

Precision grinding Product catalogue

English | Catalogue no. 21

Premium grinding tools since 1919
www.tyrolit.com

TYROLIT

The TYROLIT Group

TYROLIT is one of the world's leading manufacturers of grinding and dressing tools as well as a system provider for the construction industry.

Since 1919, our innovative tools have made an important contribution to the technological development in many industries. TYROLIT offers tailored grinding solutions for various applications, as well as a comprehensive assortment of standard tools for customers all over the world.

Headquartered in Schwaz (Austria), the family-owned business combines the strengths of being a part of the dynamic Swarovski Group with a century's worth of individual corporate and technological experience.



TYROLIT headquarters in Schwaz (Austria)

Facts & Figures



80,000+
products



29
production sites



4,600+
employees worldwide



37
sales locations



500+
worldwide patents

Sales companies in Argentina, Australia, Austria, Belgium, Brazil, Canada, China, Czechia, Denmark, Estonia, Finland, France, Germany, Hungary, India, Indonesia, Italy, the Netherlands, Norway, Poland, Portugal, Russia, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, the UAE, the UK and the USA. Distributors in 65 other countries.

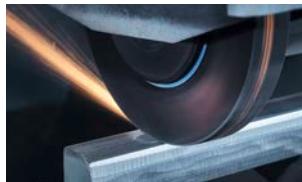
Business units

METAL INDUSTRIES



Automotive industry

Our leading grinding solutions are used for the production of automotive parts with highest precision.



Steel & Foundry

With many years of experience in the machining of high alloyed steel we are the market-leader in the steel industry.



Precision industries

The extensive field of precision industries includes tools and system solutions for various highly specialised applications.



Industrial trade

Our comprehensive assortment for cutting, grinding and surface treatment for professional end users is available worldwide.

CONSTRUCTION



Construction industry

The assortment of high efficiency diamond tools is tailored for the specific needs of customers in the construction industry.



Trade & Rental

Our wide range of professional system solutions for construction-related applications is available worldwide.



Construction professionals

We impress users with extensive know-how in the creation of perfectly optimised machines and tools and a fast repair service.



Project services

Our project services team develops individual system solutions for customer-specific special construction applications.

QUARTZ INDUSTRIES



Stone industry

With a wide assortment of diamond tools for the stone industry, we are a leading supplier in all processing steps from mining to final decorative elements.



Ceramic industry

Our customised diamond tools are used for applications in the ceramic industry – from cutting and squaring to profiling and polishing of ceramic tiles.



Glass industry

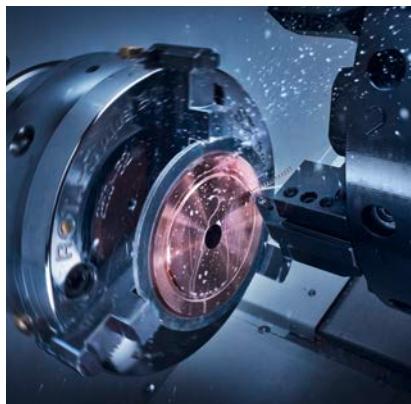
We offer diamond tools for drilling and edge processing of glass that is used to create components for the architectural and automotive industry.

100 years of advanced thinking

A passion for technology, many years of experience and a strong innovative spirit have been incorporated into the manufacture of outstanding grinding solutions.



Pioneer in the field of cut-off grinding — We created the first fibre-reinforced cut-off discs in Europe and invented the super-thin technology, which is today's global market standard for high quality cut-off discs.



Technology leader in precision grinding — We are one of the world's leading providers of high-precision grinding tools in the automotive, turbine and tooling industry as well as in various other precision industries.



Market leader in the steel industry — We are the most sought-after producer of the world's biggest cut-off wheels with diameters of up to 2,000 mm for cutting hot semi-finished steel products.



Leading solutions for construction professionals — Our innovative system solutions and the patented diamond technology (TGD®) set new standards in performance and comfort for applications in the construction industry.



Diamond tools for grinding of automotive glass — We were the first company to produce diamond tools for grinding automotive glass at 40 m/min and successfully established an industry-changing concept for edge grinding in the market.



Creator of innovative wire sawing technology — We strongly pursued the development of the wire sawing technology for applications in the stone and construction industry which is still the industry reference today.

International production and sales locations

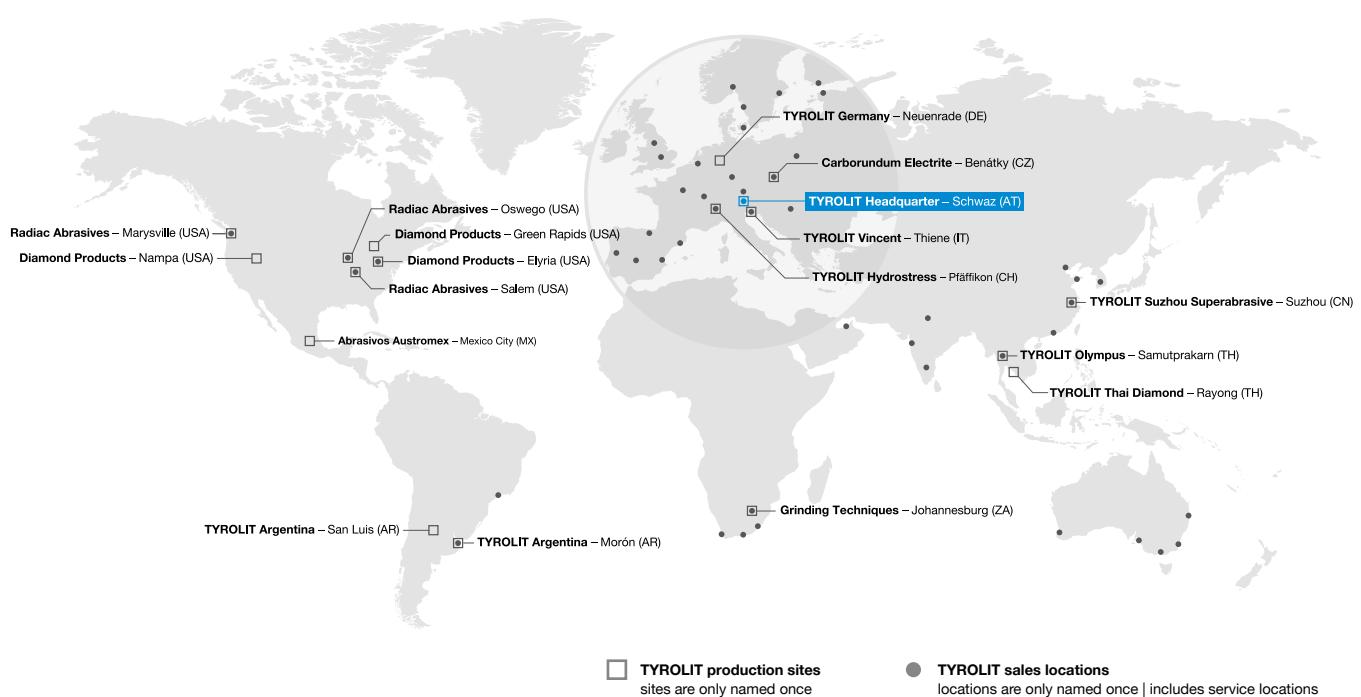
TYROLIT is represented in 29 countries through its own production and sales companies and cooperates in a further 65 countries with local partners.



Production location in Suzhou (China)



The European logistics centre in Benátky (Czechia)



The specialised trade for grinding tools at TYROLIT

TYROLIT offers professional users in different industries an extensive product range, whether for grinding, cutting or surface treatment.

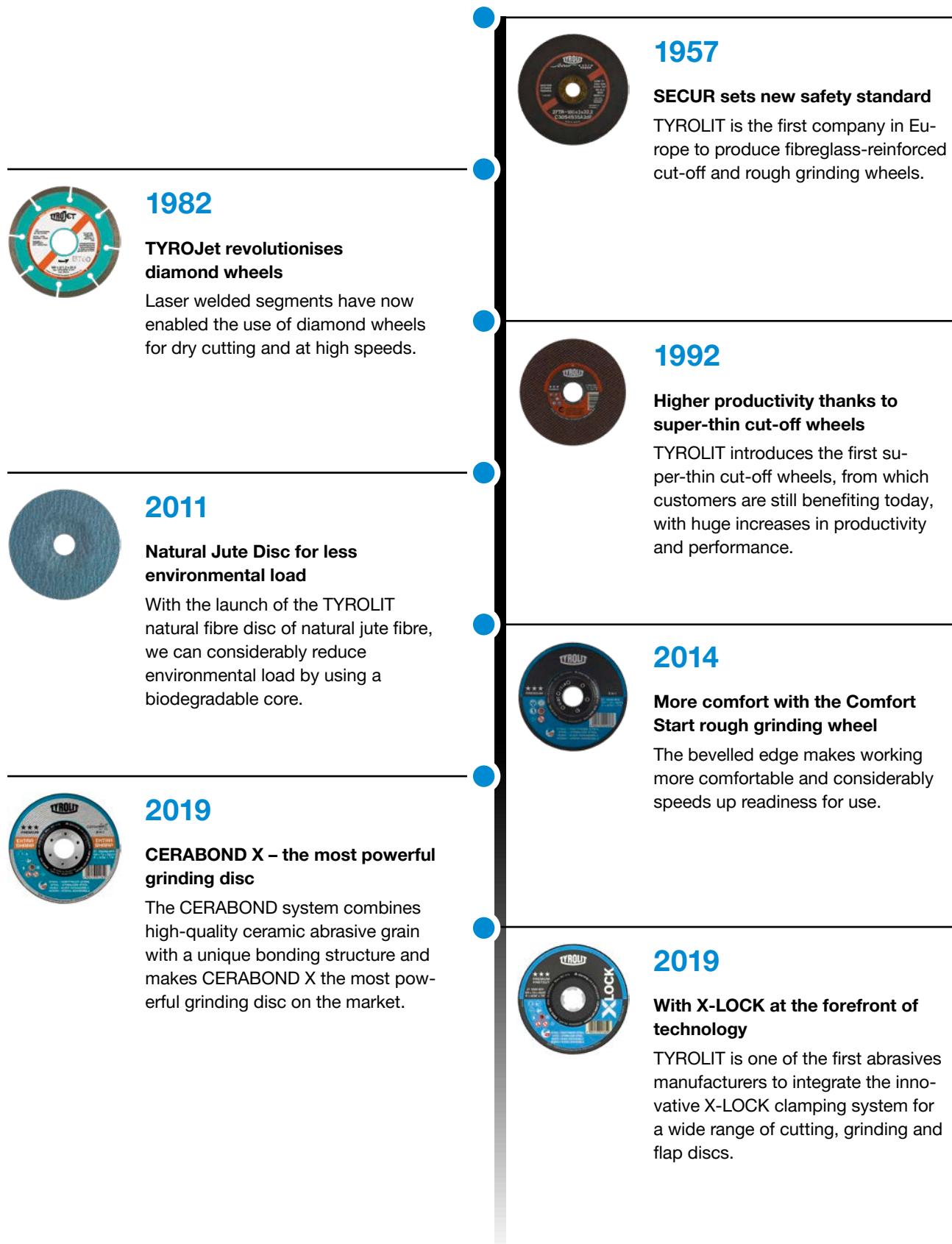
TYROLIT is a global player in the specialised trade in grinding tools and is represented in more than 65 countries. Our products are used in a wide range of sectors – in metal-processing companies, in shipyards, in workshops and on building sites.

With an extensive network of dealers, a regional sales team and experienced application engineers on site, TYROLIT can quickly provide advice and assistance to customers worldwide if they have questions.



Product innovations at TYROLIT

From idea to industry standard



Symbols

Safety

 Wear gloves	 Wear a mask	 Only permitted for wet grinding	 Not permitted for wet grinding
 Wear eye protection	 Wear protective clothing		 Do not use damaged wheels
 Wear ear protection	 Observe the instructions		 Not permitted for side grinding

Material

 Steel	 Carbide metal	 High-speed steel	 Nonferrous metals
 Abrasive materials	 Plastic	 Tiles	 Stainless steel
 Cast iron	 Stone	 Titanium	

Machines

 Floorstand grinder	 Internal-cylindrical grinding	 Tool grinding
 Stationary cutting machine	 Surface grinding	 Saw sharpening
 External-cylindrical grinding	 Hand held grinding	 Dressing and sharpening



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Precision tool specific Information

Product label



Precision tool specification

Conventional ceramic

89A 60 M 5 V 217

				Bond designation	Internal code, which defines bond type
				Bond	
			V	vitrified bonded	
			B	resin bonded	
			E	elastic bonded	
			G	galvanic bonded	
		Structure		The higher the number, the more open the wheel	
		Hardness		Hardness ascends alphabetically e.g.	
		G		Soft	
		R		Hard	
	Grit size description			Grit size indication in mesh (sieve size per inch)	
	14 – 36			COARSE	
	46 – 60			MEDIUM	
	80 – 220			FINE	
	800 – 1 200			VERY FINE	
	Abrasives description				
	10A			Regular aluminium oxide	
	50A			Mixture of 89A and 10A	
	52A			Semi-friable aluminium oxide	
	80A			Mixture of 88A and special aluminium oxide	
	87A			Mixture of 89A and 88A	
	88A			Pink aluminium oxide	
	89A			White aluminium oxide	
	91A			Red aluminium oxide	
	92A			Mixture of 89A and special aluminium oxide	
	93A			Mixture of 89A and 91A	
	97A			Special aluminium oxide	
	454A			Mixture of sintered aluminium oxide and 89A	
	455A			Mixture of sintered aluminium oxide and 89A	
	C			Green silicon carbide	
	1C			Black silicon carbide	
	50C			Silicon carbide mixture Green/black	

Precision tool specification

CBN resin / Diamant

B 126 C50 B 54

				Bond designation Internal code, which defines bond type
				Bond
			B	Resin bonded
			M	Metal bonded
			Concentration	The grain concentration shows the grain volume in carat per unit volume of the grinding layer
			Grit size description	Grit size indication in μm (average grit diameter according to FEPA)
			35 – 181 μm	
			Abrasive description	
	B			CBN
	D			Diamond

Pictograms



External-cylindrical grinding



Internal-cylindrical grinding



Surface grinding



Floorstand grinder



Hand-guided grinding



Tool grinding



Saw sharpening



Dressing and sharpening

Delivery time

EXPLANATION OF TERMS	DELIVERY TIMES
Stock type	
All products in the chapter "Precision grinding" that are listed with type numbers are in stock.	
Recommended stock type	
A standard range created by a collaboration between our application engineers and marketing managers, which guarantees optimum grinding results for various grinding applications and for processing the materials.	Delivery 7 to 10 working days.
Alternative stock type	
Existing stock products, which – based on our global market and product experience – also guarantee good grinding results, but which are replaced in the short to medium term by recommended stock types.	
Breadth of product range	
Precision is our business! However, if the specifications available in stock do not provide you with the perfect solution, modifications to the recommended product range (dimensions) can also be made, i.e. grit size, hardness and structure.	The corresponding delivery times can be found in the relevant chapters, or in our quote or order confirmation documentation.

Example for breadth of product range

C	60	H	5	Stock type	→	Recommended standard specification
C	46–180	F–I	5–8	5–6 weeks DT	→	Possible range of modifications for grit sizes, hardness and structure
C	80	F	8		→	Example of a possible modification

Modification on request

To ensure quicker delivery times in urgent cases, existing stock types (recommended stock types) can be modified to suit customer requirements. The current delivery time and price will be provided according to the enquiry.

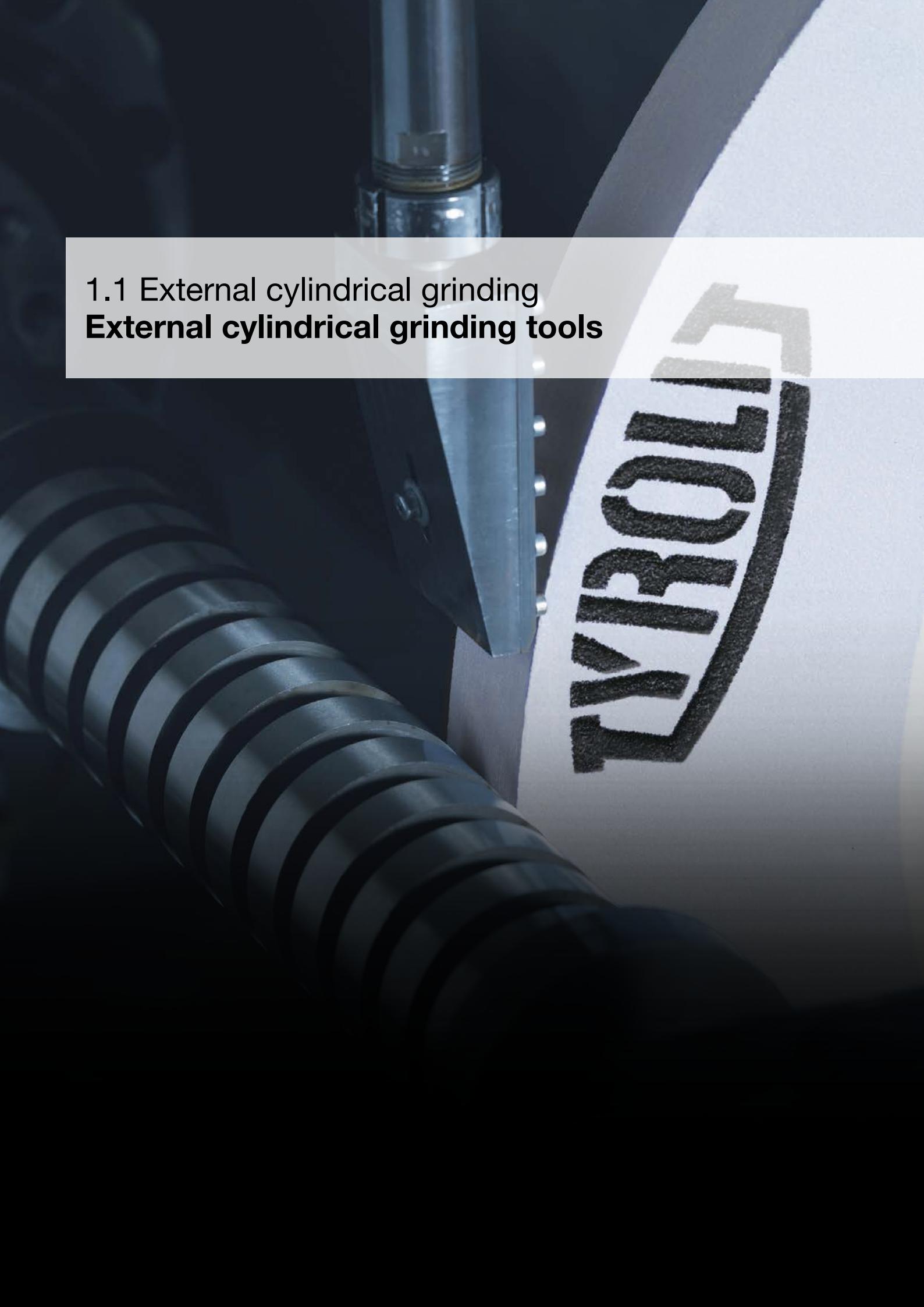


Packaging Unit

If the product table does not show any packaging unit, the products will be packaged individually.

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:
	Specifications:		
	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:			

1.1 External cylindrical grinding **External cylindrical grinding tools**





External cylindrical grinding

External cylindrical grinding is one of the most frequently used grinding processes, for example, in the automotive industry. Considering the requirements of our customers, we always offer the right tool.

The high-precision external cylindrical grinding tools from TYROLIT underlie an optimal quality assurance system and are produced using the most modern manufacturing technology and production facilities. We are therefore always able to comply with the requirements of our customers.

