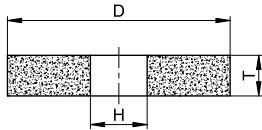
Customer-specific grinding tools can be produced on request.
Delivery times on request.



Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing.



Shape 1

	Shape	Type number	D	T	H	Specification	Stock	Note
	1	7348	200	20	20	C80J5V15	●	For grit sizes > B64
		3135	200	20	32	C80J5V15	●	For grit sizes > B64
		34163206	200	20	20	C120J5V15	●	For grit sizes ≤ B54
		250491	250	12	51	C80H8V15	●	For grit sizes > B64
		619701	250	12	51	C80J8V15	●	Harder, for grit sizes ≥ B64
		413027	250	12	51	C120H5V15	●	For grit sizes ≤ B54
		708196	250	12	51	89A120M5AV217	●	Alternative to SiC, for grit sizes ≤ B54
		34047880	300	10	76.2	C80J5V15	●	For grit sizes > B64
		34066742	300	10	76.2	C120J5V15	●	For grit sizes ≤ B54

● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

b. Application recommendation for grinding clearance and face surfaces

For the use of our grinding tools for clearance and face surface grinding, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Clearance surfaces	30 - 35	0.5 - 2.0	160 - 260	x		Required	
Face geometry	28 - 32	max. 1.5	150 - 200	x		Required	
Face gap	28 - 32	Full depth	100 - 200	x		Required	

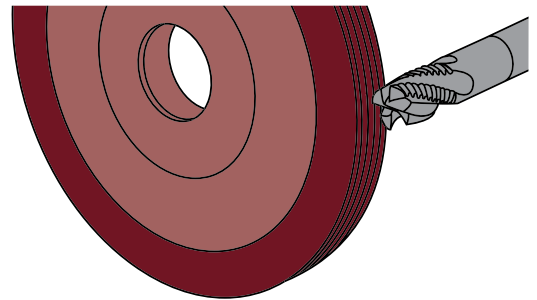
Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.





2.7 ROUGHING TEETH GRINDING ON END MILLS

For the production of roughing teeth on end mills, TYROLIT offers pre-profiled grinding wheels with adapted specifications. Various bond systems guarantee high profile retention and a good stock removal rate with low heat generation in order to achieve optimum quality of the cutting edge.



Range

We manufacture the grinding tools for roughing teeth grinding according to individual requirements. Please send us a detailed workpiece drawing and information on your grinding tool for this purpose.

Grinding process	Recommended specification	Cutting speed v_c [m/s]	Benefits
Profile grinding	STARTEC XP-P B91-4-MXPP	24 – 28	Metal bond, high profile retention, high stock removal rate
	51B91C100B42	28 – 32	Resin bond, low cutting-edge chipping, good surface finish
	60B91 XG36	28 - 32	Electroplated bond, very high profile retention

In addition, we offer individual specifications tailored to your requirements. Please send us a data sheet with information on your grinding process for this purpose.

Application recommendation

a. Application recommendation for dressing

Truing of the metal or resin-bonded grinding wheels is performed using a diamond forming roller or a suitable crushing roller in flange-mounted version, externally or in the machine. If truing is not possible, it is recommended to use an electroplated grinding wheel.

TC tool production

HSS tool production

Regrinding

Basics



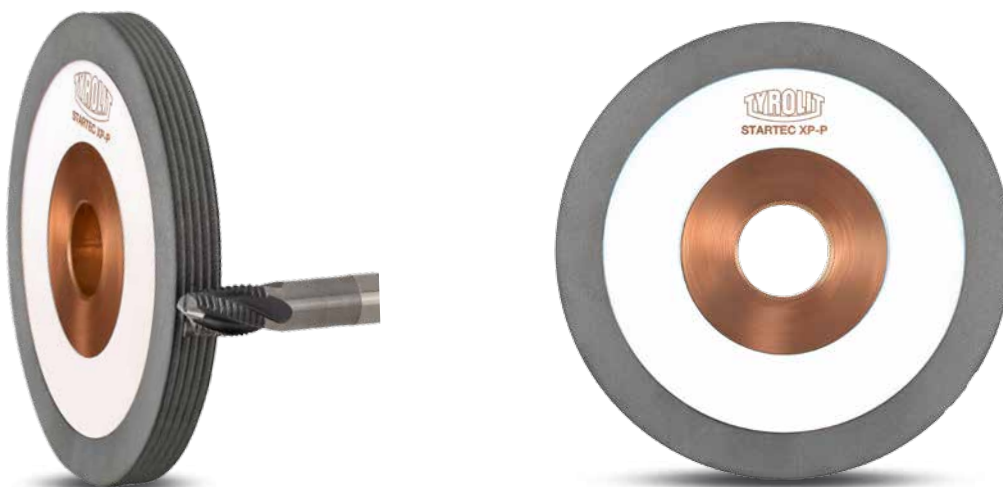
b. Application recommendation for profile grinding

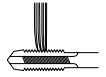
For the use of our grinding wheels for the production of roughing teeth, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed v_c [m/s]	Infeed/ a_e [mm]	Feed v_t [mm/min]	Grinding direction	Cooling	Notes
Roughing teeth	24 - 32	Full profile depth	160 - 800	Against the cutting edge	Required	Cutting speed dependent on the selected bond system; feed dependent on control of A-axis

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.

In order to achieve an optimum grinding process, our application engineers support you in defining your individual grinding solution.

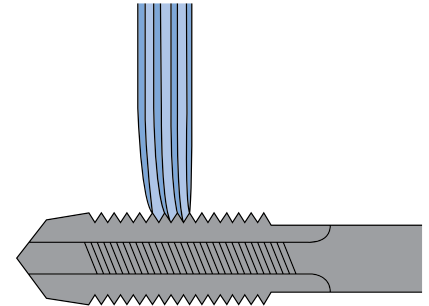




2.8 CSS ULTRA

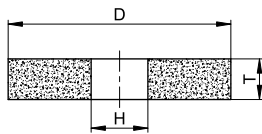
GRINDING TOOLS FOR THREAD GRINDING

For the grinding of highly precise thread profiles, TYROLIT offers the CCS ULTRA product line, optimally adapted grinding tools with high profile retention, which generate low cutting forces during grinding. These can be used to produce high-quality thread-cutting tools in a stable process.



Range

Grinding wheels for standard thread grinding machines



Shape 1

Standard dimensions

	Shapes	D	T = U	H
	1 THREAD	≥200 <300	4 to 40	According to customer requirement
		≥300 <400	6 to 60	
		≥400 <500	8 to 60	
		≥500 <620	10 to 60	

Customer-specific grinding tools can be produced on request.
Delivery time on request.

Specification recommendation for thread grinding

Standard recommendation for standard metric threads:

Thread	Pitch	Radius	Grit size	Standard recommendation
M1, M1.2	0.25	0.04	500	CS33A 500 HH3 VB1
M1.6	0.35	0.05	500	CS33A 500 HH3 VB1
M2	0.4	0.06	400	CS33A 400 HH3 VB1

TC tool production

HSS tool production

Regrinding

Basics



Thread	Pitch	Radius	Grit size	Standard recommendation
M2.5	0.45	0.07	400	CS33A 400 HH3 VB1
M3	0.5	0.07	400	CS33A 400 HH3 VB1
M4	0.7	0.10	320	CS33A 320 HH3 VB1
M5	0.8	0.12	320	CS33A 320 HH3 VB1
M6	1.0	0.14	280	CS33A 280 HH3 VB1
M8	1.25	0.18	240	CS33A 240 HH3 VB1
M10	1.5	0.22	240	CS33A 240 HH3 VB1
M12	1.75	0.25	240	CS33A 220 HH3 VB1
M16	2.0	0.29	220	CS33A 220 HH3 VB1
M20	2.5	0.36	180	CS33A 180 HH3 VB1
M24	3.0	0.36	180	CS33A 180 HH3 VB1
M30	3.5	0.51	150	CS33A 150 HH3 VB1
M36	4.0	0.58	150	CS33A 150 HH3 VB1

The grinding tools are designed as single-profile or multi-profile wheels, depending on the requirements.

We also produce thread grinding wheels in a dual-layer version. These can be used to produce the point and threaded section using one grinding tool. Here, the layer with which the thread is cut

is specified in accordance with the thread pitch. The layer for the point is designed for a high stock removal rate and surface finish, and remains unchanged.

In the case of dual-layer wheels, the relevant specification for the threaded section is combined with the following specification for the point.

- Specification for grinding the point: CS33A 120.2 FF3 VK1
- Specification for thread grinding: Standard recommendation acc. to table

Application recommendation

a. Application recommendation for dressing

The grinding tools for thread grinding are dressed in the machine using diamond tools. Individually designed diamond profile rollers are used. These are available on request. Send us your workpiece or roller drawing for this purpose.

b. Application recommendation for thread grinding

For use of our thread grinding wheels, the TYROLIT application engineers recommend the following parameters:

Cutting speed vc [m/s]	Infeed/ae [mm]	Workpiece speed [RPM]	Grinding direction		Cooling	Note
			Forward	Reverse		
30 - 80	Number of cutting passes	80 - 500	x		Required	

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.

In order to achieve an optimum grinding process, our application engineers support you in defining your individual grinding solution.



3. REGRINDING OF SHAFT TOOLS

3.1 STARTEC BASIC diamond grinding tools for wet grinding	80
3.2 STARTEC BASIC CBN grinding tools for wet grinding	87
3.3 DIAGO diamond grinding tools for dry grinding	90
3.4 AMIGO CBN grinding tools for dry grinding	95
3.5 SKYTEC BASIC+ for grinding PCD and CBN cutting tools	100

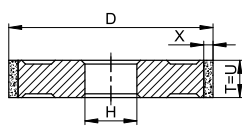
3.1 STARTEC BASIC DIAMOND GRINDING TOOLS FOR WET GRINDING

For the professional regrinding of tungsten carbide shaft tools, TYROLIT offers grinding tools especially adapted for wet grinding. The STARTEC BASIC diamond grinding tools are characterised by a high stock removal rate and excellent profile retention. This results in an outstanding surface finish, optimum cutting edge quality and maximum shape accuracy of the ground tools.

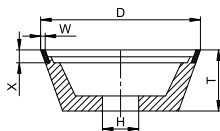
Positive side effect: the STARTEC BASIC diamond grinding tools are also suitable for the manufacture of shaft tools.