The decisive factor in the selection of the right product is the adaptation of the grinding wheel in the overall process to the specific requirements of the grinding application. Workpiece, tool, machine, parameters, cooling lubricant and the applied dressing technology contribute to the perfect

grinding result. The choice of the correct specification, as well as adaptation of the process parameters, can be optimised by TYROLIT to suit customer requirements.

Application recommendation



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding	Page
	Unhardened Hardened		Unhardened Hardened								
89A		●	●	●	●			●		●	18, 19
92A, 97A, 454A		●		●	●	●				●	19, 20
C			●	●	●	●	●	●	●	●	21
B		●		●	●	●				●	22
D						●	●	●		●	23

● Extremely suitable

● Limited suitability

Application tips

The key factor is the adjustment of the grinding wheel in the overall process (workpiece, tool, machine, parameters, coolant, dressing technology etc., as well as the specific requirements of the particular grinding applications).

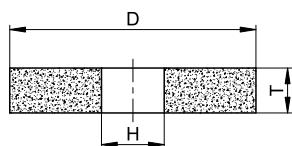
- The choice of specification, such as the adjustment of process parameters, can be optimised by TYROLIT application engineers to suit customer requirements
- Recommended operating speed: 25–35 m/sec
- Workpiece peripheral speed: depends on workpiece diameter
- Overlap rate: 30–40 % of wheel width

Diamond and CBN tool

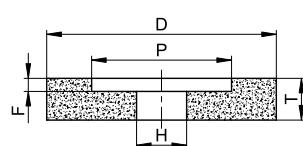
- For optimised dressing, see page 140 to 146
- Longitudinal feed/overlap rate:
30–50 % of thickness of diamond section width

- Workpiece peripheral speed: depends on workpiece diameter
- Recommended cutting speed for CBN grinding wheels for HSS and high-alloyed tool steel is 20–30 m/s
- Recommended cutting speed for diamond grinding wheels for cemented carbide and industrial ceramics is 15–25 m/s
- Concentrically trueing and sharpening of wheel before initial use with
 - unhardened structural steel shaft
 - silicon carbide grinding wheel
- Ensure sufficient coolant supply

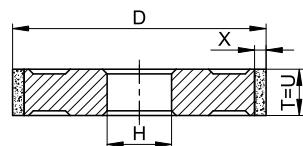
Shapes



Shape 1



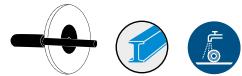
Shape 5



Shape 1A1

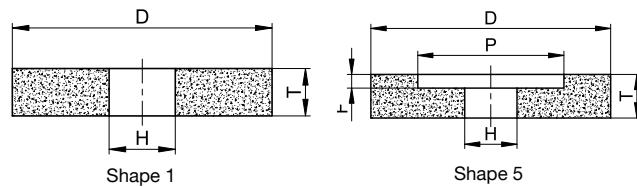
External cylindrical grinding

Conventional ceramic for non and low-alloyed steels



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
89A				●	●	●	●	●	●	●

Recommended stock type



In many industries, external cylindrical grinding is one of the most frequently used grinding processes. In the automotive industry, for example, camshafts, crankshafts and gear shafts are produced to meet the most stringent demands and requirements. Use of aluminum oxide especially for non and low-alloyed steels. The grade and structure of the wheel affect the grinding result and are tailored perfectly to use on non and low-alloyed steels. Our assortment also includes wheels for angled flute grinding.

Shape	Type no.	DxTxH	PxF	Specification	Vmax m/s	Comments
1	690785	300x40x76.2		89A 802 J5A V217 50	50	
	889228	400x20x127		89A 802 J5A V217 50	50	
	881114	400x25x127		89A 802 J5A V217 50	50	
	39869	400x30x127		89A 802 J5A V217 50	50	
	620118	400x40x127		89A 802 J5A V217 50	50	
	71665	400x50x127		89A 802 J5A V217 50	50	
	70954	400x60x127		89A 802 J5A V217 50	50	Grit size 80 Ra approx. 0.20–0.35 µm
	655864	400x80x127		89A 802 J5A V217 50	50	
	713537	500x40x203.2		89A 802 J5A V217 50	50	
	655869	500x50x203.2		89A 802 J5A V217 50	50	
	39867	500x60x203.2		89A 802 J5A V217 50	50	
	655875	500x80x203.2		89A 802 J5A V217 50	50	
	655876	600x80x305		89A 802 J5A V217 50	50	
5	119385	400x40x127		89A 120 K11 V3 50	50	Universal/angled flute grinding
	119392	500x50x203.2		89A 120 K11 V3 50	50	
5	34172112	400x80x127	200x30	89A 802 J5A V217 50	50	Grit size 80 Ra approx. 0.20–0.35 µm
	34172113	400x60x127	200x10	89A 802 J5A V217 50	50	

Breadth of product range*

89A	80	J	5	Stock type
89A	46–120	I–K	5–8	5–6 weeks DT

*For production reasons, the minimum quantity ordered may differ from non-stock types.





Alternative stock type

Shape	Type no.	DxTxH	Specification	Vmax m/s	Comments
1	44866	300x25x127	89A 602 K5A V217 50	50	Grit size 60 Ra approx. 0.35–0.50 µm
	66141	300x40x127	89A 602 K5A V217 50	50	
	690784	300x40x76.2	89A 602 K5A V217 50	50	
	34172115	300x30x127	89A 602 K5A V217 50	50	
	42216	350x40x127	89A 602 K5A V217 50	50	
	293034	356x50x127	89A 46 J6A V217 50	50	
	485430	356x50x127	89A 60 K5A V217 50	50	
	170606	350x32x127	89A 602 K5A V217 50	50	
	25473	400x40x127	89A 602 K5A V217 50	50	
	170608	400x32x127	89A 602 K5A V217 50	50	
	523430	450x50x203.2	89A 601 K5A V217 50	50	
	523437	450x25x203.2	89A 601 K5A V217 50	50	
	202294	500x60x203.2	89A 602 K5A V217 50	50	
	34273193	600x80x203.2	89A 602 K5A V217 50	50	
	523435	610x50x304.8	89A 601 K5A V217 50	50	

External cylindrical grinding

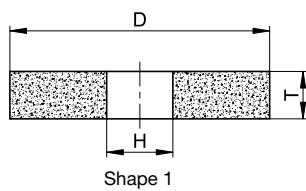
Conventional ceramic

for high-alloyed steels and HSS



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
97A, 454A				●	●	●	●			●

Recommended stock type



With this wheel we guarantee a tailored selection of high-performance aluminium oxides together with special bond systems. This ensures universal use on all high-alloyed steels and HSS.

With a sintered aluminium oxide mixture, for example 454A, it is possible to achieve the maximum stock removal rate for vitrified bonded grinding wheels. Improved performance can be achieved by resin-bonded CBN tools, such as the VIB STAR.

Type no.	DxTxH	Specification	Vmax m/s	Comments
1	664561	400x20x127	454A 802 J10 V3 50	50
	655916	400x25x127	454A 802 J10 V3 50	50
	655918	400x30x127	454A 802 J10 V3 50	50
	655919	400x40x127	454A 802 J10 V3 50	50
	216066	400x50x127	454A 802 J10 V3 50	50





	Type no.	DxTxH	Specification	Vmax m/s	Comments
	1 655921	400x60x127	454A 802 J10 V3 50	50	
	655927	500x40x203.2	454A 802 J10 V3 50	50	
	655929	500x50x203.2	454A 802 J10 V3 50	50	
	216068	500x60x203.2	454A 802 J10 V3 50	50	
	655935	500x80x203.2	454A 802 J10 V3 50	50	
	655938	600x80x305	454A 802 J10 V3 50	50	
	34273200	350x50x127	97A 802 J5A V237 50	50	Grit size 80 Ra approx. 0.20–0.35 µm
	664564	400x20x127	97A 802 J5A V237 50	50	
	664571	400x25x127	97A 802 J5A V237 50	50	
	664573	400x30x127	97A 802 J5A V237 50	50	
	664575	400x40x127	97A 802 J5A V237 50	50	
	664578	400x50x127	97A 802 J5A V237 50	50	
	664583	500x40x203.2	97A 802 J5A V237 50	50	
	664585	500x50x203.2	97A 802 J5A V237 50	50	
	664587	500x60x203.2	97A 802 J5A V237 50	50	
	664588	500x80x203.2	97A 802 J5A V237 50	50	

Breadth of product range*

454A	80	J	10	Stock type	97A	80	J	5	Stock type
454A	80–120	I–K	6–10	5–6 weeks DT	97A	46–120	I–K	5–8	5–6 weeks DT

*For production reasons, the minimum quantity ordered may differ from non-stock types.

Alternative stock type

Shape	Type no.	DxTxH	Specification	Vmax m/s
20	36576	400/220x50/5x127	454A 701 J5 V3 50	50
	290670	400/220x40/5x127	89A 60 K5A V217 50	50
1	690233	400x40x127	92A 602 I5A V217 50	50
	293789	500x50x203.2	92A 60 I5A V217 50	50
	494259	250x13x76.2	454A 601 L7G V3 50	50
	181873	350x50x127	454A 60 K5V3	50
	494271	355x25x127	454A 601 L7G V3 50	50

External cylindrical grinding

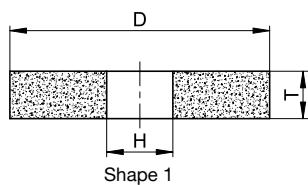
Conventional ceramic

for tungsten carbide and grey cast iron



Specific- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
C		●			●	●	●	●	●	●

Recommended stock type



This silicon carbide wheel is a cost-effective variant for machining tungsten carbide for secondary applications. It is primarily used for working on castings and nonferrous metals. This wheel is a good alternative for working on nitrified workpieces and wear-resistant thermal sprayed alloys in particular. Profiling is possible using standard diamond dressing tools.

Shape	Type no.	DxTxH	Specification	Vmax m/s
1	655957	400x40x127	C 60 H5A V18 50	50
	655958	400x50x127	C 60 H5A V18 50	50
	656023	400x40x127	C 100 H5A V18 50	50
	656025	400x50x127	C 100 H5A V18 50	50
	107611	300x15x76.2	C180 H9A V18 50	50

Breadth of product range*

C	60/100	H	5	Stock type
C	60–180	H–J	5–8	5–6 weeks DT

*For production reasons, the minimum quantity ordered may differ from non-stock types.

VIB STAR External cylindrical grinding

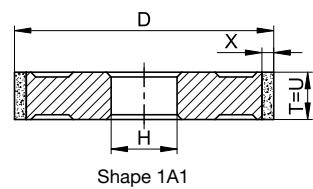
CBN resin

for high-alloyed steels and HSS



Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
		Unhardened Hardened	Unhardened Hardened							
B				●	●	●	●			●

Recommended stock type



The VIB STAR external grinding wheel is made with a vibration-reducing core. This enables a consistent and quiet grinding process. A constant self-sharpening effect also guarantees consistent power consumption and therefore high economic efficiency of the tool. Low wear results in a high level of dimensional accuracy on the workpiece, thereby reducing dimensional inspections to a minimum.

Shape	Type no.	DxTxH	U-X	Specification	Vmax m/s
1A1	34448295	200x15x51	15-3	51B 126 C50 B VIB-STAR	63
	34448296	250x15x51	15-3	51B 126 C50 B VIB-STAR	63
	34448298	300x20x76.2	20-3	51B 126 C50 B VIB-STAR	63
	34448299	300x20x127	20-3	51B 126 C50 B VIB-STAR	63
	34448297	300x20x76.2	20-5	51B 126 C50 B VIB-STAR	63
	34448311	350x20x127	20-3	51B 126 C50 B VIB-STAR	63
	34448312	350x20x127	20-3	51B 126 C75 B VIB-STAR	63
	34448300	350x20x127	20-5	51B 126 C50 B VIB-STAR	63
	34448313	400x30x127	30-3	51B 126 C50 B VIB-STAR	63
	34447898	400x20x127	20-3	51B 126 C50 B VIB-STAR	63
	34448314	400x20x127	20-5	51B 126 C50 B VIB-STAR	63

VIB STAR External cylindrical grinding

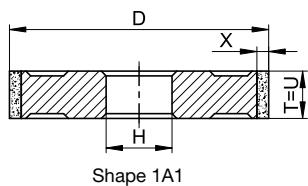
Diamond resin

for tungsten carbide and industrial ceramics



Specific- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
D						●	●	●		

Recommended stock type



The resin-bonded diamond wheel with VIB STAR core is a particularly cost-effective solution for machining tungsten carbide. Low wear and a high level of dimensional accuracy are achieved by a constant self-sharpening effect.

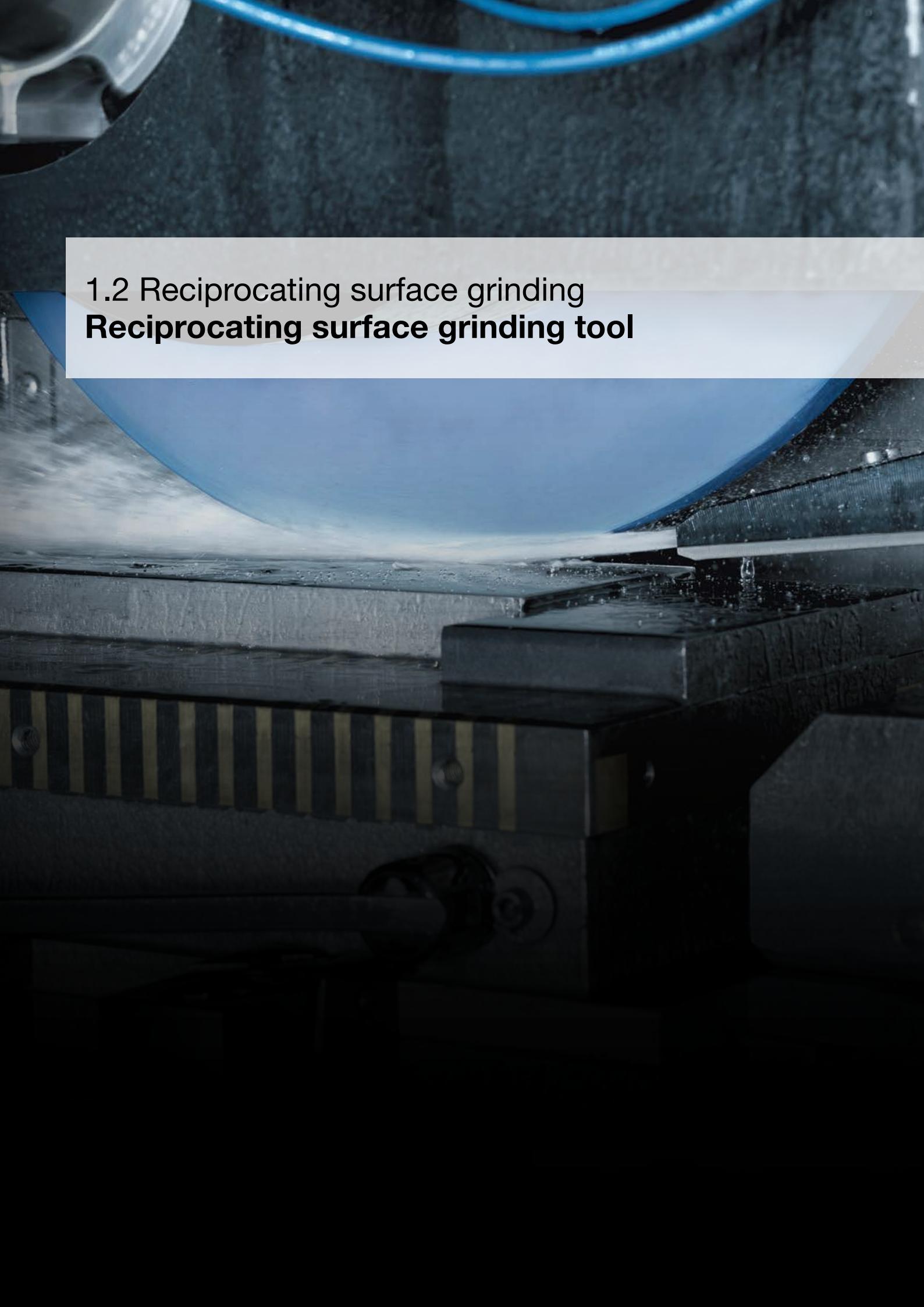
A high stock removal rate due to synthetic diamonds in resinoid bonds provides a significant advantage over less expensive silicon carbide wheels.



Shape	Type no.	DxTxH	U-X	Specification	Vmax m/s
1A1	34448315	200x10x51	10-3	11D 126 C75 B VIB-STAR	63
	34448316	250x15x51	15-3	11D 126 C75 B VIB-STAR	63
	34448317	300x20x76.2	20-3	11D 126 C75 B VIB-STAR	63
	34448318	300x15x127	15-3	11D 126 C75 B VIB-STAR	63
	34448319	300x20x127	20-3	11D 126 C75 B VIB-STAR	63
	34448320	350x20x127	20-3	11D 126 C75 B VIB-STAR	63
	34448322	400x20x127	20-3	11D 126 C75 B VIB-STAR	63

Please find information on dressing and sharpening from page 140.





1.2 Reciprocating surface grinding

Reciprocating surface grinding tool



Reciprocating surface grinding

Reciprocating surface grinding is the most frequently used surface grinding process. Especially in this process, a high stock removal rate with an adequate surface finish is required. Due to the relatively large contact area between the grinding wheel and the workpiece, a special grinding wheel composition is necessary.

The high-precision reciprocating surface grinding tools from TYROLIT underlie an optimal quality assurance system and are produced using the most modern manufacturing technology and production facilities. We are therefore always able to comply with

the requirements of our customers. The decisive factor in the selection of the right product is the adaptation of the grinding wheel in the overall process to the specific requirements of the grinding application. Workpiece, tool, machine, parameters, cooling

lubricant and the applied dressing technology contribute to the perfect grinding result. The choice of the correct specification, as well as adaption of the process parameters, can be optimised by TYROLIT to suit customer requirements.

Application recommendation



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding	Page
	Unhardened Hardened		Unhardened Hardened								
89A	●	●	●	●	●				●	●	28, 29, 30, 31, 34, 35
93A		●		●	●				●	●	29, 30, 31
F13A	●		●	●	●				●	●	29, 30
454A, 97A		●		●	●	●			●	●	32, 33, 34, 35, 36
80A		●	●	●	●	●			●	●	36
454A			●	●	●	●			●	●	36
C		●		●	●	●	●	●	●	●	36
B		●		●	●	●	●		●	●	38
D						●	●		●	●	39

● Extremely suitable

● Limited suitability

Application tips

Conventional tool

- Recommended operating speed: 20–30 m/s
- Table traverse speed: 10–20 m/min
- Infeed when roughing: 0.01–0.03 mm/stroke
- Infeed when finishing: 0.002–0.004 mm/stroke
- Transverse stroke (contact width in %): 30–40 % of wheel width
- Finishing: 1–3 strokes (without infeed)
- Ensure good coolant supply

Diamond and CBN tool

- Table traverse speed: 10–20 m/min
- Transverse stroke/overlap rate: 30–40 % of thickness of diamond section

Standard value for infeed: 1/10 of grinding grit size (e.g. D126 → infeed 12 µm)

Recommended cutting speed for CBN grinding wheels for HSS and high-alloyed tool steel is 20–25 m/s

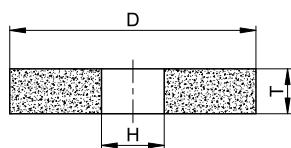
Recommended cutting speed for diamond grinding wheels for cemented carbide and industrial ceramics is 15–25 m/s

Concentrically trueing and sharpening of wheel before initial use with

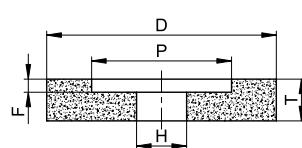
- unhardened structural steel block
- AV500 dressing device with silicon carbide grinding wheel (see chapter “Dressing and sharpening”, page 145)

Ensure good coolant supply

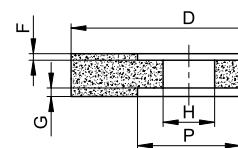
Shapes



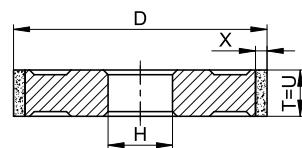
Shape 1



Shape 5



Shape 7



Shape 1A1

Reciprocating surface grinding

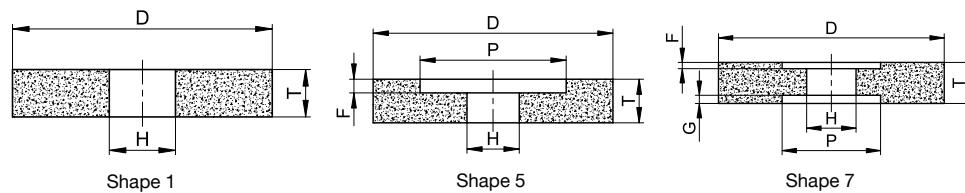
Conventional ceramic

for non and low-alloyed steels



Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
		Unhardened Hardened	Unhardened Hardened							
89A		●	●	●	●					●
93A		●		●	●					●
F13A		●	●	●	●					●

Recommended stock type



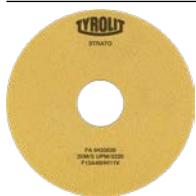
Reciprocating grinding wheels are primarily used for rough and fine grinding in machine construction and mould making. The aim is to achieve even and straight workpiece surfaces. Using highly porous grinding wheels and special aluminium oxides leads to an optimum surface result and a high stock removal rate.