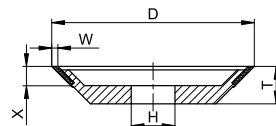
Stock range



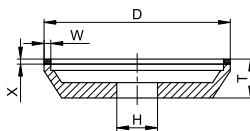
Shape 1A1



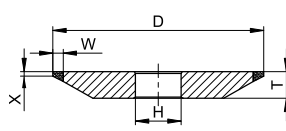
Shape 11V9



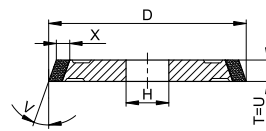
Shape 12V9




Shape 12A2D



Shape 4ET9



Shape 1V1

Shape	Type number	D	T	H	U	W	X	V°	Specification	Stock	Note
	1A1	34301112	75	8	20	8	6		STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
		34195514	100	6	20	6	6		STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
		437298	100	10	20	10	6		STARTEC BASIC DE64-3-BS	●	
		34301119	100	10	20	10	10		STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
		34301131	100	15	20	15	10		STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
		34301134	125	6	20	6	6		STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
		34301136	125	10	20	10	10		STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production

● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

TC tool production

HSS tool production

Regrinding

Basics

Shape	Type number	D	T	H	U	W	X	V°	Specification	Stock	Note
1A1	34301138	125	15	20	15		10		STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
	34301141	150	10	20	10		10		STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
1V1	34301144	75	10	20	10		10	15	STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
	34301145	100	6	20	6		10	15	STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
	34301146	100	10	20	10		10	15	STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
	34301149	100	12	20	12		10	45	STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production, gashing
	34301150	100	15	20	15		10	15	STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
	34301152	100	15	20	15		10	45	STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production, gashing
	34301153	100	15	20	15		10	30	STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
	34301155	125	10	20	10		10	15	STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production
	34301157	125	12	20	12		10	45	STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production, gashing
	34301159	125	15	20	15		10	30	STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production, gashing
34301160	125	15	20	15		10	45	STARTEC BASIC DE54-3-BS	●	Suitable for regrinding and production, gashing	
11V9	390970	75	30	20		2	10		STARTEC BASIC DE64-3-BS	●	Suitable for regrinding and production
	639781	100	35	20		2	10		STARTEC BASIC DE46-4-BS	●	Suitable for regrinding and production
	357223	100	35	20		2	10		STARTEC BASIC DE64-3-BS	●	Suitable for regrinding and production
	34301164	100	35	20		3	10		STARTEC BASIC DE46-4-BS	●	Suitable for regrinding and production
	532514	100	35	20		3	10		STARTEC BASIC DE64-3-BS	●	Suitable for regrinding and production
12V9	34301166	75	20	20		2	6		STARTEC BASIC DE46-4-BS	●	Suitable for regrinding and production
	495020	75	20	20		2	6		STARTEC BASIC DE64-3-BS	●	Suitable for regrinding and production
	34301168	100	20	20		2	10		STARTEC BASIC DE46-4-BS	●	Suitable for regrinding and production
	532510	100	20	20		2	10		STARTEC BASIC DE64-3-BS	●	Suitable for regrinding and production
	34301169	100	20	20		3	10		STARTEC BASIC DE46-4-BS	●	Suitable for regrinding and production
	532529	100	20	20		3	10		STARTEC BASIC DE64-3-BS	●	Suitable for regrinding and production
	363993	125	25	20		2	10		STARTEC BASIC DE64-3-BS	●	Suitable for regrinding and production
	34301181	125	25	20		3	10		STARTEC BASIC DE46-4-BS	●	Suitable for regrinding and production
	532540	125	25	20		3	10		STARTEC BASIC DE64-3-BS	●	Suitable for regrinding and production
12A2D	495044	125	25	20		15	3		D54C75B	●	
4ET9	897024	150	14	32		10	1		D126C100B	●	

● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

TC tool production

HSS tool production

Regrinding

Basics



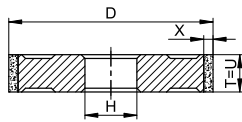
TC tool production

HSS tool production

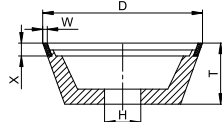
Regrinding

Basics

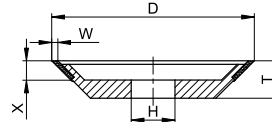
Standard range



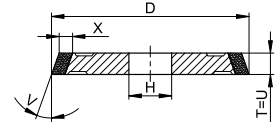
Shape 1A1



Shape 11V9



Shape 12V9



Shape 1V1

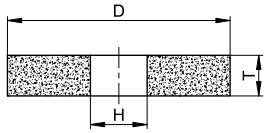
Shape	Type number	D	T	H	U	W	X	V°	Specification	Note
1A1	34301110	75	4	20	4		6		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	34285810	75	10	20	10		6		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	34301114	100	8	20	8		6		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	34301120	100	12	20	12		10		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	34301132	100	18	20	18		10		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	34301133	100	20	20	20		10		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	34301135	125	8	20	8		6		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	34301137	125	12	20	12		10		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	34301139	125	18	20	18		10		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	34301140	125	20	20	20		10		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	34301142	150	15	20	15		10		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	34301143	150	20	20	20		10		STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
	1V1	34301147	100	10	20	10		10	30	STARTEC BASIC DE54-3-BS
34301154		125	6	20	6		10	15	STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
34301156		125	10	20	10		10	30	STARTEC BASIC DE54-3-BS	Suitable for regrinding and production, gashing
34301158		125	15	20	15		10	15	STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
34301161		150	12	20	12		10	15	STARTEC BASIC DE54-3-BS	Suitable for regrinding and production
11V9	34301162	75	30	20		2	10		STARTEC BASIC DE46-4-BS	Suitable for regrinding and production
	34301165	125	40	20		3	10		STARTEC BASIC DE46-4-BS	Suitable for regrinding and production
12V9	34301170	125	25	20		2	10		STARTEC BASIC DE46-4-BS	Suitable for regrinding and production
	34301182	150	25	20		3	10		STARTEC BASIC DE46-4-BS	Suitable for regrinding and production

Customer-specific grinding tools can be produced on request. Take longer delivery times into account.

Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing.



Shape 1

	Shape	Type number	D	T	H	Specification	Stock	Note
	1	7348	200	20	20	C80J5V15	●	For grit sizes > D64
		3135	200	20	32	C80J5V15	●	For grit sizes > D64
		34163206	200	20	20	C120J5V15	●	For grit sizes ≤ D54
		250491	250	12	51	C80H8V15	●	For grit sizes > D64
		619701	250	12	51	C80J8V15	●	Harder, for grit sizes > D64
		413027	250	12	51	C120H5V15	●	For grit sizes ≤ D54
		708196	250	12	51	89A120M5AV217	●	Alternative to SiC, for grit sizes ≤ D54
		34047880	300	10	76.2	C80J5V15	●	For grit sizes > D64
		34066742	300	10	76.2	C120J5V15	●	For grit sizes ≤ D54

● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

b. Application recommendation for regrinding

For use of our STARTEC BASIC for regrinding, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Regrinding of TC tools, wet	22 - 24	Correction dimension	80 - 150	x		Required	In the case of coated tools, an infeed that is larger than the layer thickness must be selected.

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.



TC tool production

HSS tool production

Regrinding

Basics

c. Application recommendation for flute grinding

For the use of our STARTEC BASIC flute grinding wheels, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Flute grinding	20 - 25	see Q'w table		x		Required	
Face grinding	24 - 30	Full depth	40 - 100			Required	

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.

Q'w table

The values in the following table provide information on performance during the Q'w grinding process. Via the infeed ae (profile depth), you can find the optimum feed vt for use with the STARTEC BASIC flute grinding

wheels. The achieved feed values depend on the workpiece diameter, the spiral angle of the chip flutes, the cooling lubricant used and the machine-tool output available.



Standard values for flute grinding

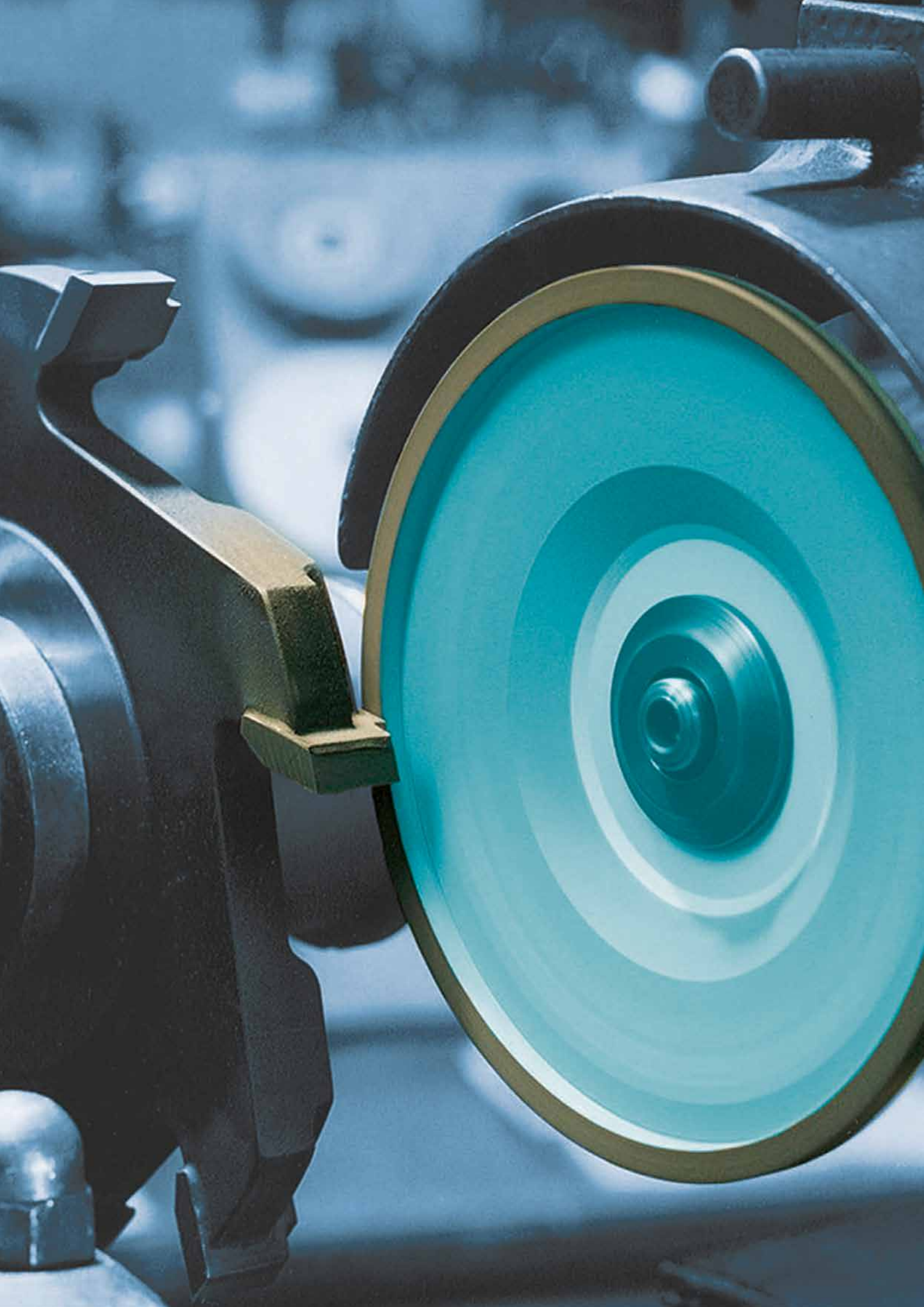
Product line	vc [m/s]	Q'w [mm ³ /s.mm]
		Standard
STARTEC BASIC	20-25	1,3 to 2,6

		Feed vt [mm/min]								
		30	40	50	60	70	80	100	120	140
Profile depth ae [mm]	1,0					1,2	1,3	1,7	2,0	2,3
	1,2				1,2	1,4	1,6	2,0	2,4	
	1,4			1,2	1,4	1,6	1,9	2,3		
	1,6			1,3	1,6	1,9	2,1	2,7		
	1,8		1,2	1,5	1,8	2,1	2,4			
	2,0		1,3	1,7	2,0	2,3	2,7			
	2,2	1,1	1,5	1,8	2,2	2,6				
	2,4	1,2	1,6	2,0	2,4	2,8				
	2,6	1,3	1,7	2,2	2,6	3,0				
	2,8	1,4	1,9	2,3	2,8					
3,0	1,5	2,0	2,5	3,0						

Calculation of values

$Q'w = ae \times vt / 60$
 $vt = Q'w \times 60 / ae$

-  vt standard STARTEC BASIC
-  vt optimisation potential



TC tool production

HSS tool production

Regrinding

Basics

STARTEC BASIC

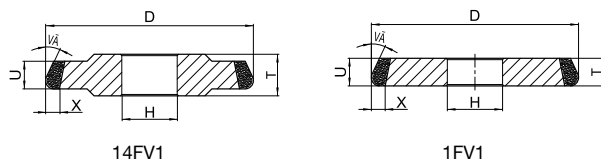
DIAMOND GRINDING TOOLS FOR WET GRINDING

TYROLIT offers shape-adapted grinding tools with specifications tailored specifically to the regrinding of high-performance drilling tools.