Exceptional grinding results are achieved thanks to grade and structure specifications tailored to non and low-alloyed steels.

Shape	Type no.	DxTxH	PxF	Specification	Comments
	1	566308	205x13x31.75	89A 46 I8A V217	
	498701	225x25x51		89A 46 I8A V217	
	331692	250x25x76.2		89A 46 I8A V217	
	351901	300x30x76.2		89A 46 I8A V217	
	936929	300x50x127		89A 46 I8A V217	
	56484	350x50x127		89A 46 I8A V217	
	215986	350x40x127		89A 46 I8A V217	For rough grinding operations
	302416	355x50x127		89A 46 I8A V217	
	64598	400x50x127		89A 46 I8A V217	
	140088	400x60x127		89A 46 I8A V217	
	295600	400x80x127		89A 46 I8A V217	
	803992	400x40x127		89A 46 I8A V217	
	664544	205x13x31.75		89A 802 J8A V217	
	664545	225x25x51		89A 802 J8A V217	
	664546	250x25x51		89A 802 J8A V217	
664548	250x25x76.2		89A 802 J8A V217		
664549	300x30x76.2		89A 802 J8A V217		
664552	300x50x76.2		89A 802 J8A V217		
666533	350x40x127		89A 802 J8A V217		
664558	350x50x127		89A 802 J8A V217		



◀

Shape	Type no.	DxTxH	PxF	Specification	Comments	
	1	666530	400x40x127	89A 802 J8A V217	For finer surface finishes	
		666532	400x50x127	89A 802 J8A V217		
	1	441403	200x20x51	F13A 46 HH11 V	For rough grinding operations	
		441401	225x25x51	F13A 46 HH11 V		
		441399	250x25x51	F13A 46 HH11 V		
		469827	250x25x76,2	F13A 46 HH11 V		
		365997	300x30x76,2	F13A 46 HH11 V		
		665267	300x50x76,2	F13A 46 HH11 V		
		665269	300x50x127	F13A 46 HH11 V		
		665282	350x40x127	F13A 46 HH11 V		
		665294	350x50x127	F13A 46 HH11 V		
		665295	400x40x127	F13A 46 HH11 V		
		665296	400x50x127	F13A 46 HH11 V		
	1	664563	225x25x51	93A 46 H8A V217	For rough grinding operations	
		664566	250x25x76,2	93A 46 H8A V217		
		849597	300x30x76,2	93A 46 H8A V217		
		524016	350x40x127	93A 46 H8A V217		
		357751	355x50x127	93A 46 H8A V217		
		117241	400x50x127	93A 46 H8A V217		
		793338	400x60x127	93A 46 H8A V217		
	5	260141	300x50x76,2	155x10	89A 46 I8A V217	For rough grinding operations
		467466	350x50x127	200x10	89A 46 I8A V217	
		548613	400x50x127	200x10	89A 46 I8A V217	
		664574	300x50x127	190x10	89A 46 I8A V217	
		664584	300x50x76,2	155x10	89A 802 J8A V217	
		664626	300x50x127	190x10	89A 802 J8A V217	
		664632	400x60x127	200x10	89A 802 J8A V217	
	5	664478	300x50x76,2	155x10	F13A 46 HH11 V	For rough grinding operations
		593712	400x50x127	200x10	F13A 46 HH11 V	
		665297	350x50x127	200x10	F13A 46 HH11 V	

▶



Recommended stock type

Shape	Type no.	DxTxH	PxF	Specification	Comments
	5 664642	300x50x127	190x10	93A 46 H8A V217	
	231513	350x50x127	200x10	93A 46 H8A V217	
	557153	400x50x127	200x10	93A 46 H8A V217	For rough grinding operations
	664643	400x60x127	200x10	93A 46 H8A V217	
	7 665281	300x50x76.2	155x10/10	89A 46 I8A V217	
	665287	350x50x127	200x10/10	89A 46 I8A V217	
	664646	400x80x127	190x15/15	89A 46 I8A V217	For rough grinding operations
	664647	400x100x127	200x20/30	89A 46 I8A V217	
	664645	400x60x127	200x10/10	89A 46 I8A V217 50	
	664648	300x50x76.2	155x10/10	89A 802 J8A V217	For finer surface finishes
	664656	400x80x127	190x15/15	89A 802 J8A V217	
	7 664506	300x50x76.2	155x10/10	F13A 46 HH11 V	
	665285	350x50x127	200x10/10	F13A 46 HH11 V	
	665278	400x80x127	190x15/15	F13A 46 HH11 V	
	7 109336	300x50x76.2	155x10/10	93A 46 H8A V217	For rough grinding operations
	664657	400x60x127	200x10/10	93A 46 H8A V217	
	664658	400x80x127	190x15/15	93A 46 H8A V217	
5	34291848	500x100x203.2	300x25	93A 461 I9A V217 P3	

Breadth of product range*

89A	46	I	8	Stock type	89	80	J	8	Stock type
89A	46–100	H–J	5–9	5–6 weeks DT	89A	46–100	H–J	5–9	5–6 weeks DT
<hr/>									
93A	46	H	8	Stock type	F13A	46	HH	11	Stock type
93A	46–100	H–J	5–9	5–6 weeks DT	F13A	46–120	FF–HH	11–12	5–6 weeks DT
<hr/>									
89A	46	I	8	Stock type	89A	80	J	8	Stock type
89A	46–60	H–J	5–9	5–6 weeks DT	89A	70–100	H–J	5–9	5–6 weeks DT

*For production reasons, the minimum quantity ordered may differ from non-stock types.





Alternative stock type

Shape	Type no.	DxTxH	PxF	Specification
1	669537	125x30x20		80A 46 I9A V217
	96235	350x40x127		87A 36 J7A V217
	12950	400x50x127		87A 36 J7A V217
	33502	250x40x76,2		88A 46 J7A V217
	61571	350x50x127		88A 46 J7 V217
	32963	125x10x25		89A 46 I7 V217
	32965	150x13x32		89A 60 J7 V217
	850504	180x13x31,75		89A 60 K5A V217
	760612	200x6x51		89A 60 K5A V217
	228819	250x40x76,2		89A 46 J7A V217
	34377444	400x40x127		89A 46 J8A V237 P22
5	235262	350x50x127	190x10	87A 36 J8A V217
	235264	400x50x127	200x10	87A 36 J8A V217
	369514	350x50x127	190x10	89A 461 I8A V237 P22
	123064	400x50x127	200x10	89A 461 I8A V237 P22
	658122	400x50x127	190x10	93A 46 I8A V217
	634502	406x70x127	230x30	F13A 80 FF12 V

Alternative stock type

Shape	Type no.	DxTxH	PxF/G	Specification
7	8749	300x50x76.2	155x10/10	50A 36 J8A V217
	265130	300x50x76.2	154x10/15	88A 36 J7 V217
	641286	300x50x76.2	155x10/10	89A 601 I10A V217
	493780	400x63x127	200x10/10	89A 461 I10A V237
	34211468	400x100x127	190x40/10	89A 462 I8A V55 50
	67472	400x100x127	200x20/35	89A 46 H8A V217
	122991	400x75x127	200x10/20	89A 46 H8A V227
	235260	400x75x127	200x10/20	89A 461 I8A V237 P22
	63824	400x100x152.4	220x15/15	89A 461 I8A V237 P22
	235261	400x75x127	200x10/20	93A 46 I8A V217
	34291849	600x100x304.8 3	90x15/15	93A 461 I8A V237 P3

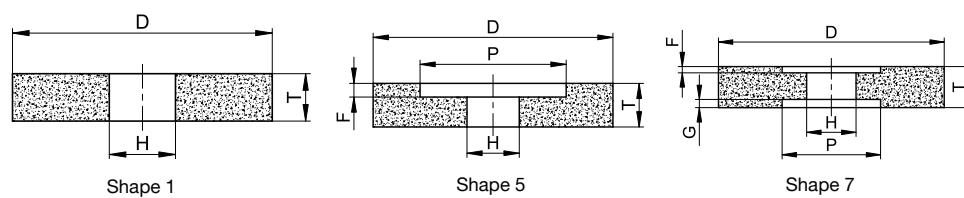
Reciprocating surface grinding

Conventional ceramic for high-alloyed steels and HSS



Specifica-	Alumin-	Non and low-alloyed	High-alloyed steels	HSS	INOX	Tungsten	Industrial	Cast iron	Dry	Wet
tion	ium	steels				carbide	ceramics		grinding	grinding
		Unhardened Hardened	Unhardened Hardened							
454A, 97A		●	●	●	●				●	

Recommended stock type



This reciprocating grinding wheel can be used universally on all high-alloyed steels and HSS. This is achieved by using special aluminium oxides and mixtures with sintered aluminium oxides combined with special bond systems.

Maximum stock removal rates can be achieved with sintered aluminium

oxide mixtures such as 454A. The next highest quality line is the resin-bonded VIB STAR CBN wheel from TYROLIT.



Shape	Type no.	DxTxH	PxF	Specification	Comments
1	34074250	200x13x32		454A 601 J10 V3	
	306283	200x20x32		454A 601 J10 V3	
	34074562	200x20x51		454A 601 J10 V3	
	162057	200x25x76,2		454A 601 J10 V3	
	664623	205x13x31,75		454A 602 J10 V3	
	664383	225x25x51		454A 602 J10 V3	
	664384	250x25x51		454A 602 J10 V3	
	664389	250x25x76,2		454A 602 J10 V3	
	664390	300x30x76,2		454A 602 J10 V3	
	664393	300x50x127		454A 602 J10 V3	
	664391	300x50x76,2		454A 602 J10 V3	
	494874	350x40x127		454A 602 J10 V3	
	664394	350x50x127		454A 602 J10 V3	
	664396	400x40x127		454A 602 J10 V3	
	664397	400x50x127		454A 602 J10 V3	
	333396	400x60x127		454A 602 J10 V3	
	664398	400x80x127		454A 602 J10 V3	



1	441342	200x20x51	97A 462 H8A V237	
	664401	205x13x31,75	97A 462 H8A V237	
	228481	225x25x51	97A 462 H8A V237	
	85536	250x25x51	97A 462 H8A V237	
	248826	250x25x76,2	97A 462 H8A V237	
	664402	300x30x76,2	97A 462 H8A V237	For rough grinding operations

Shape	Type no.	DxTxH	PxF	Specification	Comments
	1 635305	300x50x76,2		97A 462 H8A V237	
	441348	300x50x127		97A 462 H8A V237	
	441350	350x40x127		97A 462 H8A V237	
	441351	350x50x127		97A 462 H8A V237	
	524159	400x40x127		97A 462 H8A V237	For finer surface finishes
	630054	400x50x127		97A 462 H8A V237	
	476380	400x80x127		97A 462 H8A V237	
	664406	225x25x51		97A 801 H8A V237	
	664407	250x25x51		97A 801 H8A V237	
	664409	250x25x76,2		97A 801 H8A V237	
	664410	300x30x76,2		97A 801 H8A V237	
	311791	300x50x76,2		97A 801 H8A V237	
	664412	300x50x127		97A 801 H8A V237	
	664419	350x40x127		97A 801 H8A V237	
	664420	350x50x127		97A 801 H8A V237	
	664423	400x40x127		97A 801 H8A V237	
	664426	400x50x127		97A 801 H8A V237	
	5 664451	300x50x127	190x10	454A 602 J10 V3	
	664452	350x50x127	200x10	454A 602 J10 V3	
	664453	400x50x127	200x10	454A 602 J10 V3	
	664455	400x60x127	200x10	454A 602 J10 V3	
	5 664459	300x50x127	190x10	97A 462 H8A V237	
	664465	300x50x76,2	155x10	97A 801 H8A V237	
	441352	350x50x127	200x10	97A 462 H8A V237	
	664474	350x50x127	200x10	97A 801 H8A V237	
	593711	400x50x127	200x10	97A 462 H8A V237	
	664476	400x50x127	200x10	97A 801 H8A V237	
	664463	400x60x127	200x10	97A 462 H8A V237	
	664477	400x60x127	200x10	97A 801 H8A V237	
Shape	Type no.	DxTxH	PxF/G	Specification	
	7 664485	300x50x76,2	155x10/10	454A 602 J10 V3	
	664490	400x60x127	200x10/10	454A 602 J10 V3	
	664493	400x80x127	190x15/15	454A 602 J10 V3	
	359403	300x50x76,2	155x10/10	97A 462 H8A V237	
	664498	300x50x76,2	155x10/10	97A 801 H8A V237	
	566387	350x50x127	200x10/10	97A 462 H8A V237	
	512393	400x80x127	190x15/15	97A 462 H8A V237	
	664497	400x60x127	200x10/10	97A 462 H8A V237	
	664504	400x80x127	190x15/15	97A 801 H8A V237	
	34291850	400x75x127	200x10/20	97A 462 H8A V237	
	34291911	450x76x203,2	280x10/20	97A 462 H8A V237	



Breadth of product range*

454A	60	J	10	Stock type	97A	46	H	8	Stock type
454A	46–80	I–K	8–11	5–6 weeks DT	97A	46–100	H–J	5–9	5–6 weeks DT

97A	80	H	8	Stock type
97A	46–100	H–J	5–9	5–6 weeks DT

*For production reasons, the minimum quantity ordered may differ from non-stock types.

Alternative stock type

Shape	Type no.	DxTxH	PxF	Specification
1	305234	180x13x32		454A 120 I5 V3
	34074549	180x13x32		454A 601 J10 V3
	34074262	180x20x32		454A 601 J10 V3
	180994	200x10x51		454A 601 L5 V3
	494254	200x20x31,75		454A 601 L7G V3
	305260	200x20x32		454A 461 L7G V3
	294602	200x20x51		454A 462 J10 V3
	34162515	200x20x51		454A 462 K12 V3 P2 40
	30271	250x25x76		454A 601 L5 V3 40
	311922	250x25x76		454A 462 J10 V3
	34162514	250x25x76		454A 462 K12 V3 P2 40
	34062640	250x25x76,2		454A 601 K10 V3
	212627	250x25x76,2		454A 601 L7G V3
	305269	300x32x127		454A 462 H5 V3
	305279	350x40x127		454A 462 H5 V3
	305281	350x50x127		454A 462 H5 V3
	305285	400x50x127		454A 462 H5 V3
	314990	180x13x32		89A 60 I7A V237
	344194	180x16x32		89A 46 I7A V237
	344195	180x20x32		89A 46 I7A V237
	361668	500x80x203,2		89A 54 H10A V2
	307001	400x50x127		89A 461 H8A V237 P25
	749042	180x16x32		92A 602 H23 V237 W4 32
	749043	200x20x32		92A 602 H23 V237 W4
	713071	250x25x76,2		97A 462 H8A V217



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Shape	Type no.	DxTxH	PxF	Specification
1	590725	300x50x127		92A 462 H23 V237 W2
	577274	300x50x76,2		92A 462 H8A V217
	359223	350x50x127		92A 462 H8A V217
	57038	350x50x127		97A 462 I8A V217
	259325	400x50x127		92A 462 H8A V217
	733646	400x50x127		97A 462 H8A V217
	554635	400x50x127		97A 462 J9A V217 P3
5	494274	180x25x31,75	105x12	454A 601 L7G V3
	197044	350x50x127	200x10	454A 541 J10 V3 P23
	293802	400x50x127	190x10	454A 462 J10 V3
	36579	400x50x127	200x10	454A 601 J10 V3
	657669	400x50x127	190x10	92A 462 H8A V217
	280358	300x50x127	190x10	F16A 60 HH11 V
	12696	350x50x127	190x10	F16A 60 HH12 V
	110964	350x50x127	190x10	F18A 80 GG11 V
	12695	400x50x127	200x10	F16A 60 HH12 V
	92284	400x50x127	200x10	F18A 80 GG11 V
Shape	Type no.	DxTxH	PxF/G	Specification
7	176979	300x50x76,2	160x10/10	454A 461 K8 V3
	293865	300x50x76,2	155x10/10	454A 462 J10 V3
	232678	400x75x127	215x10/20	454A 541 K13 V3 P23
	657667	300x50x76,2	155x10/10	92A 462 H8A V217
	293867	300x50x76,2	155x10/10	F18A 46 HH12 V
	232665	400x100x152,4	220x15/10	F18A 70 GG11 V
	94720	400x75x127	200x10/20	F16A 60 HH12 V
	114648	450x76x203,2	280x10/20	F16A 60 HH12 V 45 A
	34291846	450x76x203,2	280x15/15	89A 461 I8A V237 P22

Reciprocating surface grinding

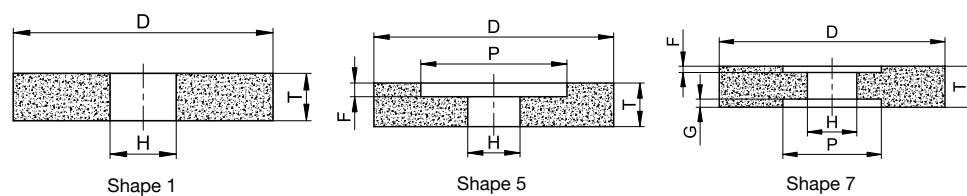
Conventional ceramic

for stainless steel



Specifica-	Alumin-	Non and low-alloyed	High-alloyed steels	HSS	INOX	Tungsten	Industrial	Cast iron	Dry	Wet
tion	ium	steels				carbide	ceramics		grinding	grinding
		Unhardened Hardened	Unhardened Hardened							
80A		●	●	●	●				●	
454A			●	●	●				●	

Recommended stock type



Special aluminium oxide and sintered aluminium oxide mixtures are a cost-effective solution for the reciprocating surface grinding of stainless steel/INOX. They offer cool grinding and excellent cutting ability thanks to

a special grain shape. A variety of shapes and dimensions mean they can cover the majority of applications.

Shape	Type no.	DxTxH	PxF/G	Specification
1	664383	225x25x51		454A 602 J10 V3
	664384	250x25x51		454A 602 J10 V3
	664397	400x50x127		454A 602 J10 V3
1	27420	400x50x127		80A 54 I9A V217 P23
5	664447	300x50x76.2	155x10	454A 602 J10 V3
	36579	400x50x127	200x10	454A 601 J10 V3
	657665	400x50x127	190x10	80A 54 I9A V217 P23
7	10845	300x50x76.2	155x10/10	80A 54 I9A V217 P23

Reciprocating surface grinding

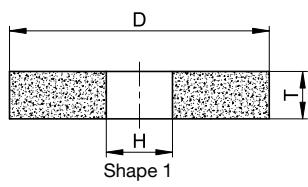
Conventional ceramic

for tungsten carbide and cast iron



Specific- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
C		●	●		●	●	●	●	●	●

Recommended stock type



The silicon carbide wheel is a cost-effective variant for machining tungsten carbide for secondary applications. It really comes into its own when machining castings and nonferrous metals.

This silicon carbide wheel is a good alternative for working on nitrified workpieces with simple profiles or wear-resistant thermal sprayed alloys, as it can be profiled with standard diamond dressing tools.

Shape	Type no.	DxTxH	Specification	Vmax m/s
1	664530	300x40x127	C 801 H8A V18 50	50
	664531	300x50x127	C 801 H8A V18 50	50
	664535	400x40x127	C 801 H8A V18 50 A	50
	664536	400x50x127	C 801 H8A V18 50 A	50
	36890	300x20x127	C 60 J11 V18	
	36918	300x40x127	C 60 J11 V18	
	775149	400x40x203	C 60 J10 V18	

Breadth of product range*

C	80	H	8	Stock type
C	46–180	F-I	5–8	5–6 weeks DT

*For production reasons, the minimum quantity ordered may differ from non-stock types.

VIB STAR reciprocating surface grinding

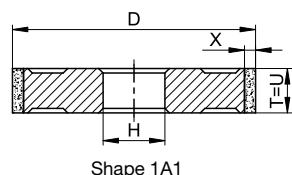
CBN resin

for high-alloyed steels and HSS



Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
		Unhardened Hardened	Unhardened Hardened							
B				●	●	●	●			●

Recommended stock type



The VIB STAR reciprocating grinding wheel is equipped with a vibration-reducing core that ensures a consistent and quiet grinding process. The constant self-sharpening effect guarantees consistent power consumption and therefore high economic efficiency. Low wear results in a high level of dimensional accuracy on the workpiece, thereby reducing dimensional inspections to a minimum.

Shape	Type no.	DxTxH	U-X	Specification	Vmax m/s
1A1	34448295	200x15x51	15-3	B 126 C50 B VIB-STAR	63
	34448296	250x15x51	15-3	B 126 C50 B VIB-STAR	63
	34448298	300x20x127	20-3	B 126 C50 B VIB-STAR	63
	34448299	300x20x76.2	20-5	B 126 C50 B VIB-STAR	63
	34448297	300x20x76.2	20-3	B 126 C50 B VIB-STAR	63
	34448311	350x20x127	20-5	B 126 C50 B VIB-STAR	63
	34448312	350x20x127	20-3	B 126 C50 B VIB-STAR	63
	34448300	350x20x127	20-3	B 126 C75 B VIB-STAR	63
	34448313	400x20x127	20-5	B 126 C50 B VIB-STAR	63
	34447898	400x20x127	20-3	B 126 C50 B VIB-STAR	63
	34448314	400x30x127	30-3	B 126 C50 B VIB-STAR	63

Please find information on dressing and sharpening from page 140.

VIB STAR reciprocating surface grinding

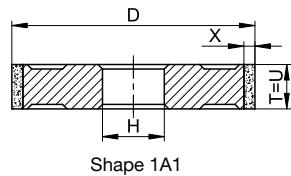
Diamond resin

for tungsten carbide and industrial ceramics



Specific- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
D						●	●		●	

Recommended stock type



The resin-bonded diamond wheel with VIB STAR core is a particularly cost-effective solution for machining tungsten carbide. Low wear and a high level of dimensional accuracy are achieved by a constant self-sharpening effect.

The high stock removal rate of synthetic diamond in resinoid bonds provides a significant advantage over less expensive silicon carbide grinding wheels.



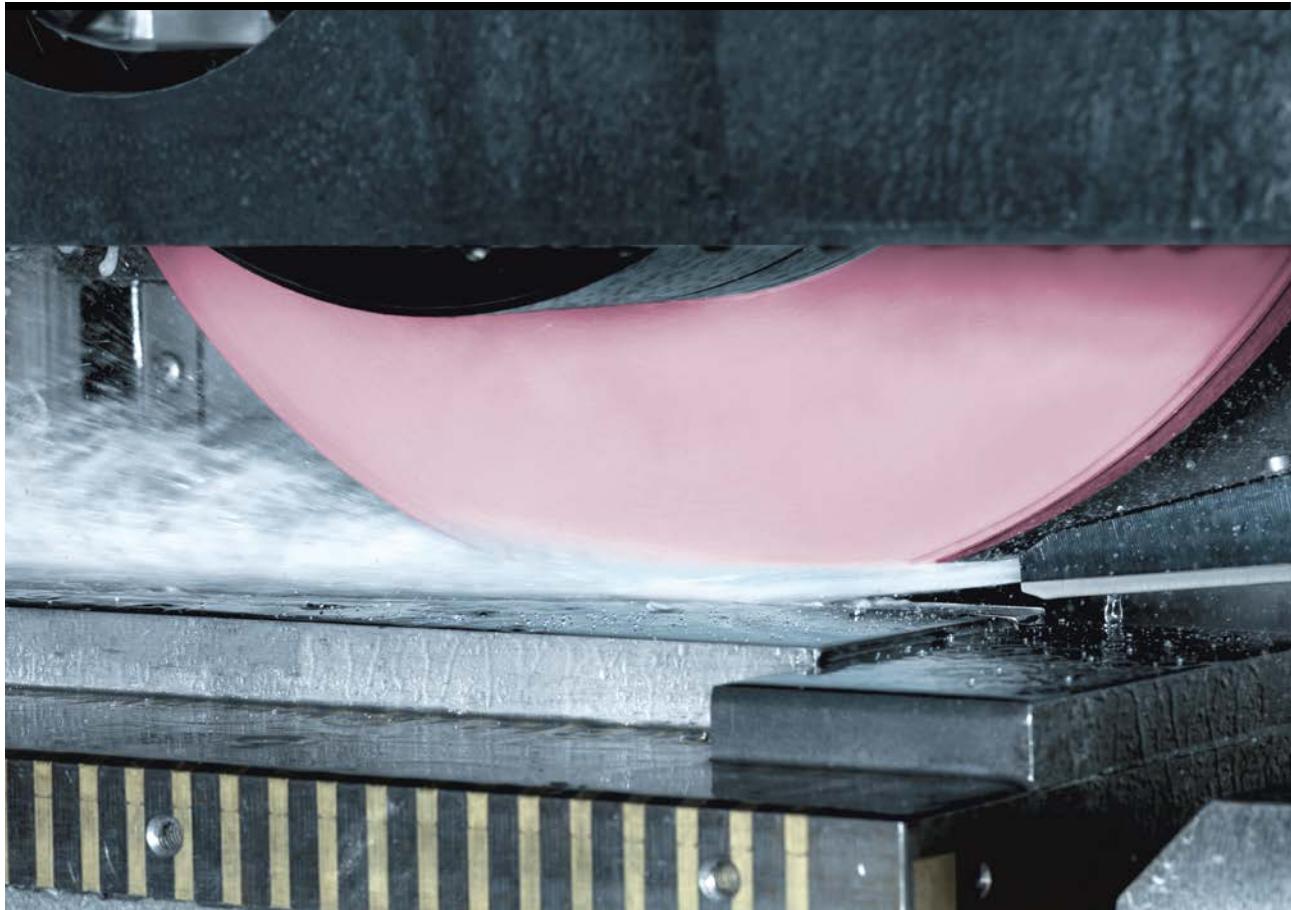
Shape	Type no.	DxTxH	U-X	Specification	Vmax m/s
1A1	34448315	200x10x51	10-3	D 126 C75 B VIB-STAR	63
	34448316	250x15x51	15-3	D 126 C75 B VIB-STAR	63
	34448317	300x15x127	15-3	D 126 C75 B VIB-STAR	63
	34448313	300x20x127	20-3	D 126 C75 B VIB-STAR	63
	34448319	300x20x76.2	20-3	D 126 C75 B VIB-STAR	63
	34448320	350x20x127	20-3	D 126 C75 B VIB-STAR	63
	34448322	400x20x127	20-3	D 126 C75 B VIB-STAR	63

Please find information on dressing and sharpening from page 140.



1.3 Profile surface grinding **Profile surface grinding tool**





Profile surface grinding

In the profile surface grinding process, pre-defined profiles are ground into the material. In order to achieve this, it is important to apply a “negative profile” through dressing the wheel. As a system supplier, TYROLIT offers not only suitable grinding wheels, but also an appropriate dresser for this purpose.

The precise profile surface grinding tools underlie an optimal quality assurance system and are produced using the most modern manufacturing technology and production facil-

ties. We are therefore always able to comply with the requirements of our customers.

TYROLIT produces this tool with a highly porous structure and special

aluminium oxides. This enables us to offer you optimum profile retention with minimum dressing diamond wear.

Application recommendation

Specific- ation	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding	Page	
	Unhardened Hardened						Unhardened Hardened					
80A		●	●		●			●		●	44, 45	
C (nitrid- ing-steel)				●	●	●	●	●		●	44	

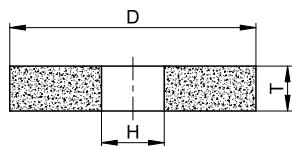
● Extremely suitable

● Limited suitability

Application tips

- Recommended operating speed: 25–30 m/s
- Infeed: 0.003–0.1 mm/stroke
- Traverse speed: 10–20 m/min
- Ensure good coolant supply
- For optimised dressing, see page 140 to 146

Shapes



Shape 1

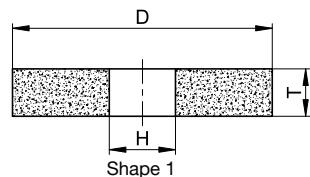
Profile surface grinding

Conventional ceramic for high-alloyed steels



Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
80A		●	●	●	●					●
C (Nitriding steel)				●	●	●	●	●		●

Recommended stock type



For conventional ceramic profile surface grinding applications we offer wheels with special aluminium oxides and a highly porous structure. They are available in grit sizes 80 and 120 for pendulum grinding and in silicon carbide in grit size C180 for creep feed grinding.

Shape	Type no.	DxTxH	Specification
1	927194	250x16x51	80A 1202 J9A V17 P8
	148656	250x20x51	80A 1202 J9A V17 P8
	163110	225x25x51	80A 802 J9A V17 P25
	337183*	250x20x51	C 180 F8A V18 P8

* For nitriding steel.

Breadth of product range*

C	180	F	8	Stock type
C	120–180	F	8	5–6 weeks DT

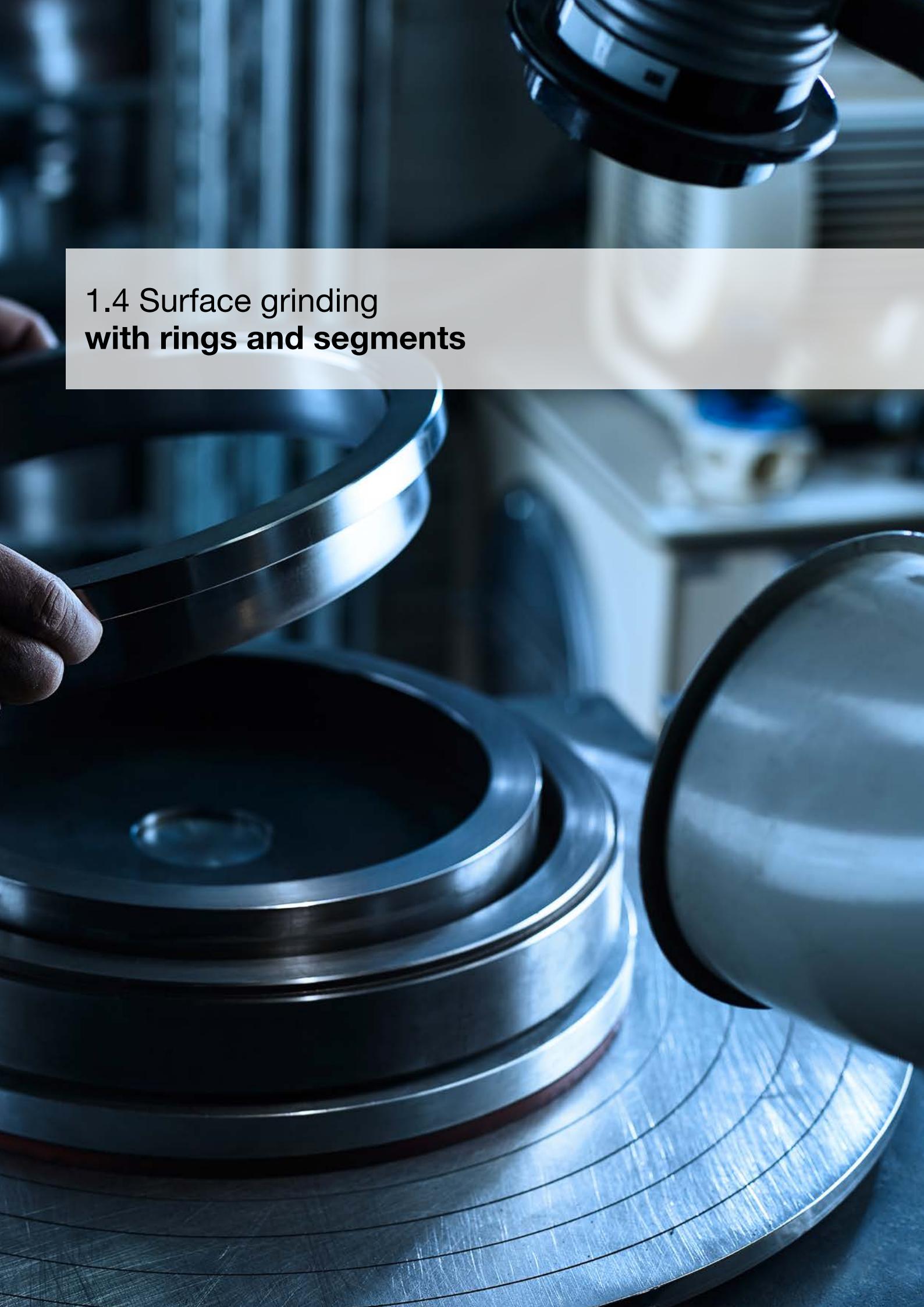
*For production reasons, the minimum quantity ordered may differ from non-stock types.



**Alternative stock type**

Shape	Type no.	DxTxH	Specification
1	876590	180x10x32	80A 1209 I7G V112
	876610	180x13x32	80A 1209 I7G V112
	876616	180x6x32	80A 1209 I7G V112
	876613	180x8x32	80A 1209 I7G V112
	876619	200x10x32	80A 1209 I7G V112
	876611	200x13x32	80A 1209 I7G V112
	876618	180x10x32	80A 809 J7G V111
	876591	180x13x32	80A 809 J7G V111
	688752	200x10x32	80A 809 J7G V111





1.4 Surface grinding with rings and segments



Surface grinding with rings and segments

In contrast to peripheral surface grinding, grinding is performed on the side when using rings and segments. This is often necessary because of the machine's construction and the workpiece dimensions which require a reduction in the permissible operating speed.

This process offers a particularly high grinding performance due to the coarse grit sizes used. To avoid breaks in the segments, which often occur during grinding, sufficient

coolant supply is beneficial. However, not only particularly cool grinding, but also the self-sharpening effect of these tools make them extremely popular, especially for the grinding

of planer knives. Here too, coarse and extremely porous tools with low hardness are used.

Application recommendation

Specifica-tion	Alumin-ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding	Page
	Unhardened Hardened		Unhardened Hardened								
89A ceramic		●	●	●	●				●	50	
89A Bakelit		●		●	●				●	50	
454A, 97A		●		●	●	●			●	51	
91A, 92A	●		●	●					●	50	

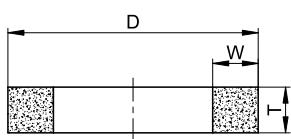
● Extremely suitable

● Limited suitability

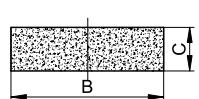
Application tips

- Recommended operating speed: 25–30 m/s
- Traverse speed: 2–10 m/min
- Infeed 0.005–0.03 mm/stroke
- Sparking out without infeed 1–3 strokes
- Ensure good coolant supply

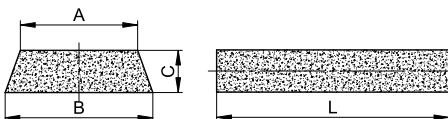
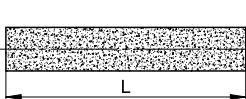
Shapes



Shape 2



Shape 3101



Shape 3109

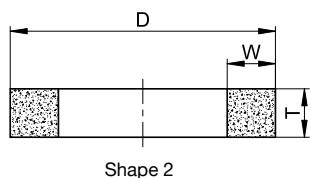
Surface grinding with rings

Ceramic / Conventional resin
for high-alloyed steels and HSS



Specification	Non and low-alloyed steels		High-alloyed steels		HSS	INOX	Wet grinding
	Unhardened Hardened		Unhardened Hardened				
50A	●	●					●
89A ceramic	●		●		●	●	●
89 A resin		●		●	●		●
97A, 454A		●		●	●	●	●
91A, 92A	●			●	●		●

Recommended stock type

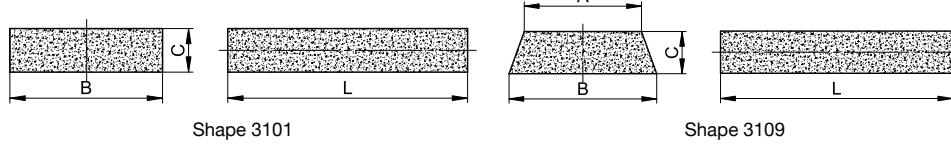


Rings for surface grinding are made of a highly porous vitrified bond in grit size 46 or resinoid bond in grit size 60. They are ideally suited for high-alloyed steels and HSS, and meet the most exacting surface quality requirements. Ring wheels with a high stock removal rate are required above all for paper and planer knives. Please be aware that resin-bonded ring wheels only feature limited coolant resistance.