The profiles of the grinding tools are optimally adapted to the relevant drill types and to the machining task. The grinding wheels impress due to their high stock removal rates as well as their excellent profile retention.



Standard range for Kennametal SE and HP drills



Shape	Type number	Drill type	Application	D	T	H	W	U	X	R1	R2	V°	Specification
	14FV1	34157285	KSEGW03-04FP	Face grinding/point grinding	125	8	20	6	6	0.4	0.4	20	DE543PD STARTEC BASIC
	1FV1	34039308	KSEGW03-06FP	Face grinding/point grinding	125	8	20	8	8	0.8	0.5	20	DE543PD STARTEC BASIC
		34039309	KSEGW06-08FP	Face grinding/point grinding	125	10	20	10	6	1.2	0.8	20	DE543PD STARTEC BASIC
		34039310	KSEGW08-11FP	Face grinding/point grinding	125	12	20	12	6	1.7	1	20	DE543PD STARTEC BASIC
		34157288	KSEGW11-15FP	Face grinding/point grinding	125	16	20	16	6	2.3	1.3	20	DE543PD STARTEC BASIC
		34039351	KSEGW15-20FP	Face grinding/point grinding	125	22	20	22	6	3	1.7	20	DE543PD STARTEC BASIC
		34157289	KSEGW20-25FP	Face grinding/point grinding	125	25	20	25	5	4.2	2.2	20	DE543PD STARTEC BASIC
		34157275	KSEGW25-32FP	Face grinding/point grinding	125	28	20	28	7.1	5	3	20	DE543PD STARTEC BASIC

The grinding tools for the SE and HP drill types are profiled with a face angle V° of 20° and two different radii R1 and R2.



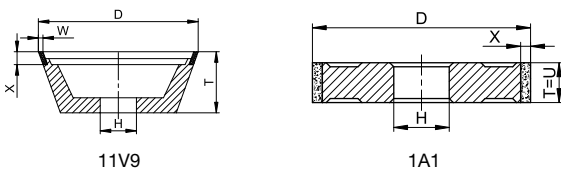
Standard range for Kennametal TF drills

Shape	Type number	Drill type	Application	D	T	H	W	U	X	R1	R2	V°	Specification
14FV1	34157276	KTFGW03-07F	Face grinding	125	8	20	6	5	0.2			24	DE543PD STARTEC BASIC
1FV1	34157277	KTFGW07-11F	Face grinding	125	8	20	8	5	0.5			24	DE543PD STARTEC BASIC
	34157278	KTFGW11-20F	Face grinding	125	13	20	13	6	1			24	DE543PD STARTEC BASIC
	34157279	KTFGW20-25F	Face grinding	125	16	20	16	6	1.5			24	DE543PD STARTEC BASIC
14FV1	34161162	KTFGW03-07P	Point grinding	125	8	20	6	5	0.2			15	DY323PD STARTEC BASIC
	34161163	KTFGW07-11P	Point grinding	125	8	20	8	5	0.5			15	DY323PD STARTEC BASIC
	34161172	KTFGW11-20P	Point grinding	125	13	20	13	6	1			15	DY323PD STARTEC BASIC
	34157284	KTFGW20-25P	Point grinding	125	16	20	16	6	1.5			15	DY323PD STARTEC BASIC

The grinding tools for the TF drill type are designed for face grinding at a face angle V° of 24° and for point thinning at a face angle V° of 15°. A radius R corresponding to the drill profile is used on the smaller grinding wheel diameter.



Standard range for Kennametal TF drills



Shape	Type number	Drill type	Application	D	T	H	W	U	X	R1	R2	V°	Specification
11V9	881915	KTXGW03-25F	Face grinding	100	35	20	2		10			20	DE463PD STARTEC BASIC
1A1	34157274	KTXGW03-12F	Face grinding	100	5	20		5	6				DE763PD STARTEC BASIC
	34157273	KTXGW03-25F	Face grinding	100	5	20		10	6				DE763PD STARTEC BASIC

Customer-specific grinding tools for further drill types can be produced on request. Delivery times on request.

TC tool production
HSS tool production
Regrinding
Basics

TC tool production

HSS tool production

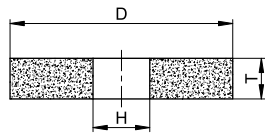
Regrinding

Basics

Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing.



Shape 1

	Shape	Type number	D	T	H	Specification	Stock	Note
	1	7348	200	20	20	C80J5V15	●	For grit sizes > D64
		3135	200	20	32	C80J5V15	●	For grit sizes > D64
		34163206	200	20	20	C120J5V15	●	For grit sizes ≤ D54
		250491	250	12	51	C80H8V15	●	For grit sizes > D64
		619701	250	12	51	C80J8V15	●	Harder, for grit sizes > D64
		413027	250	12	51	C120H5V15	●	For grit sizes ≤ D54
		708196	250	12	51	89A120M5AV217	●	Alternative to SiC, for grit sizes ≤ D54
		34047880	300	10	76.2	C80J5V15	●	For grit sizes > D64
		34066742	300	10	76.2	C120J5V15	●	For grit sizes ≤ D54

● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

b. Application recommendation for regrinding

For use of our grinding tools for regrinding, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Regrinding of Kennametal TC drill types SE, HP, TF and TX	22 - 24	Correction dimension	80 - 150	x		Required	In the case of coated drills, an infeed which is larger than the layer thickness must be selected. Special Kennametal software available

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.

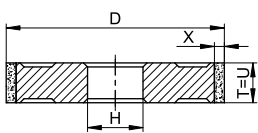
3.2 STARTEC BASIC CBN GRINDING TOOLS FOR WET GRINDING

For the professional regrinding of HSS shaft tools, TYROLIT offers grinding tools especially adapted for wet grinding. The STARTEC BASIC CBN grinding tools are characterised by a high stock removal rate and excellent profile retention. This results in an outstanding surface finish, optimum cutting edge quality and maximum shape accuracy of the ground tools.

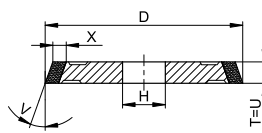


TC tool production
HSS tool production
Regrinding
Basics

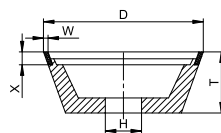
Stock range



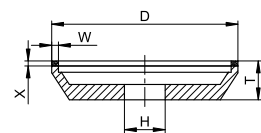
Shape 1A1



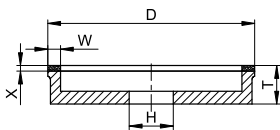
Shape 1V1



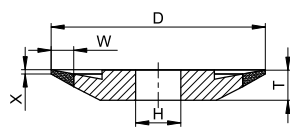
Shape 11V9




Shape 12A2D



Shape 6A2



Shape 4BT9





Shape	Type number	D	T	H	U	X	V	Specification
 1A1	906950	100	6	20	6	6		STARTEC-BASIC BL126 3PD
	906951	100	10	20	10	6		STARTEC-BASIC BL126 3PD
	906954	125	10	20	10	6		STARTEC-BASIC BL126 3PD

TC tool
production

HSS tool
production

Regrinding

Basics

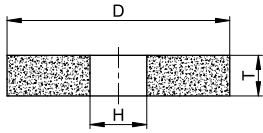
	Shape	Type number	D	T	H	W	X	V	Specification
	1V1	906946	125	12	20	12	6	45	STARTEC-BASIC BL126 3PD
		906947	150	6	20	6	6	15	STARTEC-BASIC BL126 3PD
	11V9	75669	75	30	20	2	10		STARTEC-BASIC BL126 3PD
		494983	75	30	20	2	10		STARTEC-BASIC BL76 3PD
		494985	100	35	20	2	10		STARTEC-BASIC BL76 3PD
		532564	100	35	20	3	10		STARTEC-BASIC BL76 3PD
	12A2D	495046	100	25	20	5	3		B91 C100 B
		173082	125	25	20	15	3		B91 C100 B
	6A2	495038	125	30	20	5	3		STARTEC BASIC BL91 3PD
		495037	150	35	20	5	3		STARTEC BASIC BL91 3PD
	4BT9	495058	125	10	20	10	1		STARTEC-BASIC BL126 3PD

Available ex stock.
Customer-specific grinding tools can also be produced on request.
Take longer delivery times into account.

Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing.



Shape 1

	Shape	Type number	D	T	H	Specification	Stock	Note
	1	7348	200	20	20	C80J5V15	●	For grit sizes > B64
		3135	200	20	32	C80J5V15	●	For grit sizes > B64
		34163206	200	20	20	C120J5V15	●	For grit sizes ≤ B54
		250491	250	12	51	C80H8V15	●	For grit sizes > B64
		619701	250	12	51	C80J8V15	●	Harder, for grit sizes ≥ B64
		413027	250	12	51	C120H5V15	●	For grit sizes ≤ B54
		708196	250	12	51	89A120M5AV217	●	Alternative to SiC, for grit sizes ≤ B54
		34047880	300	10	76.2	C80J5V15	●	For grit sizes > B64
		34066742	300	10	76.2	C120J5V15	●	For grit sizes ≤ B54

● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

b. Application recommendation for regrinding

For use of our grinding tools for regrinding, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Regrinding of HSS tools, wet	24 - 30	Correction dimension	80 - 150	x		Required	In the case of coated tools, an infeed that is larger than the layer thickness must be selected.

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.



TC tool production

HSS tool production

Regrinding

Basics

3.3 DIAGO



DIAMOND GRINDING TOOLS FOR DRY GRINDING

For the professional regrinding of tungsten carbide shaft tools, TYROLIT offers grinding tools especially adapted for dry grinding. Optimum heat dissipation from the grinding area and high stock removal rates as well as excellent profile retention characterise the diamond grinding tools of the DIAGO product line. This results in an outstanding surface finish, optimum cutting edge quality and maximum shape accuracy of the ground tools.