Shape	Type no.	DxT-W	Specification	Comments
2	323627	200x90-W=20	89A 46 K14 B10 LW42	
	520628	200x90-W=20	89A 60 G4 B22 W4E	
	469614	200x100-W=20	89A 602 G4 B22 W4E	
	469619	250x100-W=20	89A 602 G4 B22 W4E	
	712089	200x90-W=20	89A 60 H6A V217	
	598771	200x90-W=20	97A 54 I10A V55	
	461733	200x90-W=20	91A 461 G9A V217 B3	
	133933	200x90-W=20	454A 46 H9 V3	
	468751	200x100-W=20	89A 46 G10A V217 B3	
	664621	200x90-W=20	92A 461 H10A V237	Göckel, Reform
	664622	200x100-W=20	92A 461 H10A V237	(Planer and chopper knives)
103	709899		103K02	Accessories: Vinapas adhesive 0.5 kg

Surface grinding with segments

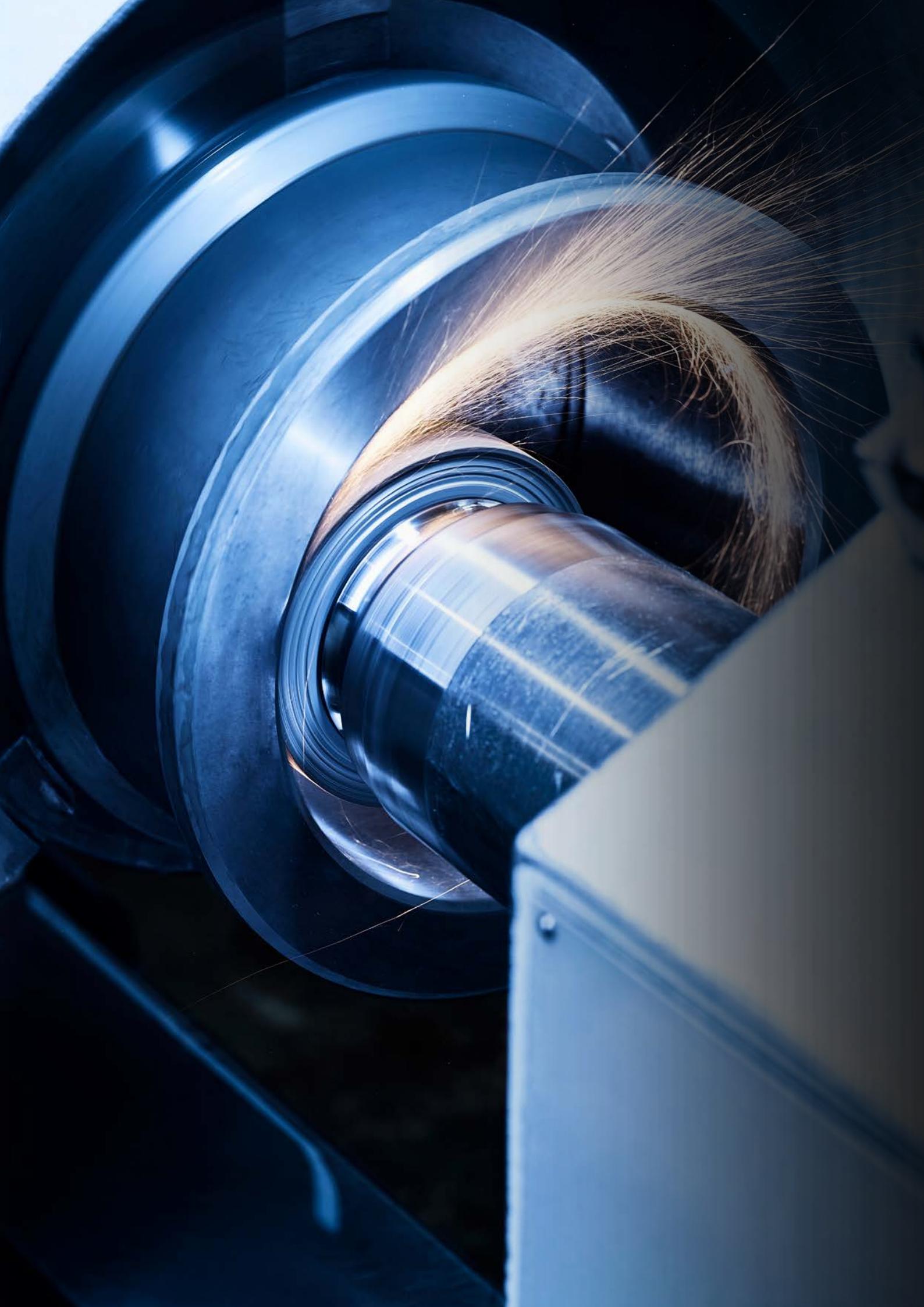
Conventional ceramic
for high-alloyed steels and HSS



Segments for surface grinding are made of sintered aluminium oxide mixtures such as 454A for high-alloyed steels and HSS, or 50A and 89A for soft and low-alloyed steels.

They offer a high stock removal rate and a self-sharpening effect.

Shape	Type no.	BxCxL / B/AxCxL	Specification
	3101	34040293	454A 361 I12 V3 P2
		34386911	452A 36 I12 V3 P2
		664628	454A 461 K13 V3
	3109	570156	455A 46 M8 V3
		36561	454A 36 J11 V3
		34386465	454A 36 I10 V3
		118827	454A 46 K13 V3
		285743	89A 46 G10A V2
		571861	455A 46 M8 V3
		587645	455A 46 J5 V3
		872177	454A 46 K13 V3
		723399	455A 54 K5 V3
		229899	454A 461 K13 V3
		664654	89A 362 I8A V2
		664655	97A 461 G10A V237



1.5 Internal cylindrical grinding

Internal cylindrical grinding tools



Internal cylindrical grinding

The internal cylindrical grinding process is mainly used for the finishing of internal functional surfaces. The process is especially often used for the connection with an axle or a shaft. For example, gears, steering systems, injection systems or hollow shafts can be machined.

With vitrified-bonded tools, TYROLIT offers you optimum profile retention and, through cool grinding, a particularly low thermal load.

Depending on the application, we recommend our diamond and CBN wheels instead of conventional grinding tools.

Application recommendation

Specifica-tion	Alumin-ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding	Page
	Unhardened Hardened		Unhardened Hardened								
89A		●	●	●	●			●		●	56, 57
97A, AT			●	●	●					●	57, 58
B		●		●	●	●			●	●	59, 60
D						●	●	●		●	60, 61

● Extremely suitable

● Limited suitability



Application tips

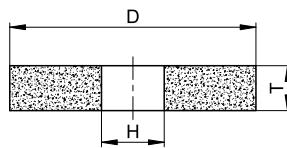
Conventional tool

- Recommended operating speed: 30–50 m/s
- Pre-grinding infeed: 0.02–0.05 mm/stroke
- Semi-finish grinding infeed: 0.01–0.005 mm/stroke
- Finish grinding infeed: 0.001–0.002 mm/stroke
- Spark-out infeed: 5 strokes
- Ensure good coolant supply

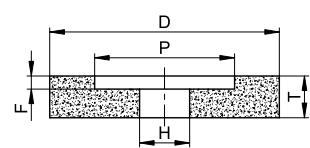
Diamond and CBN tool

- Recommended cutting speed for HSS and high-alloyed tool steel is 15–35 m/s
- Recommended cutting speed for cemented carbide and industrial ceramics is 15–25 m/s
- Cooling with emulsion recommended

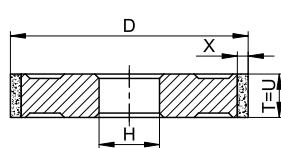
Shapes



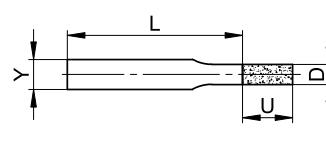
Shape 1



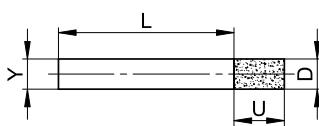
Shape 5



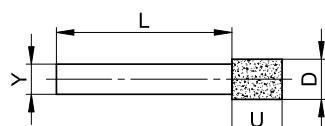
Shape 1A1



Shape 1A1W



Shape 1A1W 2



Shape 1A1W 3

Internal cylindrical grinding

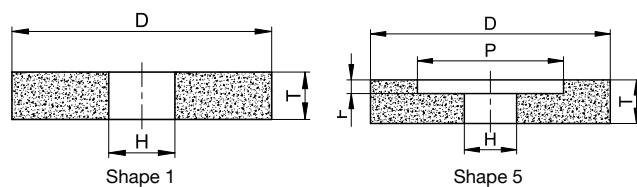
Conventional ceramic

for non and low-alloyed steels



Specifica-	Alumin-	Non and low-alloyed	High-alloyed steels	HSS	INOX	Tungsten	Industrial	Cast iron	Dry	Wet
tion	ium	steels				carbide	ceramics		grinding	grinding
		Unhardened Hardened	Unhardened Hardened							
89A		●	●	●	●			●		●

Recommended stock type



These universal internal cylindrical grinding wheels made from special aluminium oxide are used for the grinding of through-holes and alignment holes. They offer high stock removal rates and excellent shape retention.

Specification 89A60 is used primarily for soft steels and 89A80 for hardened steels.

Shape	Type no.	DxTxH	PxF	Specification	Vmax m/s	PU
1	234391	15x15x6		89A 602 J5 V111 50	50	25
	807005	15x15x6		89A 802 I5 V111 50	50	25
	234390	20x20x6		89A 602 J5 V111 50	50	25
	664711	20x20x6		89A 802 I5 V111 50	50	25
	664716	25x25x10		89A 802 I5 V111 50	50	10
	795621	25x25x10		89A 602 J5 V111 50	50	10
	664699	25x25x6		89A 602 J5 V111 50	50	10
	664712	25x25x6		89A 802 I5 V111 50	50	10
	664715	25x25x8		89A 802 I5 V111 50	50	10
	807013	25x25x8		89A 602 J5 V111 50	50	10
	664717	30x30x10		89A 802 I5 V111 50	50	10
	445055	32x25x10		89A 602 J5 V111 50	50	10
	563191	32x32x10		89A 802 I5 V111 50	50	10
	664704	32x32x10		89A 602 J5 V111 50	50	10
	664706	40x40x13		89A 602 J5 V111 50	50	10
	664719	40x40x13		89A 802 I5 V111 50	50	10
	234387	50x40x16		89A 602 J5 V111 50	50	10
	664721	50x40x16		89A 802 I5 V111 50	50	10
	664708	50x50x16		89A 602 J5 V111 50	50	10
	664722	50x50x16		89A 802 I5 V111 50	50	10
5	664768	20x20x6	13x7	89A 602 J5 V111 50	50	25
	664787	20x20x6	13x7	89A 802 I5 V111 50	50	25
	664772	25x25x10	16x10	89A 602 J5 V111 50	50	10
	664792	25x25x10	16x10	89A 802 I5 V111 50	50	10
	664771	25x25x6	12x13	89A 602 J5 V111 50	50	10





Shape	Type no.	DxTxH	PxF	Specification	Vmax m/s	PU
	664793	32x32x10	18x16	89A 802 I5 V111 50	50	10
	664780	40x40x13	20x20	89A 602 J5 V111 50	50	10
	664794	40x40x13	20x20	89A 802 I5 V111 50	50	10
	664783	50x40x16	30x13	89A 602 J5 V111 50	50	10
	664785	50x50x16	25x25	89A 602 J5 V111 50	50	10
	664796	50x50x16	25x25	89A 802 I5 V111 50	50	10
	34392592	75x50x16	32x25	89A 60 J5 V111 50	50	10

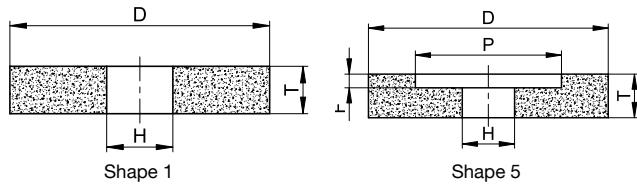
Internal cylindrical grinding

Conventional ceramic
for high-alloyed steels and HSS



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
		Unhardened Hardened	Unhardened Hardened							
97A, AT			●	●	●	●			●	

Recommended stock type



This vitrified internal cylindrical grinding tool offers a cost effective alternative to CBN tools with good stock removal. The specification AT60 can be used universally. Our wide range means you can choose exactly the right tool for the application.

Shape	Type no.	DxTxH	PxF	Specification	Vmax m/s	PU
	781647	15x15x6		97A 802 I5 V112 80	80	25
	781649	20x20x6		97A 802 I5 V112 80	80	25
	664669	25x25x10		97A 802 I5 V112 80	80	10
	664666	25x25x6		97A 802 I5 V112 80	80	10
	664668	25x25x8		97A 802 I5 V112 80	80	10
	664670	30x30x10		97A 802 I5 V112 80	80	10
	664672	32x25x10		97A 802 I5 V112 80	80	10
	747519	32x32x10		97A 602 K6 V112 80	80	10
	664673	32x32x10		97A 802 I5 V112 80	80	10
	747522	40x25x10		97A 602 K6 V112 80	80	10
	664675	40x40x13		97A 802 I5 V112 80	80	10
	664677	50x40x16		97A 802 I5 V112 80	80	10
	664679	50x50x16		97A 802 I5 V112 80	80	10





Recommended stock type

Shape	Type no.	DxTxH	PxF	Specification	Vmax m/s	PU
	664683	15x15x6		AT 60 J6 VCOL 80	80	25
	664684	20x20x6		AT 60 J6 VCOL 80	80	25
	664689	25x25x10		AT 60 J6 VCOL 80	80	10
	664685	25x25x6		AT 60 J6 VCOL 80	80	10
	664686	25x25x8		AT 60 J6 VCOL 80	80	10
	664692	30x30x10		AT 60 J6 VCOL 80	80	10
	664694	32x32x10		AT 60 J6 VCOL 80	80	10
	664695	40x40x13		AT 60 J6 VCOL 80	80	10
	664696	50x40x16		AT 60 J6 VCOL 80	80	10
	664697	50x50x16		AT 60 J6 VCOL 80	80	10
	664728	20x20x6	13x7	97A 802 I5 V112 80	80	10
	664738	25x25x10	16x10	97A 802 I5 V112 80	80	10
	664737	25x25x6	12x13	97A 802 I5 V112 80	80	10
	664742	32x32x10	18x16	97A 802 I5 V112 80	80	10
	664744	40x40x13	20x20	97A 802 I5 V112 80	80	10
	664746	50x40x16	30x13	97A 802 I5 V112 80	80	10
	664749	50x50x16	25x25	97A 802 I5 V112 80	80	10
	664757	20x20x6	13x7	AT 60 J6 VCOL 80	80	10
	664760	25x25x10	16x10	AT 60 J6 VCOL 80	80	10
	664759	25x25x6	12x13	AT 60 J6 VCOL 80	80	10
	664761	32x32x10	18x16	AT 60 J6 VCOL 80	80	10
	664764	40x40x13	20x20	AT 60 J6 VCOL 80	80	10
	664766	50x40x16	30x13	AT 60 J6 VCOL 80	80	10
	664767	50x50x16	25x25	AT 60 J6 VCOL 80	80	10

Alternative stock type

Shape	Type no.	DxTxH	PxF	Specification	Vmax m/s	PU
4	34385488	70x25x16		454A 60 K10 V3 80	80	10
5	293798	25x25x10	16x10	454A 1002 K9 V3 80	80	10
	232811	40x40x10	16x20	455A 801 L6 V3 80	80	10
	34385487	70x60x20	30x20	454A 60 K10 V3 80	80	10
	747511	20x20x6	13x7	97A 602 K6 V112 80	80	10
	747516	25x25x10	16x10	97A 602 K6 V112 80	80	10
	747526	40x32x16	25x13	97A 602 K6 V112 80	80	10
	747530	50x40x16	30x13	97A 602 K6 V112 80	80	10

Internal cylindrical grinding

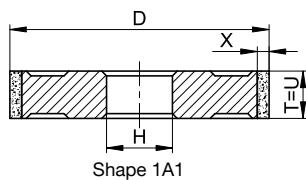
CBN resin-bonded

for high-alloyed steels and HSS



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
B				●	●	●	●		●	●

Recommended stock type



Compared to conventional ceramic grinding tools, CBN tools are characterised by a long lifetime and much shorter grinding times. They also offer a high level of dimensional accuracy.

This resin-bonded tool is primarily used for machining high-alloyed steels and HSS, but it can also be used for machining INOX.

Shape	Type no.	DxTxH	U-X	Specification
	1A1	384481	12x10x6	B 126 C75 B 54 AL
	34937	15x10x6	10-2	B 126 C75 B 54 AL
	127356	20x10x6	10-2	B 126 C75 B 54 AL
	55282	25x10x8	10-3	B 126 C75 B 54 AL
	43017	30x10x10	10-3	B 126 C75 B 54 AL
	467422	40x10x10	10-3	B 126 C75 B 54 AL

Internal cylindrical grinding

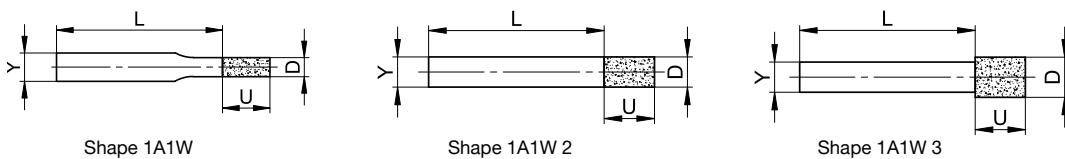
CBN electroplated

for high-alloyed steels and HSS



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
B				●	●	●	●		●	●

Recommended stock type



Recommended stock type

Compared to conventional ceramic grinding tools, CBN tools are characterised by a long lifetime and much shorter grinding times. They also offer a high level of dimensional accuracy.

This electroplated tool is primarily used for machining high-alloyed steels and HSS, but it can also be used for machining INOX.

Shape	Type no.	DxU	YxL	Specification	PU	Comments
	1A1W	477403	1.5x4	S3x50	B 91 GST	5
		477406	2x4	S3x50	B 91 GST	5
		477407	2.5x4	S3x50	B 91 GST	5
		477409	3x5	S3x50	B 91 GST	5
		477411	4x5	S3x50	B 126 GST	5
		477412	5x7	S3x50	B 126 GST	5
		477413	6x7	S6x50	B 126 GST	5
		477414	7x8	S6x50	B 126 GST	5
		477416	8x10	S6x50	B 126 GST	5
		477418	12x10	S6x50	B 151 GST	5

Internal cylindrical grinding

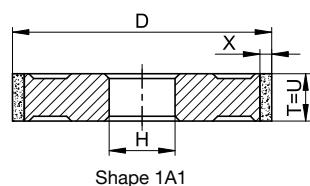
Diamond resin-bonded

for tungsten carbide and industrial ceramics



Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
		Unhardened Hardened	Unhardened Hardened							
D						●	●	●	●	●

Recommended stock type



Compared to conventional ceramic grinding tools, diamond tools are characterised by a long lifetime and much shorter grinding times. They also offer a high level of dimensional accuracy.

This resin-bonded tool is primarily used for the machining of tungsten carbide and industrial ceramics.

Shape	Type no.	DxTxH	U-X	Specification
1A1	786986	12x10x6	10-2	D 91 C75 B 52 AL
	786953	20x10x6	10-2	D 91 C75 B 52 AL
	665019	25x10x8	10-3	D 91 C75 B 52 AL
	319980	30x10x10	10-3	D 91 C75 B 52 AL
	34172349	40x10x10	10-3	D 91 C75 B 52 AL



Internal cylindrical grinding

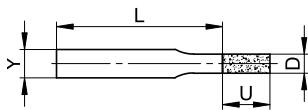
Diamond electroplated

for tungsten carbide and industrial ceramics

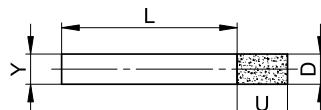


Specific- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
D						●	●	●	●	●

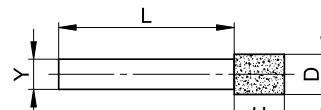
Recommended stock type



Shape 1A1W



Shape 1A1W 2



Shape 1A1W 3

This electroplated tool is primarily used for the machining of tungsten carbide and industrial ceramics. Compared to conventional ceramic grinding tools, diamond tools are characterised by a long lifetime and much shorter grinding times.

They also offer a high level of dimensional accuracy and exert a low grinding pressure. They are therefore ideally suited for machining small diameters.