Stock range

Shape 1A1	Shape 11V9	Shape 12V9	Shape 12A2				
Shape 12A2D	Shape 12A2F	Shape 4A2	Shape 4BT9				
Shape	Type number	D	T	H	U	X	Specification
1A1	640978	100	10	20	10	6	D64 C50 B


Shape	Type number	D	T	H	W	X	Specification	
	11V9	249717	75	30	20	2	6	D125 C75 B
	679634	75	30	20	2	10		DIAGO D126 C75 B
	721301	75	30	20	2	10		DIAGO D64 C50 B
	676589	100	35	20	2	10		DIAGO D181 C75 B
	46198	100	35	20	3	10		DIAGO D181 C75 B
	675309	100	35	20	2	10		DIAGO D126 C75 B
	335803	100	35	31.75	2	10		DIAGO D126 C75 B
	681915	100	35	20	2	10		DIAGO D91 C75 B
	675272	100	35	20	2	10		DIAGO D64 C50 B
	576021	100	35	20	2	10		D126 C75 B
	5028	100	35	20	3	10		D126 C75 B
	561390	100	35	20	3	10		D126 C75 B
	675318	100	35	20	3	10		DIAGO D126 C75 B
	721303	100	35	20	3	10		DIAGO D64 C50 B
	679946	125	40	20	3	10		DIAGO D126 C75 B
12V9	696324	75	20	20	2	6		DIAGO D126 C75 B
	721319	75	20	20	2	6		DIAGO D64 C50 B
	689930	100	20	20	2	10		DIAGO D126 C75 B
	311250	125	25	20	2	10		D126 C75 B
	90998	125	25	20	2	6		D54 C65 B
	194540	100	20	20	2	10		DIAGO D91 C75 B
	43588	100	20	20	2	10		D91 C75 B
12A2	19220	125	16	20	6	2		D126 C75 B
	291603	150	18	20	5	3		D91 C75 B
	12A2D	104376	100	25	20	5	3	D91 C75 B
	28162	100	25	20	6	2		D126 C75 B
	38012	100	25	20	6	2		D64 C50 B
	462949	100	27	20	6	4		D64 C50 B
	779789	100	25	20	10	3		D91 C75 B
12A2F	102902	125	23	20	5	4		D126 C50 B
	842923	125	23	20	5	4		D151 C75 B
	731399	125	23	20	5	4		D151 C75 B
	731387	125	23	20	5	4		D64 C50 B
	97868	125	23	20	5	4		D64 C50 B
	416671	150	22	20	4	3		D64 C50 B
	679671	150	23	20	5	4		D126 C75 B

TC tool production

HSS tool production

Regrinding

Basics

	Shape	Type number	D	T	H	W	X	Specification
	4A2	86734	125	10	20	5	2	D64 C50 B
		480500	125	10	20	5	2	D126 C75 B
		215813	150	12	20	5	2	D126 C50 B
		436472	150	12	20	5	2	D64 C50 B
	4BT9	255835	100	10	20	10	1	D91 C75 B

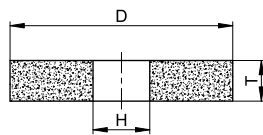
Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.


Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing.



Shape 1

	Shape	Type number	D	T	H	Specification	Stock	Note
	1	7348	200	20	20	C80J5V15	●	For grit sizes > D64
		3135	200	20	32	C80J5V15	●	For grit sizes > D64
		34163206	200	20	20	C120J5V15	●	For grit sizes ≤ D54
		250491	250	12	51	C80H8V15	●	For grit sizes > D64
		619701	250	12	51	C80J8V15	●	Harder, for grit sizes > D64
		413027	250	12	51	C120H5V15	●	For grit sizes ≤ D54
		708196	250	12	51	89A120M5AV217	●	Alternative to SiC, for grit sizes ≤ D54
		34047880	300	10	76.2	C80J5V15	●	For grit sizes > D64
		34066742	300	10	76.2	C120J5V15	●	For grit sizes ≤ D54

● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

b. Application recommendation for regrinding

For use of our grinding tools for regrinding, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Regrinding of TC tools, dry	16 - 22	Correction dimension	50 - 120	x			In the case of coated tools, an infeed that is larger than the layer thickness must be selected.

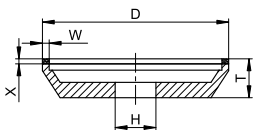
Please note that the application parameters presuppose optimum workpiece clamping. Please observe the safety information on page 122.

DIAGO

DIAMOND GRINDING TOOLS FOR DRY GRINDING

TYROLIT offers adapted diamond grinding tools specially for grinding tungsten carbide precision tools on EWAG WS11 machines. Optimised specifications ensure excellent cutting edges and a perfect surface finish on the ground tools.

Standard range



Shape 12A2D

	Shape	D	T	H	W	X	Specification	Type number	Note
	12A2D						D126 C75 B	201729	Pre-grinding, rapid stock removal
							D46 C75 B	34032701	Medium stock removal
		75	22	20	3	3	D20 C75 B	15226	Improved cutting edges
							D15 C75 B	15211	Fine grinding
							D7 C50 B	642021	Polish grinding

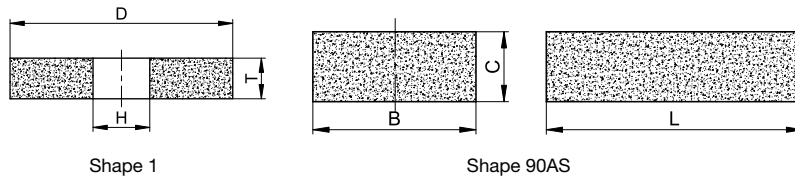
Customer-specific grinding tools can be produced on request. Delivery times on request.





Application recommendation

a. Application recommendation for dressing

We recommend the specially adapted dressing wheels for dressing in the machine.



	Shape	D	T	H	Specification	Type number	Stock	Note
	1	100	10	20	A120M5V	34023777		For grit sizes \leq D126
					A240M5V	178029		For grit sizes \leq D46 and \geq D15
					A600G5V	34070169		For grit sizes \leq D7
					C120H5V	78685		For grit sizes \leq D126
					C240H5V	372459		For grit sizes \leq D46 and \geq D20
					C600H5V	606366		For grit sizes \leq D15

	Shape	B	C	L	Specification	Type number	Stock	Note
	90AS	24	13	100	A120H7V	845593	●	For grit sizes \leq D126
					A240J7V	845595	●	For grit sizes \leq D46 and \geq D20
					A600-25V	33531	●	For grit sizes \leq D15

● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

b. Application recommendation for regrinding

For use of our grinding tools for regrinding, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed v_c [m/s]	Infeed/ae [mm]	Feed v_t [mm/min]	Note
Regrinding of TC tools, dry	18 - 20	0.2-0.007	Manual	The maximum infeed ae depends on the grit size used

Please note that the application parameters presuppose optimum workpiece clamping.
Please observe the safety information on page 122.

TC tool
production

HSS tool
production

Regrinding

Basics

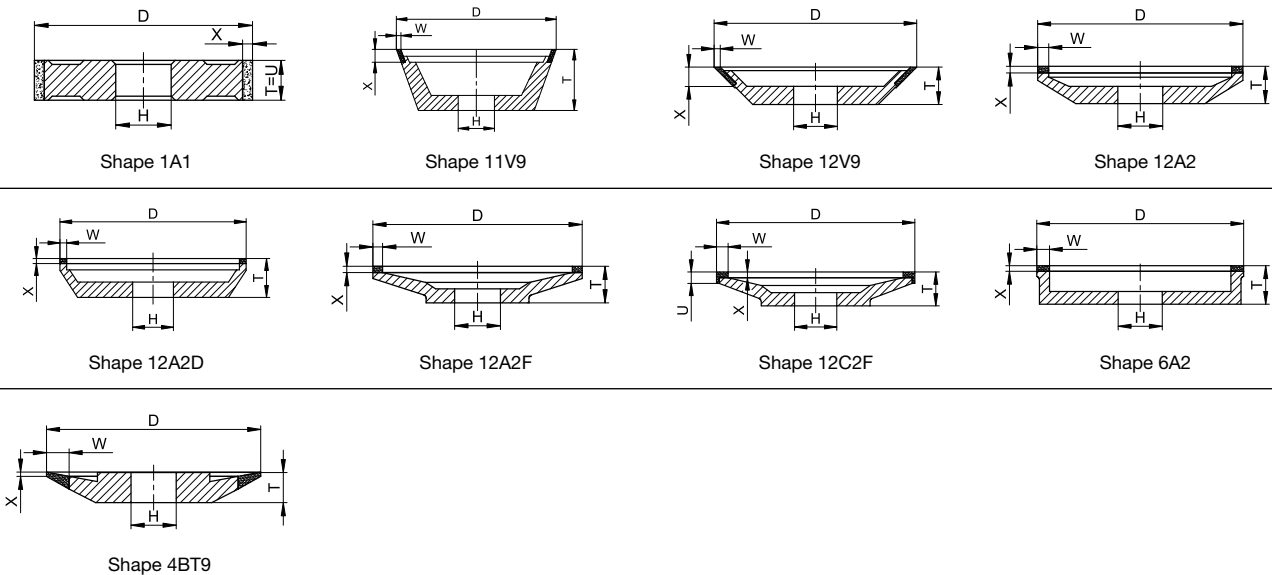
3.4 AMIGO CBN GRINDING TOOLS FOR DRY GRINDING

For the professional regrinding of HSS shaft tools, TYROLIT offers grinding tools especially adapted for dry grinding. Optimum heat dissipation from the grinding area and high stock removal rates as well as excellent profile retention characterise the CBN grinding tools of the AMIGO product line. This results in an outstanding surface finish, optimum cutting edge quality and maximum shape accuracy of the ground tools.



TC tool production
HSS tool production
Regrinding
Basics

Stock range





Shape	Type number	D	T	H	U	X	Specification
1A1	620464	100	10	20	10	6	B126 C50 B54 BA

TC tool
productionHSS tool
production

Regrinding

Basics

	Shape	Type number	D	T	H	W	U	X	Specification		
	11V9	640777	75	30	20	2		10	AMIGO B126 C75 B		
		666288	100	35	20	2		10	AMIGO B181 C75 B		
		561391	100	35	20	2		10	B151 C75 B		
		617388	100	35	20	2		10	AMIGO B126 C75 B		
		644514	100	35	20	2		10	AMIGO B91 C75 B		
		636398	100	35	20	3		10	AMIGO B126 C75 B		
		649723	100	35	32	2		10	AMIGO B126 C75 B		
		641854	125	40	20	2		10	AMIGO B126 C75 B		
		644532	125	40	20	2		10	AMIGO B91 C75 B		
		12V9	703242	75	20	20	2		6	AMIGO B126 C75 B	
636658	100			20	20	2		10	AMIGO B126 C75 B		
840506	125			25	20	2		10	AMIGO B126 C75 B		
12A2	436484	150	18	20	5		2	B126 C50 B			
		124644	150	18	20	5		3	B126 C50 B		
		337051	150	18	20	4		3	B126 C75 B		
		649692	175	20	20	6		2	B151 C75 B		
12A2D	217976	100	25	20	6		2	B126 C50 B			
		666137	100	25	20	6		3	B126 C50 B		
	12A2F	69502	125	23	20	5		4	B126 C50 B		
		12C2F	646778	125	23	20	5	5	4	AMIGO B91 C75 B	
				641839	125	23	20	5	5	4	AMIGO B151 C75 B
				641842	150	23	20	5	5	4	AMIGO B151 C75 B
		6A2	735896	100	30	20	3		6	B126 C75 B	
		4BT9	119325	100	10	20	10		1	B126 C75 B	

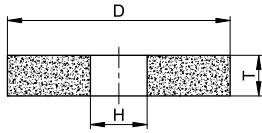
● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing.



Shape 1

	Shape	Type number	D	T	H	Specification	Stock	Note
	1	7348	200	20	20	C80J5V15	●	For grit sizes > B64
		3135	200	20	32	C80J5V15	●	For grit sizes > B64
		34163206	200	20	20	C120J5V15	●	For grit sizes ≤ B54
		250491	250	12	51	C80H8V15	●	For grit sizes > B64
		619701	250	12	51	C80J8V15	●	Harder, for grit sizes ≥ B64
		413027	250	12	51	C120H5V15	●	For grit sizes ≤ B54
		708196	250	12	51	89A120M5AV217	●	Alternative to SiC, for grit sizes ≤ B54
		34047880	300	10	76.2	C80J5V15	●	For grit sizes > B64
		34066742	300	10	76.2	C120J5V15	●	For grit sizes ≤ B54

● ... Available ex stock

*Customer-specific grinding tools can be produced on request.
Delivery times on request.*

b. Application recommendation for regrinding

For use of our grinding tools for regrinding, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed vc [m/s]	Infeed/ae [mm]	Feed vt [mm/min]	Grinding direction		Cooling	Note
				Forward	Reverse		
Regrinding of HSS tools, dry	20 - 25	Correction dimension	50 - 120	x			In the case of coated tools, an infeed that is larger than the layer thickness must be selected.

Please note that the application parameters presuppose optimum workpiece clamping.
Please observe the safety information on page 122.

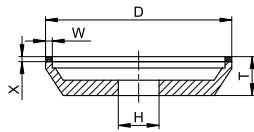


AMIGO


CBN GRINDING TOOLS FOR DRY GRINDING

TYROLIT offers adapted CBN grinding tools specially for grinding HSS precision tools on EWAG WS11 machines. Optimised specifications ensure excellent cutting edges and a perfect surface finish on the ground tools.

Standard range



Shape 12A2D

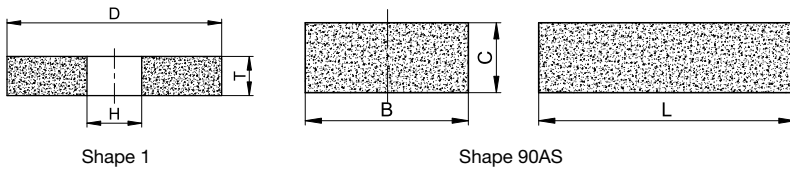
	Shape	D	T	H	W	X	Specification	Type number	Note
	12A2D						B126 C75 B	206511	Pre-grinding, high stock removal
							B54 C75 B	206513	Medium stock removal
		75	22	20	3	3	B30 C75 B	770469	Fine grinding
							B15 C75 B	770467	Polish grinding


Customer-specific grinding tools can be produced on request.
Delivery times on request.


Application recommendation

a. Application recommendation for dressing

Specially adapted dressing wheels are available ex stock for dressing.



	Shape	B	T	H	Specification	Type number	Stock	Note
	1	100	10	20	A120M5V	34023777	●	For grit sizes ≤ B126
					A240M5V	178029	●	For grit sizes ≤ B46 and ≥ B15
					A600G5V	34070169	●	For grit sizes ≤ B7
					C120H5V	78685	●	For grit sizes ≤ B126
					C240H5V	372459	●	For grit sizes ≤ B46 and ≥ B20
					C600H5V	606366	●	For grit sizes ≤ B15

	Shape	B	C	L	Specification	Type number	Stock	Note
	90AS	24	13	100	A120H7V	845593	●	For grit sizes ≤ B126
					A240J7V	845595	●	For grit sizes ≤ B46 and ≥ B20
					A600-25V	33531	●	For grit sizes ≤ B15
						25	13	100

● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

b. Application recommendation for regrinding

For use of our grinding tools for regrinding, the TYROLIT application engineers recommend the following parameters:

Grinding process	Cutting speed v_c [m/s]	Infeed/ae [mm]	Feed v_t [mm/min]	Note
Regrinding of TC tools, dry	18 - 20	0.2-0.007	Manual	The maximum infeed ae depends on the grit size used

Please note that the application parameters presuppose optimum workpiece clamping.
Please observe the safety information on page 122.

TC tool production
HSS tool production
Regrinding
Basics

TC tool production

HSS tool production

Regrinding

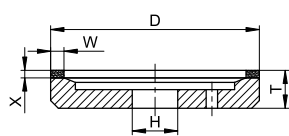
Basics

3.5 SKYTEC BASIC+ GRINDING OF PCD AND CBN CUTTING TOOLS

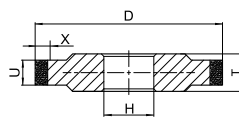
An extensive range of grinding tool is available especially for sharpening shaft tools with PCD or PCBN cutting edges. The SKYTEC BASIC+ product line represents all that is best in grinding tools. Lowest levels of cutting-edge chipping and an increased stock removal rate guarantee shorter grinding times and longer dressing intervals, which represents even more improvements compared with conventional grinding tools.



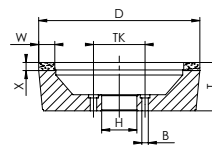
Stock range



Shape 6A2T





Shape 14A1



Shape 11A2B

	Shape	D [mm]	T [mm]	H [mm]	W/U [mm]	X [mm]	Specification	Type number	C100	New C125
	6A2H	150	40	40	4	5	D9VB+	735142	●	
					4	5	D15VB+	735143	●	
					6	8	D15VB+	617338	●	
					5	6	D64VB+	702920		●
					10	10	D9VB+	735144	●	
					10	10	D15VB+	735147	●	
					10	10	D15VB+	617337	●	
					10	10	D20VB+	735148	●	
					10	10	D32VB+	735150	●	
					10	10	D64VB+	683341		●

	Shape	D [mm]	T [mm]	H [mm]	W/U [mm]	X [mm]	Specification	Type number	C-100	New C125			
	14A1	350	20	127	4	5	D12VB+	735155	●				
					6	10	D12VB+	735156	●				
	11A2B	200	57	50	4	6	D9VB+	165927		●			
					10	10	D9VB+	165050		●			
					20	8	D9VB+	165055		●			
					4	6	D15VB+	166628		●			
					10	10	D15VB+	166631		●			
					20	10	D15VB+	168325		●			
					5	6	D9VB+	165056		●			
					8	10	D9VB+	165093		●			
					250	70	60	10	10	D9VB+	165100		●
					20	8	D9VB+	165105		●			
10	10	D15VB+	166656		●								
20	8	D15VB+	168327		●								

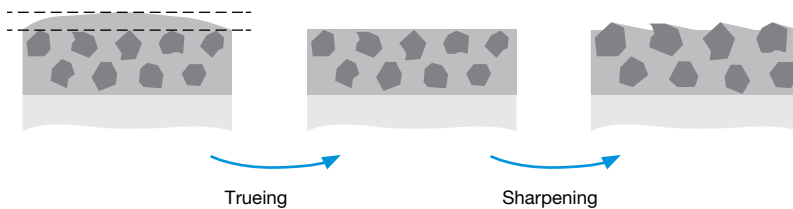
● ... Available ex stock

Customer-specific grinding tools can be produced on request.
Delivery times on request.

Application recommendation

a. Application recommendation for dressing

In addition to the correct choice of specification, dressing and sharpening are also important factors. Dressing is carried out using a ceramic SiC wheel that produces the geometry and evenness of the abrasive layer. Following trueing, sharpening is performed using a ceramic aluminium oxide or ceramic SiC sharpening stick that resets the bond and exposes the diamonds again.



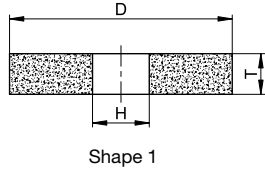
TC tool production


HSS tool production

Regrinding

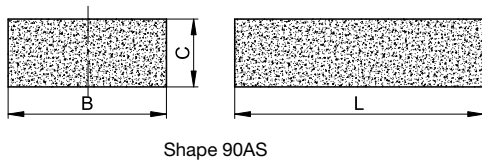
Basics


Recommended dressing wheel – shape 1



	Shape	Material number	D	T	H	Specification	Stock
	1	473304	75	20	12.7	C120J5V15	●

Recommended sharpening stick – shape 90AS



	Shape	Material number	B	C	L	Specification	Stock
	90AS	845595	25	13	100	89A240J7AV17	●
		33531	25	13	100	89A600-25V83	●
		703371	25	13	100	1C40014AV18	

b. Application recommendations for PCD/PCBN grinding

For the use of our grinding tools for PCD/PCBN grinding, the TYROLIT application engineers recommend the following parameters:

PCD peripheral grinding

Application	Requirements for cutting edges and surface	Standard values for achievable chipping	Specification
Pre-grinding	Low	>20µm	D25VB+
Universal grinding	Medium	10-20µm	D15VB+
Finish grinding	High	<10µm	D9VB+
Fine grinding	Very high	<8µm	D6VB+

Suitable for use on manual or CNC-controlled EWAG or Coborn machines.