Shape	Type no.	DxU	YxL	Specification	PU	Comments
	1A1W	477335	1x4	S3x51	D 91 X GST	5
		477342	2x4	S3x51	D 91 X GST	5
		477346	3x5	S3x50	D 91 X GST	5
		477349	4x5	S3x50	D 126 X GST	5
		477352	6x7	S6x53	D 126 X GST	5
		477356	8x10	S6x50	D 126 X GST	5
		477358	10x10	S6x50	D 151 X GST	5
		477360	15x10	S6x50	D 151 X GST	5

Diamond layer, single

DRROLL

FA 9228359
89AFFEIN



1.6 Hand-guided grinding **Files and stones**



Hand-guided grinding

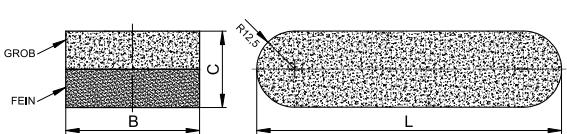
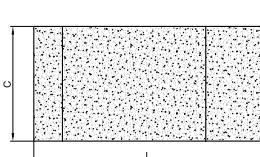
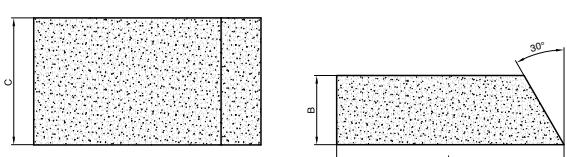
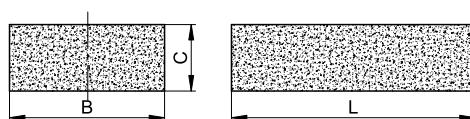
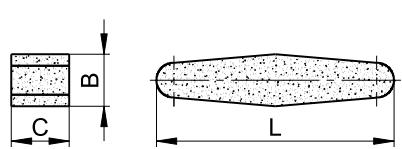
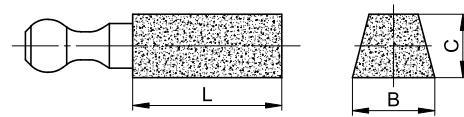
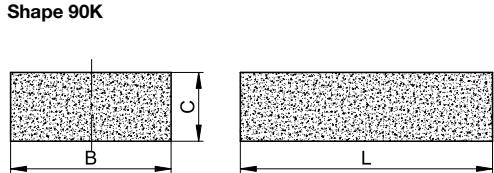
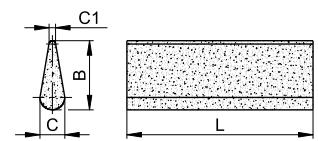
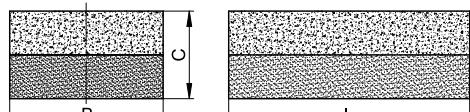
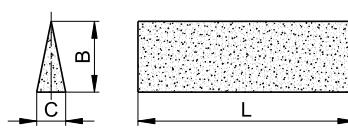
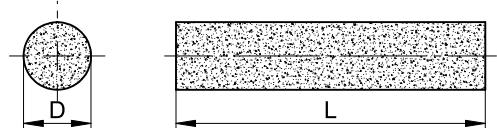
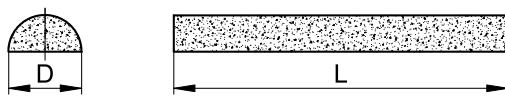
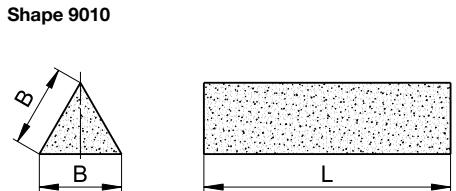
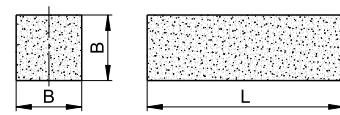
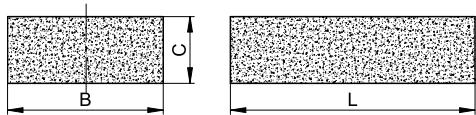
In the area of hand-guided tools, TYROLIT offers a wide selection of files, stones and hand rubbing bricks. We offer these tools in both aluminium oxide as well as silicon carbide.

Our files, bench stones, knife blade files and hollow chisel stones are available in different grit sizes from

coarse to "Super", depending on your intended area of application. A tool that is a must have for every work-

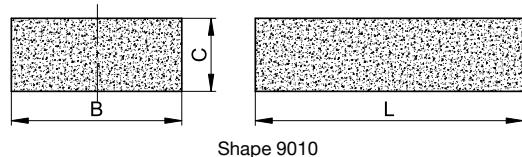
shop is the TYFIX hand rubbing brick. This enables easy removal of dirt, rust and paint from your surfaces.

Shapes



Flat stick

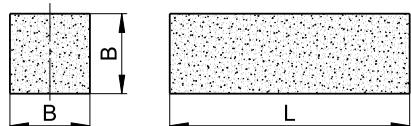
Vitrified-bonded



These files are used in particular for machining tools in the wood and machine construction industries. Thanks to the varying grit sizes you can select the perfect tool for your application.

Silicon carbide files are primarily used for tungsten carbide or tungsten carbide tipped tools and are grey-green in colour. Orange is used primarily for all types of steels and stainless steel.

Shape	Type no.	BxCxL	Specification	Grit size	PU
9010	34331970	13x6x150	89A 80 G8A V217	10	
	34331994	13x6x150	89A 120 J5A V227	10	
	734089	19,1x9,5x100	89A 80 J4A V227	10	
	734090	19,1x12,7x100	89A 80 J4A V227	10	
	34369031	20x6x150	89A 100 G8A V217	10	
	290181	20x8x150	88A 100 G7A V217	10	
	34331996	20x12x150	89A 120 H8A V227	10	
	34383077	25x10x150	88A 80 G7A V217	10	
	34383074	25x10x150	88A 150 G7A V217	10	
	34383075	25x10x150	88A 220 G7A V217	10	
	34383076	25x10x150	88A 320 G7AV 217	10	
557	6x3x100	C MEDIUM	240	10	
556	6x3x100	C COARSE	120	10	
555	6x3x100	C FINE	400	10	
548	6x3x100	89A MEDIUM	240	10	
547	6x3x100	89A FINE	400	10	
566	30x13x200	C MEDIUM	240	10	
564	30x13x200	C FINE	400	10	
554	30x13x200	89A MEDIUM	240	10	
563	13x6x150	C MEDIUM	240	10	
562	13x6x150	C COARSE	120	10	
561	13x6x150	C FINE	400	10	
552	13x6x150	89A MEDIUM	240	10	
551	13x6x150	89A FINE	400	10	
560	10x5x100	C MEDIUM	240	10	
559	10x5x100	C COARSE	120	10	
558	10x5x100	C FINE	400	10	
550	10x5x100	89A MEDIUM	240	10	
549	10x5x100	89A FINE	400	10	

Square file**Vitrified-bonded**

Shape 9011

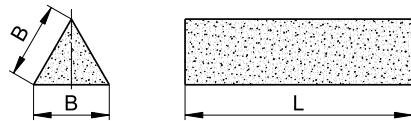
The square files are used primarily for efficient machining of tools in the wood and machine construction industries. Silicon carbide files are primarily used for tungsten carbide or tungsten carbide tipped tools and are grey-green in colour. Orange is used primarily for all types of steels and stainless steel.

Thanks to the varying grit sizes you can select the perfect tool for your application.

Shape	Type no.	BxCxL	Specification	Grit size	PU	
	9011	285090	19,1x100	89A 80 J4A V237	10	
		290183	20x150	88A 100 G7A V217	10	
		728	6x100	89A FINE	400	10
		729	6x100	89A MEDIUM	240	10
		747	6x100	C FINE	400	10
		749	6x100	C MEDIUM	240	10
		732	10x100	89A MEDIUM	240	10
		733	10x100	89A FINE	400	10
		752	10x100	C FINE	400	10
		754	10x100	C MEDIUM	240	10
		738	13x150	89A FINE	400	10
		739	13x150	89A MEDIUM	240	10
		758	13x150	C FINE	400	10
		760	13x150	C MEDIUM	240	10
		741	16x150	89A FINE	400	10
		742	16x150	89A MEDIUM	240	10
		761	16x150	C FINE	400	10
		763	16x150	C MEDIUM	240	10
		746	20x200	89A MEDIUM	240	10
	767	20x200	C FINE	400	10	
	768	20x200	C COARSE	120	10	
	769	20x200	C MEDIUM	240	10	
	6341	20x200	89A FINE	400	10	

Triangular file

Vitrified-bonded



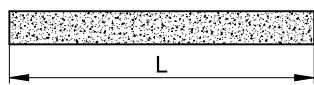
Shape 9020

These files are used in particular for machining tools in the wood and machine construction industries. Thanks to the varying grit sizes you can select the perfect tool for your application. Silicon carbide files are primarily used for tungsten carbide or tungsten carbide tipped tools and are grey-green in colour. Orange is used primarily for all types of steels and stainless steel.

Shape	Type no.	BxL	Specification	Grit size	PU
9020	501	6x100	89A MEDIUM	240	10
	518	6x100	C FINE	400	10
	519	6x100	C MEDIUM	240	10
	505	10x100	89A FINE	400	10
	504	10x100	89A MEDIUM	240	10
	523	10x100	C FINE	400	10
	525	10x100	C MEDIUM	240	10
	511	13x150	89A FINE	400	10
	510	13x150	89A MEDIUM	240	10
	531	13x150	C FINE	400	10
	533	13x150	C MEDIUM	240	10
	8807	16x150	89A FINE	400	10
	512	16x150	89A MEDIUM	240	10
	534	16x150	C FINE	400	10
	536	16x150	C MEDIUM	240	10
	8808	20x200	89A FINE	400	10
	516	20x200	89A MEDIUM	240	10
540	20x200	C FINE	400	10	
542	20x200	C MEDIUM	240	10	

Half round file

Vitrified-bonded



Shape 9040



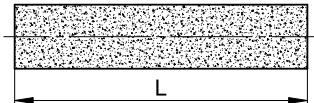
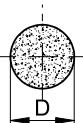
The half round files are used primarily for efficient machining of tools in the wood and machine construction industries. Silicon carbide files are primarily used for tungsten carbide or tungsten carbide tipped tools and are grey-green in colour. Orange is used primarily for all types of steels and stainless steel.

Thanks to the varying grit sizes you can select your tool based on the application.

Shape	Type no.	DxL	Specification	Grit size	PU
9040	6313	6x100	89A MEDIUM	240	10
	603	10x100	89A MEDIUM	240	10
	607	13x150	89A MEDIUM	240	10
	629	13x150	C FINE	400	10
	610	16x150	89A MEDIUM	240	10
	632	16x150	C FINE	400	10
	633	16x150	C MEDIUM	240	10
	637	20x200	C MEDIUM	240	10

Round file

Vitrified-bonded



Shape 9030

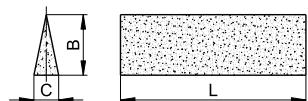


These files are used in particular for machining tools in the wood and machine construction industries. Thanks to the varying grit sizes you can select the perfect tool for your application. Silicon carbide files are primarily used for tungsten carbide or tungsten carbide tipped tools and are grey-green in colour. Orange is used primarily for all types of steels and stainless steel.

Shape	Type no.	DxL	Specification	Grit size	PU
9030	614	6x100	C FINE	400	10
	616	6x100	C MEDIUM	240	10
	660	6x100	89A FINE	400	10
	656	10x100	C FINE	400	10
	664	10x100	89A FINE	400	10
	666	10x100	89A MEDIUM	240	10
	657	13x150	89A FINE	400	10
	671	13x150	89A MEDIUM	240	10
	691	13x150	C FINE	400	10
	693	13x150	C MEDIUM	240	10
	674	16x150	89A MEDIUM	240	10
	696	16x150	C FINE	400	10
	698	16x150	C MEDIUM	240	10

Knife blade file

Vitrified-bonded



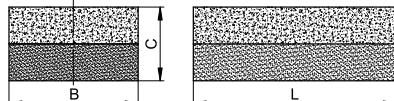
The ceramic knife blade file is used for grinding and whetting knife blades. It is ideally suited for machining blades made of HSS and high-alloyed steels. Thanks to the varying grit sizes you can select your tool based on the application.

Shape 90FMK

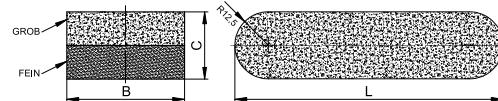
Shape	Type no.	BxL	Specification	Grit size	PU
90FMK	6321	25x3x100	89A FINE	400	10
	6322	25x3x100	89A MEDIUM	240	10
	6324	25x3x100	C MEDIUM	240	10

Combination stone

Vitrified-bonded



Shape 90K



Shape 90SK

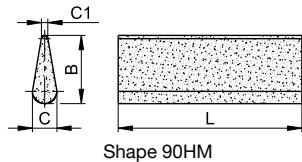
You can use the TYROLIT combination stone for deburring various workpieces. Due to its two different grit sizes, you will always be equipped for the respective application.

This product can also be used for whetting magnetic tables.

Shape	Type no.	BxL	Specification	Grit size	PU
90K	185988	18x10x75	89A KOMBI	120/400	10
	186109	18x10x75	C KOMBI	120/400	10
	642	25x13x100	C KOMBI	120/400	10
	6314	25x13x100	89A KOMBI	120/400	10
	6317	40x20x125	C KOMBI	120/400	10
	640	40x20x125	89A KOMBI	120/400	10
	644	50x25x150	C KOMBI	120/400	10
	645	50x25x200	C KOMBI	120/400	10
	6315	50x25x150	89A KOMBI	120/400	10
	6316	50x25x200	89A KOMBI	120/400	10
90SK	6318	25x20x100	C KOMBI	150/400	10

Hollow chisel stone

Vitrified-bonded

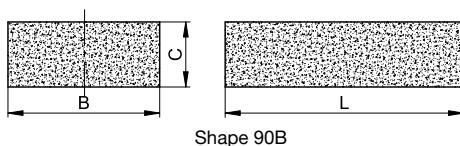


The ceramic hollow chisel stones are ideally suited for whetting narrow-toothed tools. Thanks to the varying grit sizes you can select your tool based on the individual application. Due to the conical shape it is possible for you to grind and deburr right down to the tooth base.

Shape	Type no.	BxC/C1xL	Specification	Grit size	PU
90HM	576	25x6/1x100	89A FINE	400	10
	577	25x6/1x100	89A MEDIUM	240	10
	583	25x6/1x100	C FINE	400	10
	584	25x6/1x100	C MEDIUM	240	10
	579	45x6/2x115	89A MEDIUM	240	10
	587	45x6/2x115	C MEDIUM	240	10
	9017	45x6/2x115	C FINE	400	10
	15885	45x6/2x115	89A FINE	400	10
	578	45x10/3x100	89A FINE	400	10
	586	45x10/3x100	C MEDIUM	240	10
	6309	45x10/3x100	89A MEDIUM	240	10
	6310	45x10/3x100	C FINE	400	10
	28465	45x10/3x100	89A SUPER T3	1200	10
	20332	50x16/5x150	C FINE	400	10

Bench stone

Vitrified-bonded



The TYROLIT bench stones are primarily used for sharpening and whetting knives and blades. They are therefore perfectly suited for all gardening and woodworking tools. Thanks to the varying grit sizes you can select your tool based on the individual application.

Shape	Type no.	BxCxL	Specification	Grit size	PU
90B	486453	25x10x150	89A 120 H7AV 237 P8		10
	469	25x13x100	C MEDIUM	240	10
	8804	25x13x100	89A MEDIUM	240	1
	20313	25x13x100	C FINE	400	10
	20311	25x6x100	C FINE	400	10
	28466	45x13x100	89A SUPER T3	1200	1
	456	50x25x150	89A MEDIUM	240	1
	457	50x25x150	89A FINE	400	1
	479	50x25x150	C FINE	400	1





Bench stone

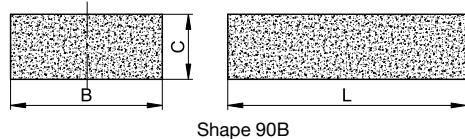
Vitrified-bonded



Shape	Type no.	BxCxL	Specification	Grit size	PU
90B	481	50x25x150	C MEDIUM	240	1
	28467	50x25x150	89A SUPER T3	1200	1
	461	50x25x200	89A FINE	400	1
	462	50x25x200	89A MEDIUM	240	1
	485	50x25x200	C MEDIUM	240	1
	486	50x25x200	C FINE	400	1

COARSE bench stone

Vitrified-bonded



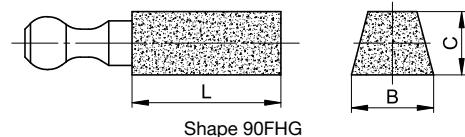
Coarse bench stones from TYROLIT can be used to deburr large workpieces that have no surface quality requirements.

For example, these bench stones are used for pre-grinding large woodworking tools such as wood splitters.

Shape	Type no.	BxCxL	Specification	Grit size	PU
90B	29382	50x25x200	1C 24 M5 V15	24	10
	103622	50x25x200	1C 36 L5 V15	36	10
	28869	50x50x200	1C 24 M5 V15	24	10

File with handle

Vitrified-bonded



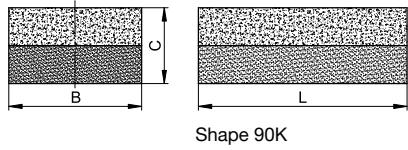
The file with handle from TYROLIT can be used to deburr large workpieces that have no surface quality requirements.

For example, these bench stones are used for pre-grinding large woodworking tools such as wood splitters.

Shape	Type no.	BxCxL	Specification
90FHG	79664	40x30x230	C 70 O5 V18

Combined rubbing brick for tiles

Vitrified-bonded

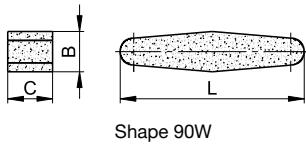


The rubbing brick for tiles in shape 90K facilitates deburring and creating a bevelled edge on flags and tiles. Using the rubbing brick in shape 90RH you can machine and smooth floor screeds, concrete and plaster mixtures with ease. You can achieve even surfaces when smoothing window and door lintels before coating them. It is also possible to work difficult-to-reach places with ease.

Shape	Type no.	BxCxL	Specification
90K	175220	80x30x160	C 24 M5 V15/C 70 L5 V15
	146640	120x30x200	C 24 M5 V15/C 70 L5 V15
90RH	20450	90x40x205	1C 24 L5 V15

Whetstone

Vitrified-bonded

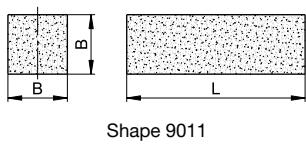


Our whetstones are used for re-sharpening scythes and sickles. This tool is only available in a silicon carbide version.

Shape	Type no.	BxCxL	Specification
90W	362775	35x13x230	AC-V

Square file

Elastic-bonded

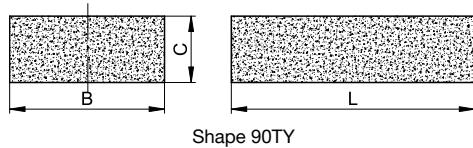


The elastic-bonded square file can be used to lightly deburr and polish workpieces. Due to its composition it can be used on the widest variety of materials. Select coarse grain for light deburring or fine grain for polishing, depending on the application.

Shape	Type no.	BxL	Specification	PU	Comments
9011	35677	15x100	C 80 - BE15	10	Deburring (COARSE)
	6335	20x100	C 400 - BE15	10	Polishing (FINE)

TYFIX hand rubbing brick

Elastic-bonded



The TYFIX hand rubbing brick is an eraser used to improve surfaces. Its main tasks include deburring, polishing, and removing rust, dirt and paint. The TYFIX is especially suited for use in the home to clean domestic appliances, pans, etc. made of stainless steel and aluminium. It can also be used to clean tile joints.



Lappers

Resin-bonded



The resin-bonded lappers are primarily used for deburring and lapping extremely hard materials. They are therefore the common choice for whetting tungsten carbide cutting edges.

This product is only available in a diamond grain version with a grit size of D35.



Diamond files

Galvanic-bonded



These galvanic-bonded diamond files are primarily used for machining hardened steels and tungsten carbide. However, they are also suitable for glass, ceramics and materials above 40 HRC.

This product is only available in a diamond grain design with a grit size of

D126 and is standard equipment for every toolmaker. Fine grit sizes are available on request.



Shape	Type no.	L	L2-W-X/Y/AUFN	Specification	File shape
90N	136535	140	70-3.6-1.5x2.92X70	D 126 GST	Triangular
	477283	140	70-2.4x3X70	D 126 GST	Square
	477289	140	70-5-1.5x3X70	D 126 GST	Flat point
	477422	140	70-5-1.5x3X70	D 126 GST	Flat
	477430	140	70-5-2x3X70	D 126 GST	Half round

1.7 Bench grinding wheels **Bench grinders**





Bench grinding wheels

The bench grinder is a versatile machine used in many workshops for machining various materials. The TYROLIT range of bench grinding wheels therefore contains the right wheel for every material.

Wheels with the universal application specification impress in particular through their smooth running and

easy handling. A reduction bush set is included in each package for proper assembly. The packaging itself is suit-

able for stacking on racks and thus saves space and storage costs.

Application recommendation

Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding	Page
	Unhardened Hardened		Unhardened Hardened								
10A	●	●						●	●		78, 79
89A		●	●	●	●			●	●		80, 81
C			●	●	●	●		●	●		82, 83, 84

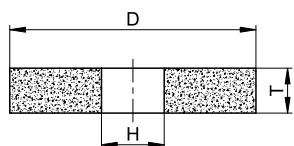
● Extremely suitable

● Limited suitability

Application tips

- Grinding unhardened, low-alloyed steels with regular aluminium oxide = 10A
- Regrinding HSS tools with white aluminium oxide = 89A
- Sharpening cemented carbide tipped tools only with silicon carbide = C

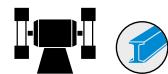
Shapes



Shape 1

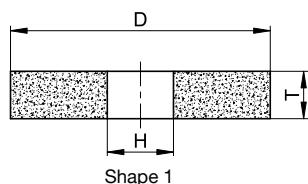
Bench grinding wheels

Conventional ceramic for non and low-alloyed steels



Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
		Unhardened Hardened	Unhardened Hardened							
10A		●	●					●	●	

Recommended stock type



Vitrified bonded bench grinding wheels are primarily used in workshops and repair companies. They can be used universally for grinding and sharpening various components. The specially tailored specifications enable them to be used for a wide range of applications, from coarse to fine grinding.

These wheels are delivered in packaging suitable for retailers so that they take up minimum space in storage. A reduction bush set is included in the packaging and can be reordered.

Shape	Type no.	DxTxH	Specification	Vmax m/s
1	7205	150x20x32	10A 46 N5A V217	40
	2693	150x20x32	10A 60 M5A V217	40
	52223	150x25x32	10A 46 N5A V217	40
	2758	150x25x32	10A 60 M5A V217	40
	2962	175x25x32	10A 60 M5A V217	40
	68134	175x25x51	10A 60 M5A V217	40
	548815	175x32x32	10A 60 M5A V217	40
	600134	200x20x32	10A 36 N5A V217	40
	15842	200x20x32	10A 46 N5A V217	40
	15839	200x20x32	10A 60 M5A V217	40
	781702	200x20x51	10A 60 M5A V217	40
	31694	200x25x32	10A 46 N5A V217	40
	502978	200x25x31,75	10A 60 N5A V217	40
	9572	200x25x32	10A 60 M5A V217	40
	3217	200x25x32	10A 80 M5A V217	40
	116708	200x25x51	10A 46 N5A V217	40
	718361	200x25x51	10A 60 M5A V217	40
	664256	200x32x51	10A 36 N5A V217	40
	675264	200x32x51	10A 46 N5A V217	40
	516594	200x32x51	10A 60 M5A V217	40
	3474	250x25x32	10A 60 M5A V217	40
	664261	250x32x32	10A 36 N5A V217	40
	3538	250x32x32	10A 60 M5A V217	40
	737812	250x32x51	10A 60 M5A V217	40
	110032	300x40x51	10A 60 M5A V217	40
	34983	300x40x76	10A 60 M5A V217	40



◀ Alternative stock type

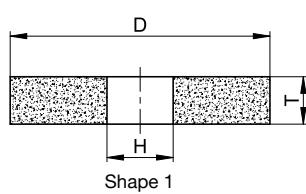
Shape	Type no.	DxTxH	Specification	Vmax m/s
1	34046758	125x15x32	10A 36 M5A V17	40
	34046770	125x15x32	10A 60 M5A V17	40
	147626	125x20x32	10A 60 M5A V17	40
	147698	125x20x32	10A 36 M5A V17	40
	34046759	150x15x32	10A 36 M5A V17	40
	34046772	150x15x32	10A 60 M5A V17	40
	146965	150x20x32	10A 601 M5A V217	40
	147574	150x20x32	10A 36 P5A V17	40
	147601	150x25x32	10A 36 P5A V17	40
	16577	175x20x32	10A 36 P5A V17	40
	147600	175x25x32	10A 36 P5A V17	40
	147656	200x20x40	10A 36 P5A V17	40
	146910	200x25x32	10A 361 P5A V17	40
	147652	200x25x51	10A 36 P5A V17	40
	34046763	200x32x40	10A 36 P5A V17	40
	34046781	200x32x40	10A 60 M5A V17	40
	34046764	250x25x40	10A 36 P5A V17	40
	34046765	250x32x40	10A 36 P5A V17	40
	147701	250x32x51	10A 36 P5A V17	40
	34046785	300x40x40	10A 60 M5A V17	40
	32981	350x50x127	10A 24 Q5A V17	40

Bench grinding wheels Conventional ceramic for high-alloyed steels and HSS



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
		Unhardened Hardened	Unhardened Hardened							
89A		●	●	●	●			●	●	

Recommended stock type



This wheel is preferable for grinding and sharpening temperature-sensitive steels and HSS tools. The use of aluminium oxide results in particularly cool grinding so that the workpiece is not subjected to additional thermal load.

We offer a wide spectrum of dimensions to cover the most common applications. A reduction bush set is included in the packaging and can be reordered.



◀ Recommended stock type

Shape	Type no.	DxTxH	Specification	Vmax m/s
1	34046786	125x15x32	89A 60 L5A V217	40
	2536	125x20x32	89A 60 M5A V217	40
	281719	125x20x32	89A 80 M5A V217	40
	449559	125x20x32	89A 46 M5A V217	40
	14515	150x4x20	89A 60 J5A V217	40
	664052	150x13x25	89A 80 M5A V217	40
	34046788	150x15x32	89A 60 L5A V217	40
	2697	150x20x32	89A 46 M5A V217	40
	2699	150x20x32	89A 60 M5A V217	40
	764468	150x20x32	89A 80 M5A V217	40
	2762	150x25x32	89A 60 M5A V217	40
	147614	150x25x32	89A 80 L5A V217	40
	853353	150x25x32	89A 46 M5A V217	40
	2916	175x20x32	89A 60 M5A V217	40
	543615	175x20x32	89A 80 M5A V217	40
	2973	175x25x32	89A 80 L5A V217	40
	16022	175x25x32	89A 60 M5A V217	40
	377415	175x25x51	89A 80 M5A V217	40
	723118	175x25x51	89A 60 M5A V217	40
	3020	175x32x32	89A 60 M5A V217	40
	918448	175x32x32	89A 80 M5A V217	40
	541741	200x10x32	89A 60 L5A V217	40
	471114	200x20x31,75	89A 60 M5A V217	40
	3142	200x20x32	89A 46 M5A V217	40
	3145	200x20x32	89A 60 M5A V217	40
	820958	200x20x32	89A 80 M5A V217	40
	664048	200x20x51	89A 46 M5A V217	40
	826839	200x20x51	89A 80 M5A V217	40
	841086	200x20x51	89A 60 M5A V217	40
	3224	200x25x32	89A 60 M5A V217	40
	3220	200x25x32	89A 46 M5A V217	40
	39540	200x25x32	89A 60 M5A V217	40
	129550	200x25x32	89A 80 M5A V217	40
	33435	200x25x51	89A 80 L5A V217	40
	50184	200x25x51	89A 46 M5A V217	40
	534539	200x25x51	89A 60 M5A V217	40
	34046791	200x32x40	89A 60 L5A V217	40
	78379	200x32x51	89A 80 M5A V217	40
	99864	200x32x51	89A 46 M5A V217	40





Shape	Type no.	DxTxH	Specification	Vmax m/s
1	723117	200x32x51	89A 60 M5A V217	40
	831179	250x25x32	89A 60 M5A V217	40
	3545	250x32x32	89A 60 M5A V217	40
	126665	250x32x32	89A 80 M5A V217	40
	111799	250x32x51	89A 60 M5A V217	40
	34046794	300x40x40	89A 60 L5A V217	40
	867598	300x40x51	89A 60 M5A V217	40
	30840	300x40x76	89A 60 M5A V217	40
	1F	250x10x20	89A 60 L5A V217	40

Alternative stock type

Shape	Type no.	DxTxH	Specification	Vmax m/s
1	73667	150x10x20	89A 80 L5A V55	40
	103872	150x20x16	89A 60 M5A V55	40
	413774	150x20x20	89A 60 L5A V217	40
	7210	150x20x32	89A 60 K5A V217	40
	462826	175x20x20	50A 60 M8A V217	40
	122996	200x20x20	89A 60 L5A V217	40
	184247	200x20x20	89A 60 M5A V55	40
	3144	200x20x32	89A 60 K5A V217	40
	16615	200x20x32	89A 46 K5A V217	40
	68340	200x25x20	89A 60 M5A V55	40
	122997	200x25x20	89A 60 L5A V217	40
	3222	200x25x32	89A 60 K5A V217	40
	7374	200x25x32	89A 80 L5A V217	40
	146630	200x25x32	89A 461 K5A V217	40
	407610	250x10x32	89A 60 K5A V217	40
	127554	300x32x127	89A 602 K5A V217	40

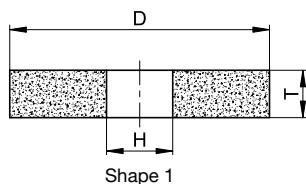
Bench grinding wheels

Conventional ceramic for tungsten carbide and cast iron



Specifica-	Alumin-	Non and low-alloyed	High-alloyed steels	HSS	INOX	Tungsten	Industrial	Cast iron	Dry	Wet
tion	ium	steels				carbide	ceramics		grinding	grinding
		Unhardened Hardened	Unhardened Hardened							
C				●	●	●	●	●	●	●

Recommended stock type



When sharpening solid carbide or tungsten carbide tipped tools, only wheels with silicon carbide specifications should be used. Due to their special grain shape you can achieve good results even on extremely hard workpieces.

This wheel can also be used for cast iron. A reduction bush set is included in the packaging and can be reordered.

Recommended stock type



Shape	Type no.	DxTxH	Specification	Vmax m/s
1	706631	125x15x32	C 602 J5 V15	40
	2529	125x20x32	C 80 J5 V15	40
	664185	150x13x25	C 80 J5 V15	40
	56155	150x16x32	C 80 J5 V15	40
	2658	150x20x20	C 80 J5 V15	40
	2680	150x20x32	C 46 K5 V15	40
	123633	150x20x32	C 80 J5 V15	40
	861009	150x20x32	C 60 K5 V15	40
	2751	150x25x32	C 46 K5 V15	40
	2753	150x25x32	C 80 J5 V15	40
	333180	150x25x32	C 60 K5 V15	40
	34165304	150x32x32	C 602 J5 V15	40
	34364771	175x8x12,7	C 60 J5 V15	40
	2905	175x20x32	C 80 J5 V15	40
	2956	175x25x32	C 80 J5 V15	40
	9653	175x25x51	C 80 J5 V15	40
	76712	200x10x32	C 80 J5 V15	40
	7348	200x20x20	C 80 J5 V15	40
	3132	200x20x32	C 46 K5 V15	40
	3135	200x20x32	C 80 J5 V15	40
	596597	200x20x32	C 60 K5 V15	40
	837436	200x20x51	C 46 K5 V15	40





Shape	Type no.	DxTxH	Specification	Vmax m/s
1	872497	200x20x51	C 80 J5 V15	40
	3186	200x25x20	C 80 J5 V15	40
	3206	200x25x32	C 46 K5 V15	40
	3210	200x25x32	C 80 J5 V15	40
	819893	200x25x32	C 60 K5 V15	40
	263506	200x25x51	C 60 K5 V15	40
	822622	200x25x51	C 80 J5 V15	40
	103851	200x25x76,2	C 80 J5 V15	40
	34165307	200x32x40	C 602 J5 V15	40
	9651	200x32x51	C 80 J5 V15	40
	879608	200x32x51	C 46 K5 V15	40
	75079	250x25x32	C 80 J5 V15	40
	49680	250x25x76	C 80 J5 V15	40
	58964	250x32x32	C 80 J5 V15	40
	822623	250x32x51	C 80 J5 V15	40
	822624	300x40x51	C 80 J5 V15	40
	9652	300x40x76	C 80 J5 V15	40

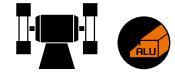
Alternative stock type

Shape	Type no.	DxTxH	Specification	Vmax m/s
1	34344299	75x20x20	C80 J5 V15	40
	11182	150x20x32	C 120 J5 V15	40
	146906	150x20x32	C 801 J5 V15	40
	450328	150x20x32	C 60 J5A V15	40
	146644	150x25x32	C 801 J5 V15	40
	3208	200x25x32	C 60 J5 V15	40
	72045	203x20x32	C 120 J5 V15	40
	59861	203x25x32	C 120 J5 V15	40
	28584	350x32x127	C 60 J5 V15	40

Bench grinding wheels

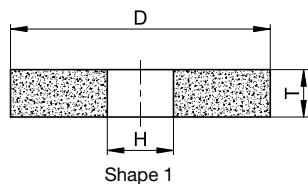
Conventional ceramic

for nonferrous metals



Specifica-	Alumin-	Non and low-alloyed	High-alloyed steels	HSS	INOX	Tungsten	Industrial	Cast iron	Dry	Wet
tion	ium	steels				carbide	ceramics		grinding	grinding
		Unhardened Hardened	Unhardened Hardened							
C		●				●		●	●	

Recommended stock type



An inhouse-developed clean-cutting specification for bench grinding wheels enables the grinding of nonferrous metals such as aluminium, aluminium base alloys, bronze, copper, copper alloys and titanium. High-quality silicon carbide provides for effortless surface grinding and deburring of workpieces. Through minimal clogging of the grinding wheel, dressing times are reduced and dressing cycles prolonged.

Shape	Type no.	DxTxH	Specification	PU
1	34287482	125x20x32	C46 H5A V18	1
	34287483	150x20x32	C46 H5A V18	1
	34287484	150x25x32	C46 H5A V18	1
	34287485	175x20x32	C46 H5A V18	1
	34287486	175x25x32	C46 H5A V18	1
	34287487	175x25x51	C46 H5A V18	1
	34287488	200x20x32	C46 H5A V18	1
	34287489	200x25x32	C46 H5A V18	1
	34287490	200x25x51	C46 H5A V18	1
	34287491	200x32x51	C46 H5A V18	1

Floorstand grinder accessories

Reduction bushes

The enclosed reduction bush set minimises the range of tools required and saves on storage space. Reduction bushes are available free of charge to

be used with all bench grinding wheels.

Shape	Type no.	DxTxH
100RR	111434	32x19x16
	667841	51x10x31.75
	911408	51x9x32
	111436	76x9x40



1.8 Sharpening and polishing wheels

Bench grinders



Sharpening and polishing wheels

The bench grinder is a versatile machine used in many workshops for machining various materials. The TYROLIT range of bench grinding wheels therefore contains the right wheel for every material.

TYROLIT sharpening and polishing wheels are particularly elastic and provide for easy profiling. On the basis of their structure, they can quickly create the finest surfaces. When used

at the recommended speed, they provide for a long tool lifespan and particularly cool grinding. Through their use, you improve the cutting ability of your cutting tools and

benefit from the easiest handling. In this way, your tool cutting edges are quickly resharpened.

Application recommendation

Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding	Page
Unhardened Hardened						Unhardened Hardened					
C		●	●	●	●	●	●	●	●	●	88
C	●	●	●	●	●	●	●	●	●	●	89

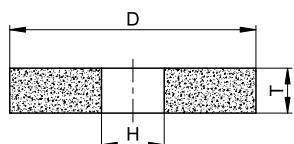
● Extremely suitable

● Limited suitability

Application tips

- Polishing steel, nonferrous heavy metal, precious metal and sintered metal or plastic (C240-BE15)
- Fine grinding of various precision mechanical components, like watches, glasses, medical technology (C150-BE13)
- Effect grinding (C46-BE16 and C46-BE19F)
- Deburring (C80-BE15)
- Whetting of all kinds of kitchen and pocket knives (C400-BE15)
- Not suitable for sharp edges, large burrs or high stock removal
- For whetting, deburring and sharpening knives, splitting tools and axes (C400-BE15)
- Dressing stone (ceramic bond) for elastic grinding wheels (see chapter "Dressing and sharpening")
- Vs = 16–32 m/s maximum operating speed for floor-stand grinding

Shapes



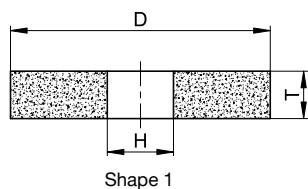
Shape 1

Sharpening wheel for cutting tool for steel, HSS, stainless steel and tungsten carbide



Specifica-	Alumin-	Non and low-alloyed	High-alloyed steels	HSS	INOX	Tungsten	Industrial	Cast iron	Dry	Wet
tion	ium	steels				carbide	ceramics		grinding	grinding
		Unhardened Hardened	Unhardened Hardened							
C		●	●	●	●	●	●	●	●	●

Recommended stock type



This product was specially developed for sharpening whittlers. Its grit size and tailored bond system enable you to achieve particularly cool grinding. Its fine surface improves the cutting ability and lifetime of the cutting tools.

Ensure that you pay attention to the rotation direction of the wheel when in use. **The sharpening wheel must always move away from the cutting edge. In addition, the wheel flange diameter must be at least two thirds of the wheel diameter.**

Shape	Type no.	DxTxH	Specification	Vmax m/s	Degree of hardness	Comments
1	10016	125x20x32	C 800 - BE11	25	Medium	Sharpening of whittlers
	7133	125x25x20	C 800 - BE11	25	Medium	
	2540	125x25x32	C 800 - BE11	25	Medium	
	669110	150x20x20	C 800 - BE11	25	Medium	
	7204	150x20x32	C 800 - BE11	25	Medium	
	669109	175x20x32	C 800 - BE11	25	Medium	

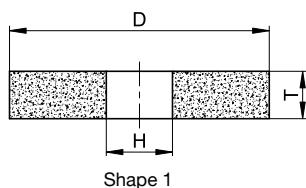
Fine grinding and polishing wheels

for steel, HSS, stainless steel, tungsten carbide and cast iron



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
C		●	●	●	●	●	●	●	●	●

Recommended stock type



The soft elastic specification of this wheel means it perfectly follows the contours of the work-piece and does not alter the surface geometry. It can be used for polishing, fine grinding, effect grinding, deburring, matting and whetting. However, it is not suitable for large burrs or high stock removal rates.



Shape	Type no.	DxTxH	Specification	Vmax m/s	Degree of hardness	PU	Comments
1	19435	125x20x20	C 400 - BE15	20	Medium	1	Sharpening of kitchen knives
	7203	150x20x32	C 400 - BE15	20	Medium	1	
	22411	200x25x32	C 400 - BE15	20	Medium	1	
	802276	150x10x25	C 150 - BE13	16	Soft	1	
	2661	150x20x20	C 150 - BE15	20	Medium	1	
	71212	150x20x20	C 400 - BE16	32	Hard	1	
	7186	150x20x20	C 80 - BE15	20	Medium	1	Surface improvement on pre-ground workpieces (low stock removal)
	22257	150x20x32	C 150 - BE16	32	Soft	1	
	320369	200x25x20	C 240 - BE15	20	Medium	1	
	7362	200x25x20	C 80 - BE15	20	Medium	1	
	32765	200x25x32	C 150 - BE15	20	Medium	1	



1.9 Saw sharpening tools

Saw sharpening





Saw sharpening

Only a sharp tool is a good tool. For this reason, TYROLIT produces an extensive range of grinding wheels for sharpening saws.

This spans everything from conventional grinding wheels through to diamond and CBN grinding tools. In conjunction with its proven application engineering service, TYROLIT

provides specific solutions that ensure maximum customer benefit. Specially selected grain qualities and innovative bond systems with efficient grinding wheel design guarantee

optimum quality at the cutting edges. TYROLIT is therefore your competent partner in the saw industry.