PCBN peripheral grinding

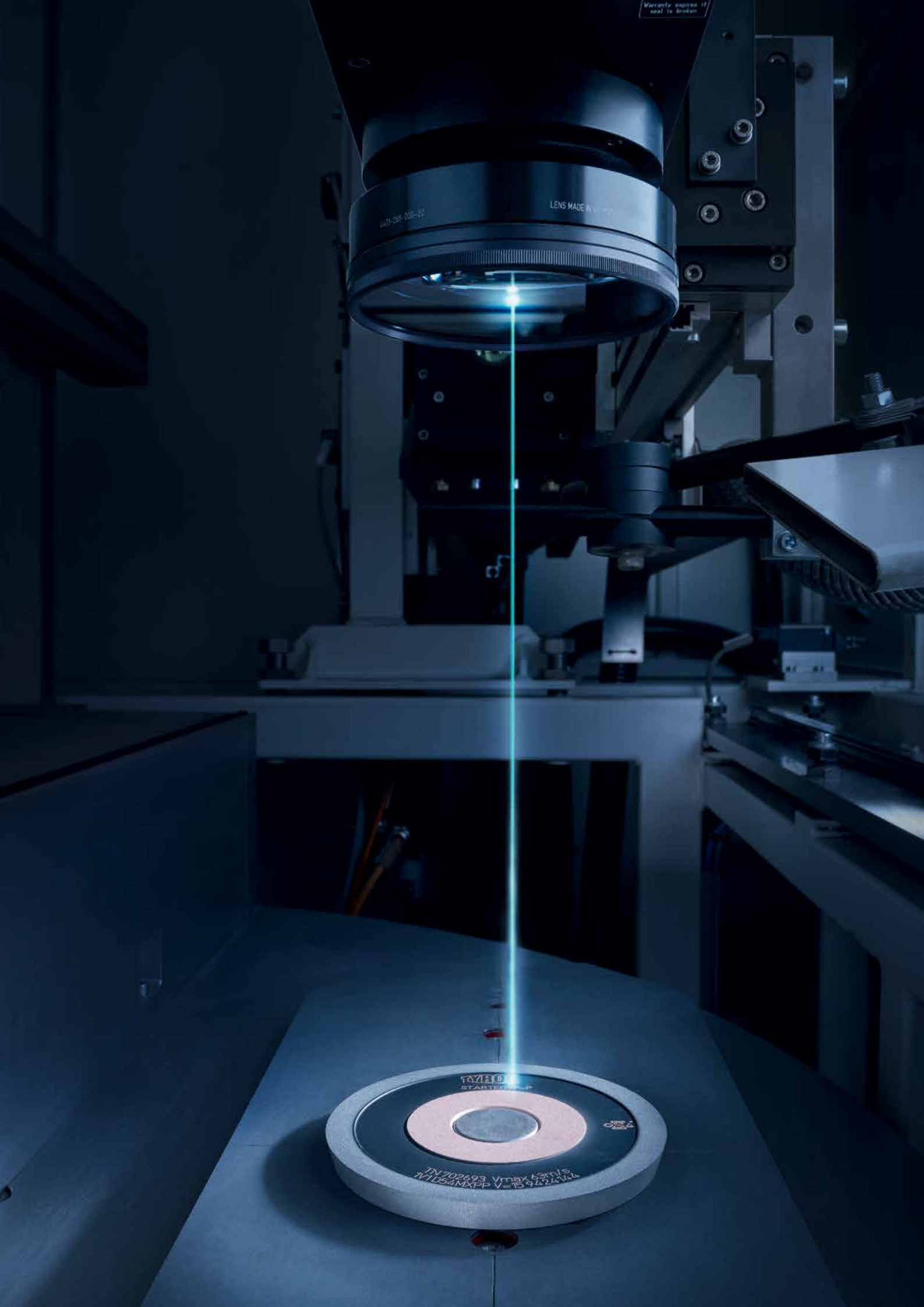
Application	Requirements for cutting edges and surface	Standard values for achievable chipping	Specification
Pre-grinding	Low	>20 µm	DU46K53VB
Universal grinding	Medium	10-20 µm	D32VB+
Finish grinding	High	>10 µm	D20VB+

Suitable for use on manual or CNC-controlled EWAG or Coborn machines.

Peripheral grinding of tools with PCD and PCBN cutters

Parameter	
Cutting speed [vc]:	12-22 m/s
Oscillation / no. of strokes:	40-120 passes/min
Pressure: RS09, RS15, EWAMATIC RS12	2.5-3.5 bar position 1-3

Please note that the application parameters presuppose optimum coolant supply and workpiece clamping. Please observe the safety information on page 122.



Warranty expires if seal is broken

4401-056-001-14

LENS MADE IN JAPAN

TA710
STARTER KIT

TN 202493 $v_{max} 43m/s$
JW1054NXPP $v = 1597.24V/s$

4. BASICS

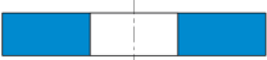
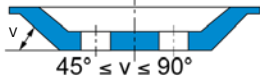
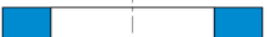
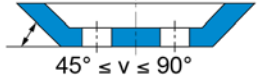
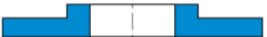
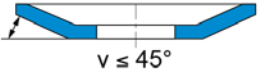


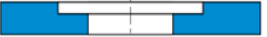

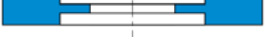
4.1 SHAPE DESIGNATION of grinding tools with superabrasives	108
4.2 SPECIFICATION	112
4.3 CONDITIONING of diamond and CBN grinding tools	116
4.4 COOLING during tool grinding	120
4.5 SAFETY during grinding	122
4.6 DATA SHEET	124



4.1 SHAPE DESIGNATION OF GRINDING TOOLS WITH SUPERABRASIVES

In order to reliably identify grinding tools with superabrasives based on their basic shape and the arrangement of the grinding layer, these tools are described in accordance with the FEPA shape designation at TYROLIT. These shape designations always include a description of the carrier shape, the coating shape and the arrangement of the grinding layer on the carrier.

Basic shapes

Shape	Description	Shape	Description
1	 straight wheel without recess	11	 tapered pot with cylindrical collar $45^\circ \leq v \leq 90^\circ$
2	 ring	11	 tapered pot without collar $45^\circ \leq v \leq 90^\circ$
3	 straight wheel, recessed on one side	12	 plate $v \leq 45^\circ$
4	 straight wheel, conical on one side	14	 straight wheel, recessed on both sides
6	 straight wheel with one recess	15	 dual taper pot
9	 straight wheel with two recesses		

Coating shapes

Shape	Shape	Shape	Shape
A		DU	
B		E	
BT		EE	
C		ER	
CH		ET	
D		F	
DD		FB	
		FE	
		FF	
		FV	
		G	
		K	
		L	
		LL	
		M	
		Q	
		S	
		U	
		V	
		Y	

Grinding layer arrangements on core

Shape	Shape	Shape	
1		4	
		5	
2		6	
		7	
3		8	
		9	
		10	

TC tool production

HSS tool production

Regrinding

Basics

TC tool production

HSS tool production

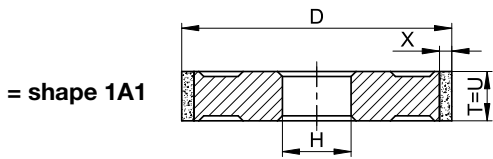
Regrounding

Basics

Example of a complete grinding wheel designation according to FEPA

Basic form 1 +

Shape	Description
1	straight wheel without recess



Grinding layer shape A + Arrangement 1

Shape	Description
A	

Shape	Description
1	at circumference

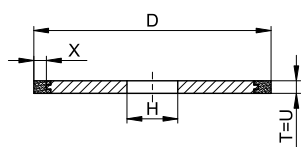
Additional information

In addition to the shape designations, a special core design may be specified, for example a double-sided exposed grinding layer on cut-off saws or mounting bores and threaded bores.

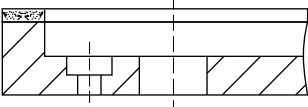
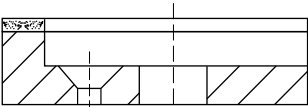
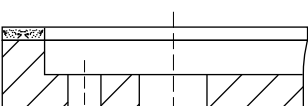
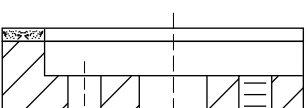
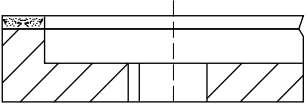
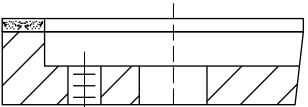
Description of the carrier design

Shape	Description
P	Free rotation on one side of the wheel. The width of the carrier is less than the thickness of the abrasive layer.
R	Free rotation on two sides of the wheel. The width of the carrier is less than the thickness of the abrasive layer.
S	Grinding layer is interrupted (grinding segments)

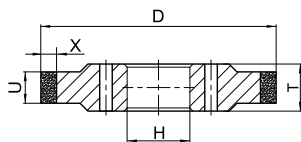
Example: 1A1R: cut-off saw with freely rotating grinding layer on both sides



Description of mounting bores in the carrier

Shape	Description
<p>B</p> 	<p>Flat countersunk mounting bores in the carrier</p>
<p>C</p> 	<p>Conical countersunk mounting bores in the carrier</p>
<p>H</p> 	<p>Cylindrical mounting through-bores in the carrier</p>
<p>M</p> 	<p>Mounting bores and threaded bores in the carrier</p>
<p>N</p> 	<p>Keyway in the carrier bore</p>
<p>T</p> 	<p>Threaded bores in the carrier</p>

Example: 14A1H: Straight grinding wheels, recessed on both sides with cylindrical mounting bores in the carrier



TC tool production

HSS tool production

Regrinding


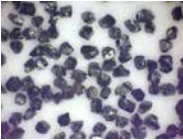


Basics

4.2 SPECIFICATION

In grinding technology, the term "specification" refers to the composition of the grinding layer, which always comprises an abrasive medium and a corresponding bonding agent. The abrasive medium is the grinding material which performs the stock removal work.

The bonding agent is the binder which holds the abrasive in the matrix until the predominant wear mechanism has become dull and breaks out so that new abrasive is used.

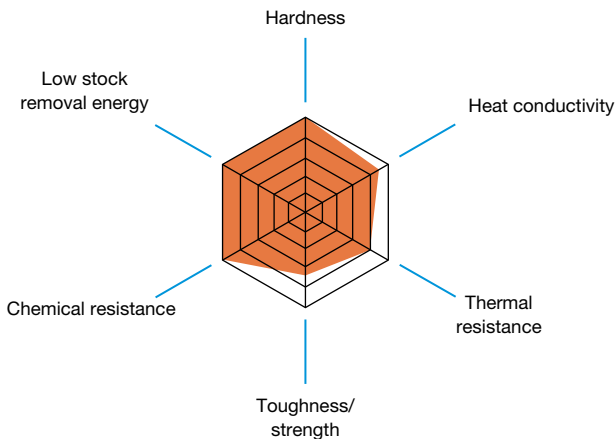
Overview of grain types

Conventional abrasives		Superabrasives		
	A Aluminium oxide		B CBN	for long-chipping, ductile materials, e.g. steels, super alloys
	C Silicon carbide		D Diamond	
				for short-chipping, brittle materials, e.g. stone, glass, tungsten carbide, grey cast iron

In the tool manufacturing industry, tungsten carbides are primarily used as a tool material. The preferred type of abrasive for this material group is diamond. For HSS materials, high-performance aluminium oxides or CBN are used as abrasives.

Silicon carbide is primarily used on dressing wheels for diamond or CBN grinding wheels. The individual abrasives are used in different quality classes and in standard grit sizes for the production of grinding and dressing tools.

Properties of CBN



Properties of CBN – cubic boron nitride

Code: B
Knoop hardness: 47 Gpa
Chemical composition: BN

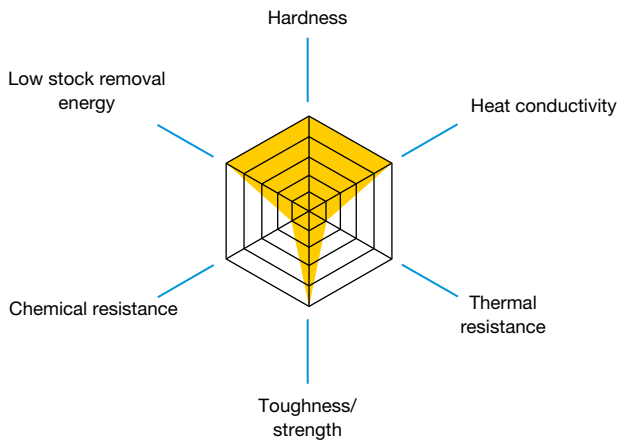


TC tool production

HSS tool production

Regrinding

Basics



Properties of diamond

Code: D
 Knoop hardness: 80 Gpa
 Chemical composition: C plus catalysts



The efficiency of a grinding tool primarily depends on the quality and quantity of the abrasive used. The type of bonding of the abrasive also significantly determines its performance.

Overview of bond types

Bond types for conventional grinding wheels

- Vitrified bond – standardized bond designation V
- Resin bond – standardized bond designation B
- Elastic bond – standardized bond designation BE

Grain types used: aluminium oxide and silicon carbide

Bond types for grinding wheels with diamond or CBN

- Vitrified bond – standardized bond designation V
- Resin bond – standardized bond designation B
- Metal bond – standardized bond designation M
- Electroplated bond – standardized bond designation G

Grain types used: CBN and diamond

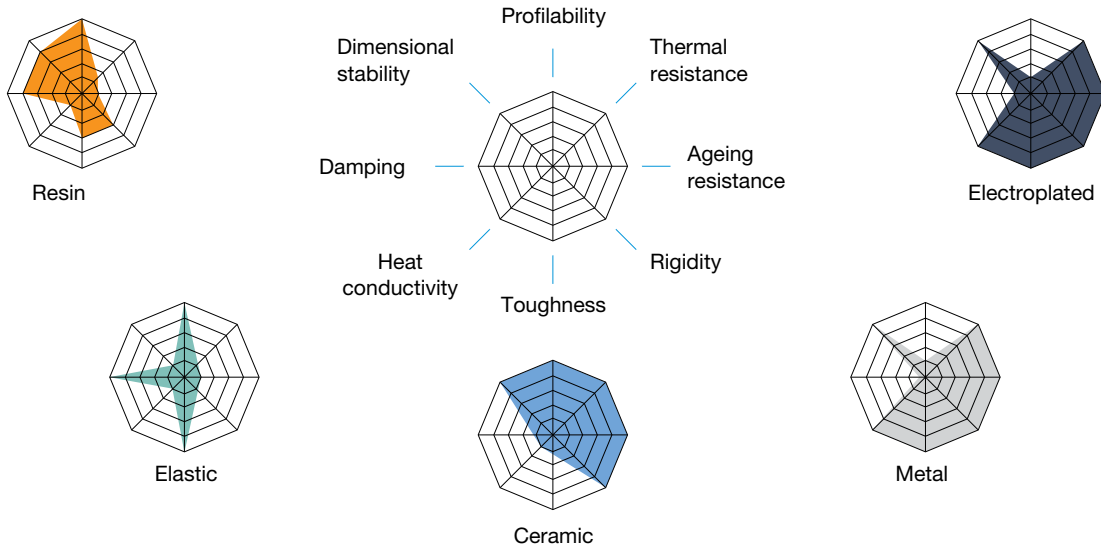
TC tool production

HSS tool production

Regrinding

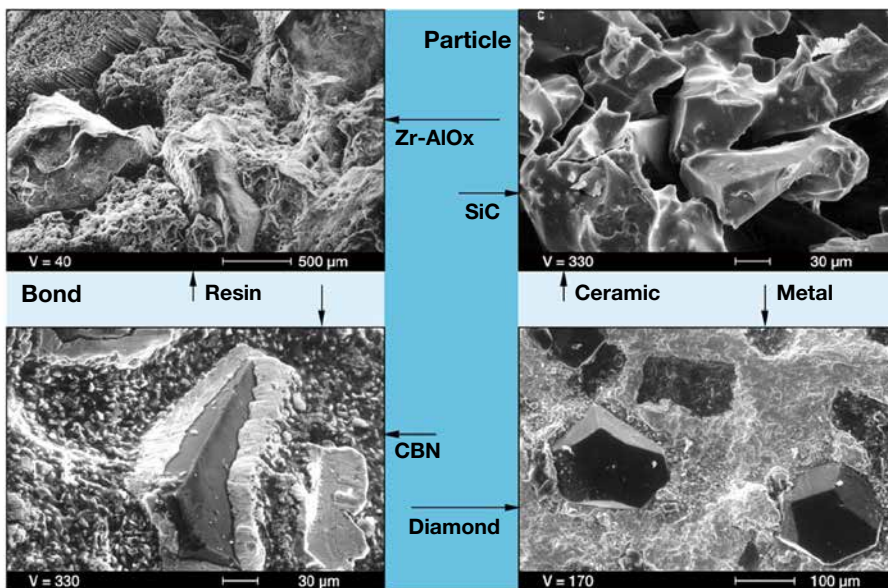
Basics

Overview of the various bond types with their specific properties



The type of bond is selected in accordance with the abrasive used and its grit size, which is adapted to the machining task, and the grinding process.

Overview of the bonding of conventional abrasives and of diamond and CBN in different bonds.



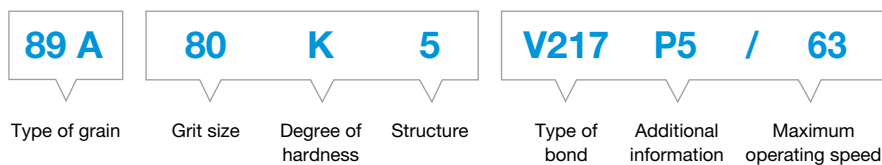
Description of the specification

The specification essentially includes the type of abrasive and its grit size, which is indicated in mesh for conventional abrasives and in μm for superabrasives. The following digits indicate the hardness and structure. In the case of grinding tools with superabrasives, the concentration replaces the indications of hardness and structure. The bond used is indicated by means of a standard code and the manufacturer's designation. Further information may also be included.

In order to clarify the TYROLIT specifications an explanation based on a conventional and CBN specification is given below.

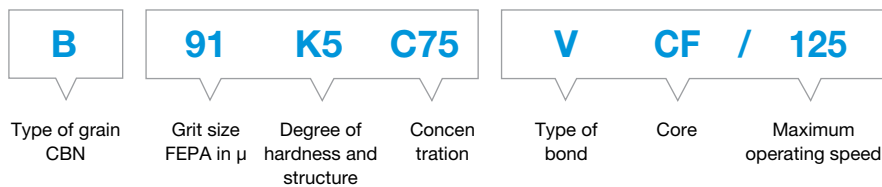
– Conventional grinding tools

Specification: 89A80 K 5 V217 P5 / 63



– Grinding tools with CBN or diamond

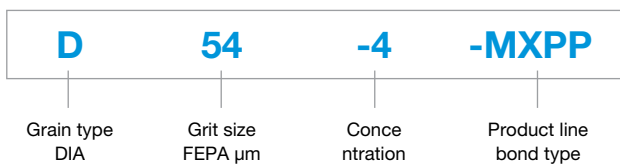
Specification: B91 C75 V



The specification is indicated in a special form for the product lines.

– Specification for the STARTEC XP-P product line

Specification: D54-4-MXPP

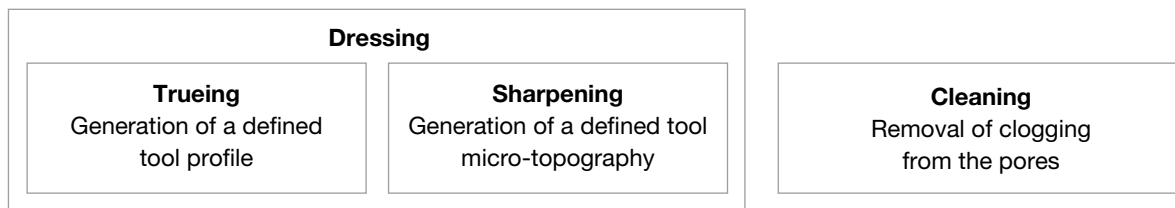


4.3 CONDITIONING OF DIAMOND AND CBN GRINDING TOOLS

The term "conditioning" refers to the preparation of diamond or CBN grinding tools for the grinding task. In order to achieve an optimum grinding result, all grinding wheels must always be conditioned prior to use.

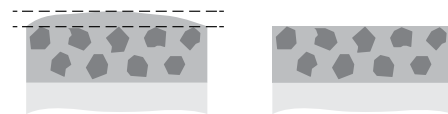
Condition comprises two steps – trueing and sharpening.

Conditioning



Trueing

Trueing is used to produce the required macro-geometry of the grinding wheel. Simultaneously, radial and axial run-out are corrected to the required application conditions after clamping of the grinding tools or after use.

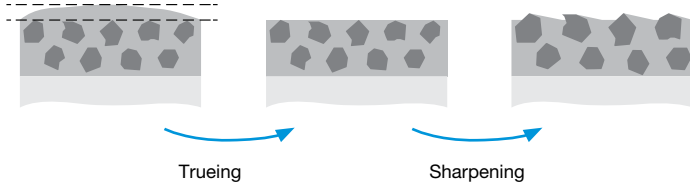


Sharpening

The aim of sharpening is to achieve a process-compatible micro geometry of the contact area of the grinding tool. Sufficient grain protrusion and chipping space must be achieved.



Dressing = trueing + sharpening



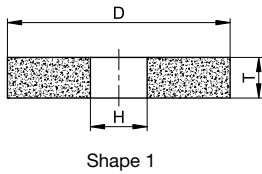
For the optimum conditioning of diamond and CBN grinding tools, TYROLIT produces dressing and sharpening tools especially adapted to the various bond systems.

Dressing on external machine

Dressing of resin and metal-bonded diamond and CBN grinding tools

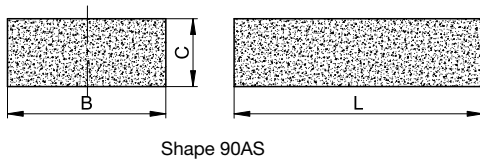
- with silicon carbide wheels

Recommended specifications



	Shape	Type number	Dimension	Specification	Stock	Note
	1	413027	250x12x51	C120 H8 V	●	For grit sizes ≤ 64
		250491	250x12x51	C80 H8 V	●	For grit sizes >64 and ≤181

Recommended sharpening sticks



	Shape	Type number	Dimension	Specification	Stock	Note
	90AS	577953	24x13x200	A600 J5 V	●	For grit sizes ≤ 35
		678953	24x13x200	A240 H5 V	●	For grit sizes > 46 and < 126
		34244360	24x13x200	A120 J7 V		For grit sizes ≥ 126

TC tool production
HSS tool production
Regrinding
Basics

TC tool production

HSS tool production

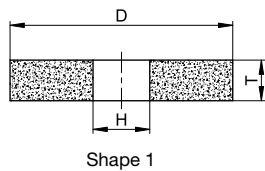
Regrounding


Basics

Dressing of resin and metal-bonded diamond and CBN grinding tools

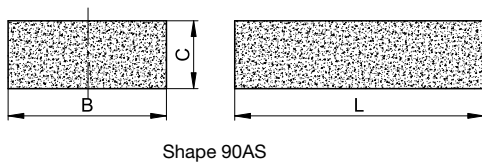
– with aluminium oxide wheels


Recommended specifications



	Shape	Type number	Dimension	Specification	Stock	Note
	1	708196	250x12x51	A120 M5 V	●	For grit sizes ≤ 64
		401769	250x12x51	A100 K5 V	●	For grit sizes >64 and ≤181

Recommended sharpening sticks



	Shape	Type number	Dimension	Specification	Stock	Note
	90AS	577953	24x13x200	A600 J5 V	●	For grit sizes ≤ 35
		678953	24x13x200	A240 H5 V	●	For grit sizes > 46 and < 126
		34244360	24x13x200	A120 J7 V		For grit sizes ≥ 126

For dressing diamond and CBN grinding tools, aluminium oxide grinding wheels should be preferred over SiC wheels in most cases as these represent a more sparing variant for the diamond grain and an additional sharpening process can be dispensed with.

Recommended dressing parameters

For use of our dressing wheels, the TYROLIT application engineers recommend the following parameters:

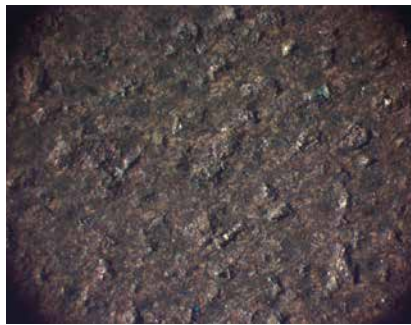
Grinding process	Dressing wheel peripheral speed v_{cr} [m/s]	Grinding wheel peripheral speed v_{cs} [m/s]	Infeed a_e [mm]	Feed v_t [mm/min]	Grinding direction			Note
					Forward	Reverse	Cooling	
Rough dressing	15 - 20	8 - 13	depending on grit size	200 - 500		x		Recommended
Fine dressing	10	3	depending on grit size	200 - 500	x			Recommended

Differences in dressing for aluminium oxide wheels compared to SiC wheels

Dressing wheel	Time requirement	Condition of grinding layer	Sharpening
Aluminium oxide wheel	high	open	not necessary
SiC wheel	low	smooth	required

Sharpening takes place in three steps following dressing:

1. Wet the sharpening stick with cooling lubricant
2. Select the same rotational direction and cutting speed as for grinding when sharpening
3. Apply the sharpening stick to the running grinding wheel. It is recommended to support the sharpening stick

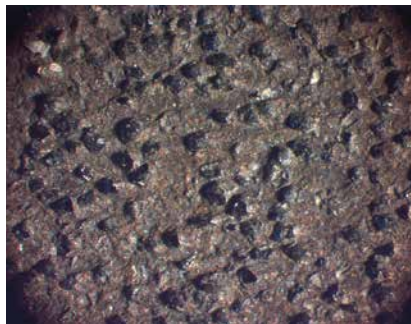


UNSHARPENED GRINDING LAYER

The abrasive grain does not project from the coating surface. The grain protrusion is therefore insufficient.

Consequences

- High grinding forces
- High heat build up
- Damage to the workpiece and grinding tool



SHARPENED GRINDING LAYER

The abrasive grain clearly projects from the coating surface. The grain protrusion is sufficient.

Consequences

- Low grinding forces
- Low heat build up
- High stock removal rate

4.4 COOLING DURING TOOL GRINDING

Enhanced performance thanks to optimum cooling

In addition to selection of the correct grinding wheel and the correct process parameters, the productivity of a grinding process essentially depends on optimum supply of the cooling lubricant. An increase in performance through optimisation of the cooling lubricant supply requires that the necessary quantity of cooling lubricant is available in the grinding area. Here, the coolant pressure, design and positioning of the coolant nozzles play a decisive role.

Through optimisation of the cooling, performance increases can be achieved in the process (Figure 1) and power consumption can be significantly reduced during the grinding process (Figure 2).

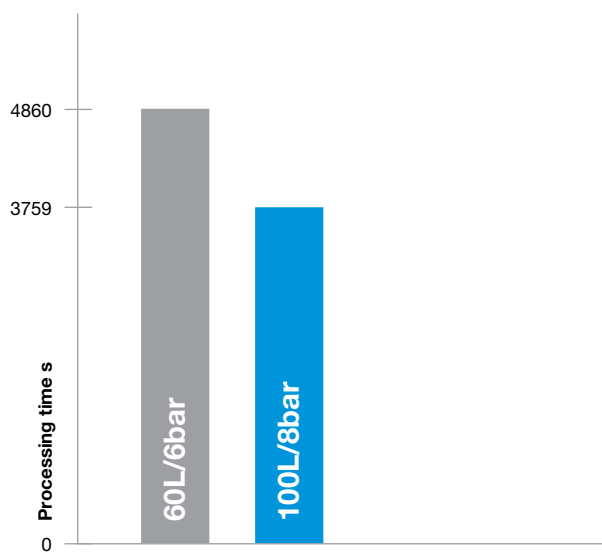


Figure 1: Time saving of 20% through optimised cooling

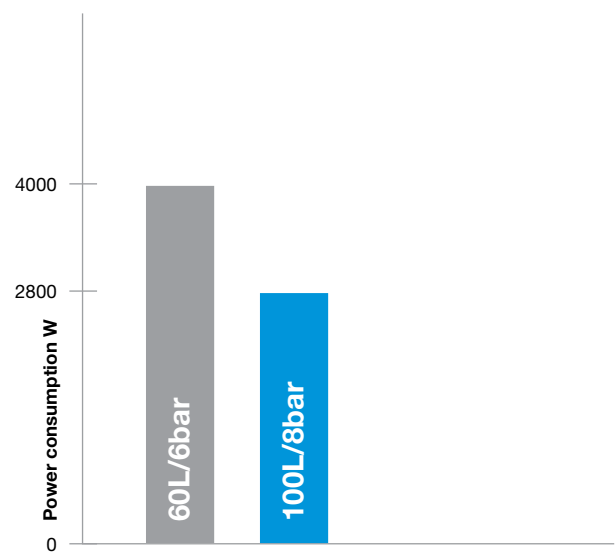


Figure 2: Reduction of power consumption by 30% through optimised cooling

Example:

Milling cutter $d = 20$ mm, 4 flutes $l = 68$ mm, $dk = 10$ mm, $ae = 5$ mm, batch size 30 units

At 60L/6 bar max. spec. stock removal rate $Q'w = 9$
Feed during flute grinding 108 mm/min

At 100 L/8 bar max. spec. stock removal rate $Q'w = 12$
Feed during flute grinding 144 mm/min



Our application engineers will support you with their expertise during optimisation of the cooling lubricant supply.

TC tool
production

HSS tool
production

Regrinding

Basics

4.5 SAFETY DURING GRINDING

TYROLIT quality management system

The TYROLIT quality management system has been certified to ISO 9001:2000 for the entire production area by an external authorised body. Production is carried out in accordance with European standards:

- EN12413 for grinding wheels made of bonded abrasives
- EN13236 for grinding wheels made of diamond and boron nitride

Due to the fact, that in the approval principles, very high demands on the grinding tools are specified via defined safety parameters, TYROLIT supplies all grinding tools in accordance with these principles. In this way, we guarantee a consistently high level of safety, even in deliveries to countries without official approval requirements.

DOs

- ✓ Handle and store grinding tools carefully; use the oldest tools first.
- ✓ Prior to mounting or use, grinding wheels must be cleaned and undergo a visual check for cracks or possible damage.
- ✓ Ceramic bonded grinding tools must undergo a sound check or "ring test" before mounting.
- ✓ Make sure that the operating speed (m/s) or rotational speed (RPM) of the machine (RPM) does not exceed the maximum operating speed (m/s) or rotational speed (RPM) specified on the packaging or on the abrasive.
- ✓ Ensure that the bore of the grinding tool — with or without thread — fits the shaft of the machine perfectly and that the wheel flanges are clean, flat, the same size and suitable for the grinding tool to be clamped.
- ✓ As intended or supplied, use the intermediate layers (blotters) between the grinding wheel and wheel flanges.
- ✓ Only use machines with protection/guards and ensure their proper condition and fixture before the machine is switched on.
- ✓ After each mounting, carry out a test run for at least one minute at the operating speed and ensure machine guard is mounted correctly. In doing so, hold the machine in such a way that any fragments would not be able to hit you or someone else in the event of a possible breakage.
- ✓ Eye protection is always recommended for all grinding processes. For off-hand grinding, protective goggles or a safety mask is recommended.
- ✓ When working with cut-off or roughing wheels, ensure that the air supply and protective measures sufficiently correspond with the material to be processed. Suitable extraction systems should be fitted for all dry grinding processes.
- ✓ Before stopping the machine, cut off the supply of cooling lubricant and remove the excess cooling lubricant from the grinding wheel.

TC tool
productionHSS tool
production

Regrinding

Basics

DON'Ts

- × Do not use abrasives that are exposed to particularly humid/wet conditions or high temperatures prior to mounting.
- × Never use abrasives that have been dropped, damaged or that look like they would not be fit for purpose.
- × Never exceed the maximum permissible operating speed specified.
- × Do not use wheel flanges with surfaces that are not free of foreign bodies (e. g. grinding swarf), flat or burr-free.
- × Do not over-tighten the work-holding device or wheel flange.
- × Do not use recessed wheel flanges or flanges with recesses for cup wheels or cones.
- × Never use force when clamping and do not make any changes to the grinding tool.
- × Only switch on the machine when the protection cover is correctly and securely fixed (machine guards or covers should be set in such a way that they divert sparks and grinding particles away from the body).
- × Only start the machine if there is no contact between the workpiece and the grinding tool.
- × Never work with grinding tools without sufficient air supply (never without breathing apparatus and ear protection, particularly in enclosed spaces) and without personal safety equipment (see pictogram).
- × Use a suitable grinding tool – an unsuitable product can generate excessive grinding particles and dust.
- × Avoid mechanical damage to the grinding wheel as a result of force effects, impacts or heating.
- × Never use grinding machines in an improper condition or that contain faulty components.
- × Never mount more than one grinding tool on one shaft.

Summary

The most important points for safe use of grinding wheels are summarised again below:

- Compliance of machine data with designation data
- Checking of grinding wheels prior to clamping
- Mounting carried out by skilled persons
- Checking of the functionality of the machine protection
- Test run of grinding wheels prior to grinding jobs
- Suitable personal protective equipment

Precision data sheet			Recorded by: on:	
Customer	ATDB no.		Country:	
	Target group:		Product family:	
	Item requirements:			
	Customer: *		Classification:	
	Department:		Customer no.:	
	Contact:		Tel. / fax	
Customer	Shape: *		1 set = item.:	
	Dimensions (mm): *			
	Dimensions (mm):		Tolerance:	
	Specification:			
	Manufacturer:		Current price:	
	Vs max. (m/s) *		Order quantity:	
Customer	Grinding process:			
	Machine manufacturer:			
	Vs (m/s):			
	Coolant / lubricant:			
	Dressing tool:			
	Dressing cycle:		Dressing amount:	
Workpiece	Workpiece: *		Dimensions (mm): *	
	Material group: *		Stock (mm):	
	Condition: *		Hardness: *	
Aim	Surface roughness:		Contact time:	
	Lifetime:			
	Addition:			
Probe	Specification:			
	Specification:			
	Specification:			
Info			Drawing:	
Distributor:				

* COMPULSORY fields are marked in grey

A large grid of graph paper for data recording, consisting of 20 columns and 30 rows of small squares.

The page contains a large grid of graph paper, consisting of 20 columns and 30 rows of small squares. This grid is intended for recording data points or plotting a graph.

A large grid of graph paper for data recording, consisting of 20 columns and 30 rows of small squares.

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