Application recommendation

Specification	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding	Page
	Unhardened Hardened		Unhardened Hardened								
SA				●	●				●	●	96, 97, 98
A	●	●							●	●	97
88A, 89A, 50A		●		●	●				●	●	95, 96, 98, 99
455A, 765A			●						●	●	97, 98
52A	●								●	●	97, 98
D						●			●	●	100, 101, 102, 104, 105
B			●	●					●	●	103, 104, 105
89A, 455A				●					●	●	104
55AC, 454A				●						●	106
C				●		●				●	105, 106

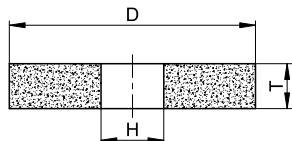
● Extremely suitable

● Limited suitability

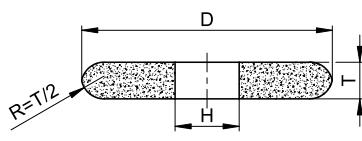
Application tips

↳ Operating speed: 25–40 m/s

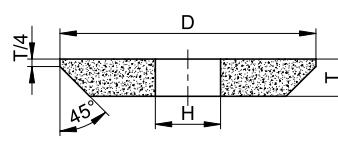
Shapes



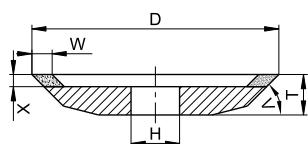
Shape 1



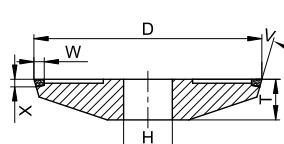
Shape 1F



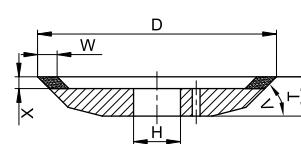
Shape 1C



Shape 4V2

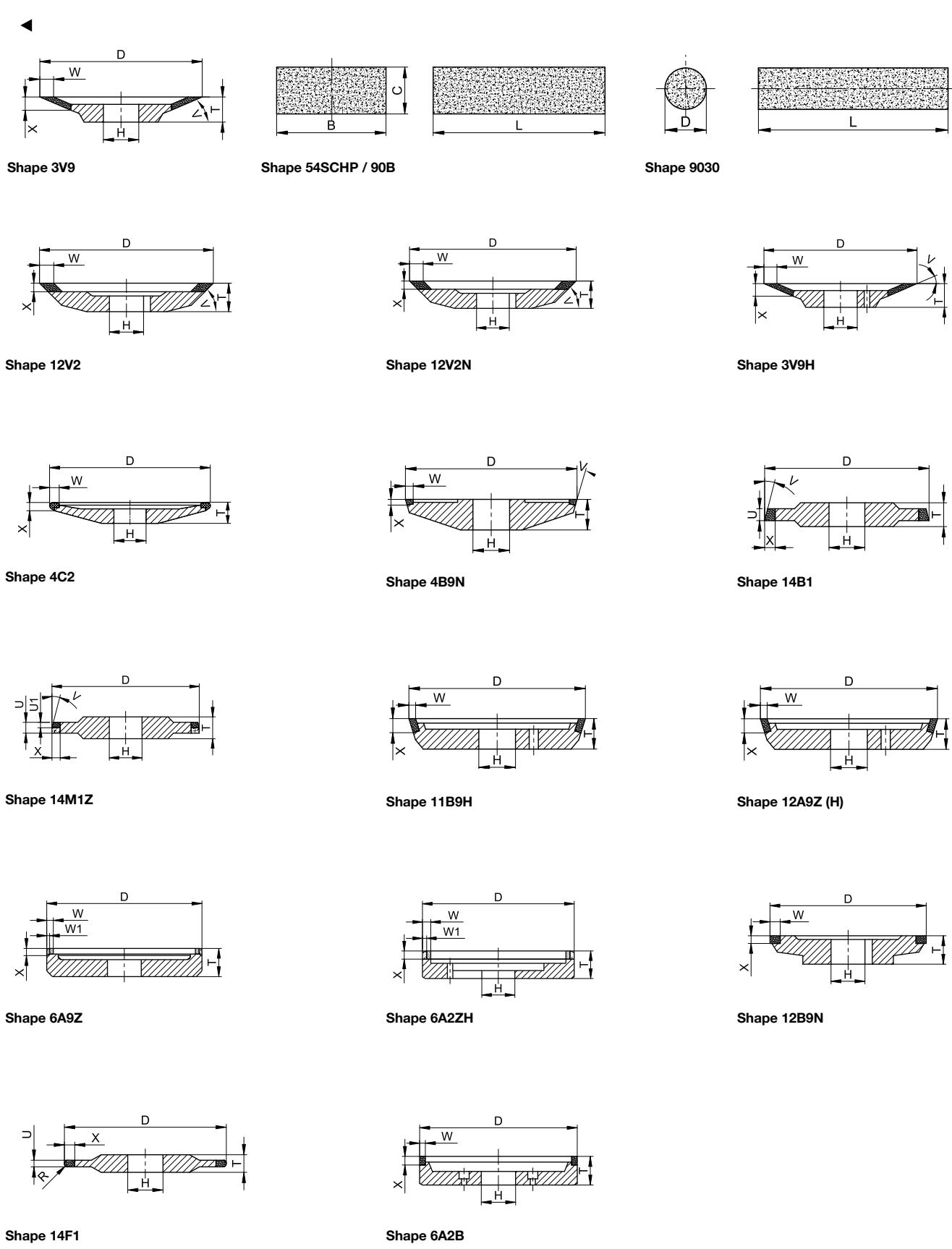


Shape 4B9



Shape 4V2H



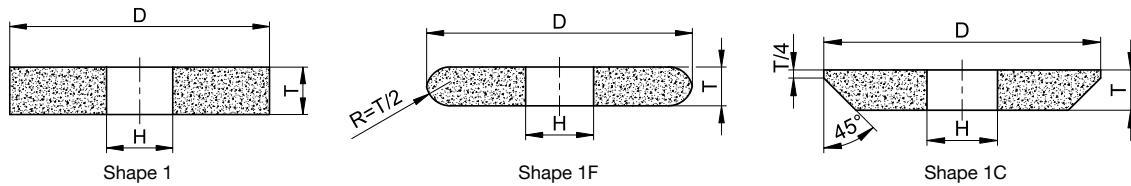


Grinding tools for automatic saw for circular saws, stellite band and gang saws



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
SA				●	●				●	●
A	●	●							●	●
88A, 89A		●		●	●				●	●
455A, 765A				●						●
52A	●								●	●

Recommended stock type



TYROLIT sells a wide assortment of tools tailored to various grinding machines and tooth pitches. They are suitable for dry and wet grinding for HSS, chrome vanadium and stellite saws.

The products are available with different edge profiles; shape 1, 1F, 1C, in diameters ranging from 150 to 350 mm.

Shape	Type no.	DxTxH	Specification	Vmax m/s	Comments	PU
1	18825	150x3x30	88A 80 M5A V217	40		10
	55375	150x3x32	88A 80 M5A V217	40		10
	9293	150x4x20	88A 80 M5A V217	40		10
	291120	150x4x32	88A 80 M5A V217	40		10
	719904	150x6x38	88A 60 K5A V217	40		10
	490222	150x6x38	88A 80 K5A V217	40		10
	448604	200x2,5x32	88A 80 M5A V217	40		10
	59872	200x6x32	88A 60 K4 V217	40		10
	448603	200x2x32	88A 80 M5A V217	40		10
	7318	200x3x32	88A 80 M5 V217	40		10
1F	370493	145x3x22	88A 60 M5A V217	40		1
	1	59667	150x5x32	89A 60 M5 V217	40	10
	455120	150x5x32	89A 60 M5A V217	40		10
	305800	150x6x32	89A 60 M5A V217	40		10
	10265	150x10x32	89A 60 M5A V217	40		10
	455124	150x8x32	89A 60 M5A V217	40		10
	719906	175x3x51	89A 60 M5A V217	40		10
	50844	175x4x51	89A 60 M5A V217	40		10
	123222	175x6x51	89A 60 M5A V217	40		10
	50845	175x8x51	89A 60 M5A V217	40		10





Recommended stock type

Shape	Type no.	DxTxH	Specification	Vmax m/s	Comments	PU
1	294034	180x6x31,75	89A 60 K5A V217	40		10
	3085	200x10x20	89A 60 M5A V217	40		10
	3091	200x10x32	89A 60 K5A V217	40		10
	3092	200x10x32	89A 60 M5 V217	40		10
	608080	200x10x32	89A 60 M5A V217	40		10
	762445	200x10x32	89A 60 M5A V217 E5	40	Lateral face impregnation	10
	51494	200x13x32	89A 60 M5A V217	40		10
	3070	200x6x20	89A 60 M5A V217	40		10
	110554	200x6x32	89A 60 K5A V217	40		10
	7328	200x6x32	89A 60 M5 V217	40		10
	107050	200x6x32	89A 60 M5 V227	40		10
	3077	200x8x20	89A 60 M5A V217	40		10
	525686	200x8x32	89A 60 M5A V217	40		10
	3424	250x10x20	89A 60 M5A V217	40		10
	461239	250x10x32	89A 60 M5A V217 E5	40	Lateral face impregnation	10
	33249	250x13x20	89A 60 M5A V217	40		10
	719922	250x13x32	89A 60 M5A V217	40		10
1C	28549	200x10x32	89A 60 M5A V217	40		10
1	20917	125x2x32	SA 80 L4 VN-M OD	63		10
	292129	150x1,5x32	SA 80 L4 VN-M OD	63		10
	441301	150x10x32	SA 60 L5 VN-M OD	63		10
	123688	150x2,5x32	SA 80 L4 VN-M OD	63		10
	935730	150x2x32	SA 80 L4 VN-M OD	63		10
	47009	150x3x32	SA 80 L4 VN-M OD	63		10
	226295	150x3x32	SA 80 L5 VN-M OD	63		10
	47010	150x4x32	SA 80 L4 VN-M OD	63		10
	159000	150x4x32	SA 80 L5 VN-M OD	63		10
	78052	150x4,76x15,87	SA 80 L5 VN-M OD	63		10
	667182	150x5x32	SA 80 L5 VN-M OD	63		10
	946904	150x6x32	SA 60 L5 VN-M OD	63		10
	47005	150x6x32	SA 80 L4 VN-M OD	63		10
	27867	150x6x32	SA 60 K5 VN-M OD	63		10
	680277	150x6x38	SA 60 K5 VN-M OD	63		10
	740907	150x6x38	SA 80 J5 VN-M OD	63		10
	740912	150x6x38	SA 60 J5 VN-M OD	63		10
	761917	150x6x38	SA 60 K5 VN-M OD	63		10
	17256	150x6x38	SA 60 K5 VN-M OD	63		10
	441302	150x8x32	SA 60 L5 VN-M OD	63		10
	614332	175x3x51	SA 80 L4 VN-M OD	63		10





Shape	Type no.	DxTxH	Specification	Vmax m/s	Comments	PU
1	922647	200x1,5x32	SA 80 L4 VN-M OD	63		10
	804963	200x1,75x32	SA 80 L4 VN-M OD	63		10
	922857	200x2x32	SA 80 L4 VN-M OD	63		10
	922858	200x2,25x32	SA 80 L4 VN-M OD	63		10
	922860	200x3x32	SA 80 L5 VN-M OD	63		10
	804979	200x10x32	SA 60 L5 VN-M OD	63		10
	867603	200x2,5x32	SA 80 L4 VN-M OD	63		10
	922857	200x2x32	SA 80 L4 VN-M OD	63		10
	804957	200x3,5x32	SA 80 L5 VN-M OD	63		10
	922860	200x3x32	SA 80 L5 VN-M OD	63		10
	804945	200x4x32	SA 80 L5 VN-M OD	63		10
	804993	200x5x32	SA 60 L5 VN-M OD	63		10
	805000	200x6x32	SA 60 L5 VN-M OD	63		10
	804976	200x8x32	SA 60 L5 VN-M OD	63		10
	54153	250x10x32	SA 60 L5 VN-M OD	63		10
	901252	250x3x32	SA 80 L4 VN-M OD	63		10
	901254	250x4x32	SA 80 L4 VN-M OD	63		10
	901256	250x5x32	SA 60 L5 VN-M OD	63		10
	901258	250x6x32	SA 60 L5 VN-M OD	63		10
	73343	250x10x32	SA 60 L5 VN-M OD	63		10
	437634	250x10x32	52A 54 M5A V217 E5	63	Lateral face impregnation	10
						10
Shape	Type no.	DxTxH	Specification	Vmax m/s	Comments	
1	237227	250x10x32	M455A 609 M7 B82	63		
	226682	300x10x30	M455A 802 M6 B22	63		
	527875	300x10x32	M455A 609 L7 B82	63		
	241857	300x10x32	M455A 809 K6 B22	63		
	313636	300x10x40	M455A 609 M7 B82	63		
	179959	300x10x40	M455A 80 M6 B22	63		
	223733	300x12x40	M455A 609 M7 B82	63		
	471747	300x12x40	M455A 802 M6 B22	63		For stellite band and gang saws
	267138	300x12x40	M455A 809 M6 B22	63		
	485953	300x8x32	M455A 80 M6 B22	63		
	487467	350x10x127	M455A 80 M6 B22	63		
	226679	350x10x127	M455A 802 M6 B22	63		
	226680	350x13x127	M455A 802 M6 B22	63		
	34340601	250x10x32	765A 609P7B100	63		
	34340604	300x12x40	765A 609P7B100	63		

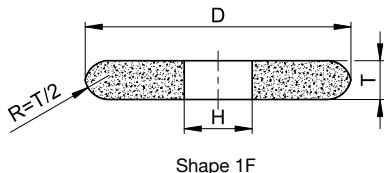




Recommended stock type

Shape	Type no.	DxTxH	Specification	Vmax m/s	Comments
1	34340599	300x8x32	765A 801P6B100	63	For stellite band and gang saws
	34340602	300x8x32	765A 609P7B100	63	
	34340596	350x10x40	765A 801P6B100	63	
	34340598	350x10x127	765A 801P6B100	63	
	34340597	350x10x32	765A 609P6B100	63	
	34340600	350x13x127	765A 801P6B100	63	
1F	150403	200x10x32	M455A 609 M7 B82	63	For stellite band and gang saws
	476545	250x12x32	M455A 609 M7 B82	63	
	150402	300x10x32	M455A 609 L7 B82	63	
	34340579	200x10x32	765A 609P7B100	63	
Shape	Type no.	DxTxH	Specification	Vmax m/s	Comments
1F	805007	200x8x32	SA 60 K5 VN-M OD	63	10
	805008	200x10x32	SA 60 K5 VN-M OD	63	10
	805015	250x13x32	SA 60 K5 VN-M OD	63	10
	805017	250x8x32	SA 60 K5 VN-M OD	63	10
	805018	250x10x32	SA 60 K5 VN-M OD	63	10
	805019	250x12x32	SA 60 K5 VN-M OD	63	10
	804983	200x10x32	SA 60 L5 VN-M OD	63	10
	804986	200x8x32	SA 60 L5 VN-M OD	63	10
1C	161678	250x10x20	88A 60 N4A V217/89A 60 40 M5A V217	40	10
	162874	200x12x20	88A 60 N4A V217/89A 60 40 M5A V217	40	10
	172352	175x8x20	88A 60 N4A V217/89A 60 40 M5A V217	40	10
	719918	200x10x20	88A 60 N4A V217/89A 60 40 M5A V217	40	Two-layer wheels
	720012	200x10x32	88A 60 N4A V217/89A 60 40 M5A V217	40	10

Grinding tool for chain saw sharpening machines for steel



With this wheel you receive a precise product that will significantly increase the lifetime of your chain saws. The profile radius of this product corresponds to half the wheel width and is optimally tailored to the tooth base radius. This tool is suited for dry grinding with an edge profile shape 1F and a 140 mm diameter.

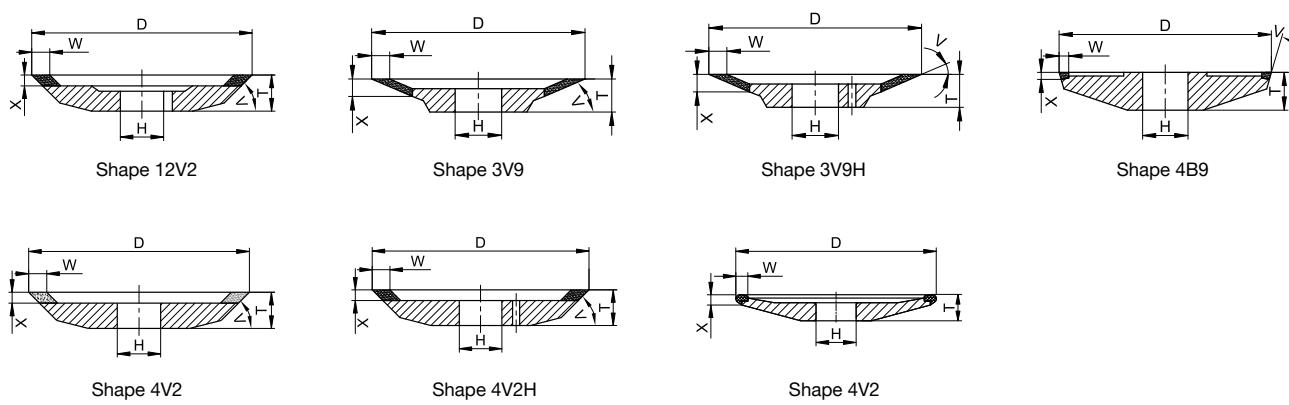


Resin-bonded diamond grinding wheels for chip surface grinding (tooth-face grinding) for tungsten carbide



Specific- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							

Recommended stock type





Recommended stock type

TYROLIT offers a wide assortment of tools tailored to various grinding machines for narrow and wide tooth pitches due to their adapted diamond section thicknesses and core shapes. This enables you to achieve perfect surface geometries.

This product is available for all standard sharpening machines in 100–200 mm diameters.

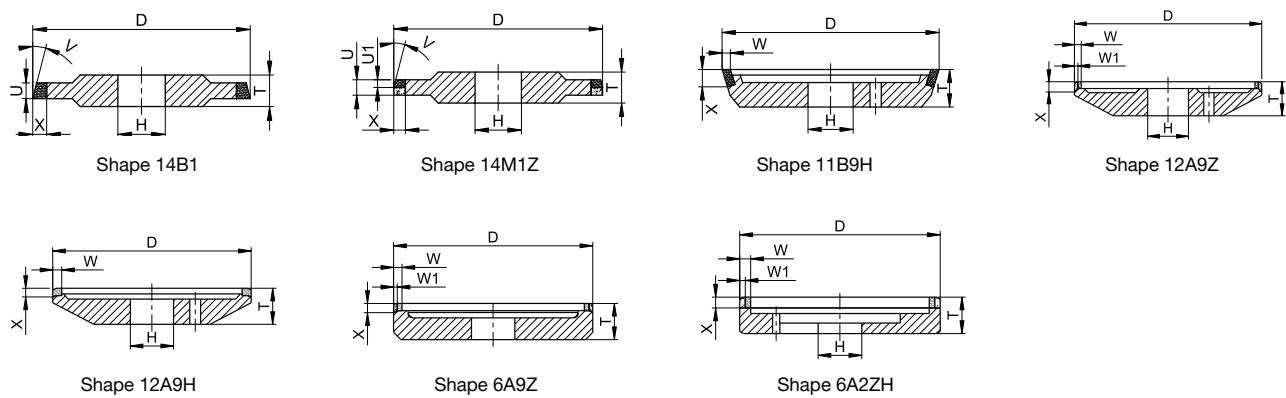
Shape	Type no.	DxTxH	W-X V	Specification	Comments	
	12V2	462766	200x13x32	4-2 V30	D 46 C125 B 48 AL e.g. Vollmer, Biberach	
	12V2N	463026	100x10x25	4-2 V30	D 46 C100 B 48 AL e.g. Vollmer, Dornhan, Widma	
	3V9	563857	125x13x32	2,5-5,5 V70	D 46 C100 B 48 AL e.g. Vollmer, Biberach	
		578936	150x13x32	2,5-5,5 V70	D 46 C100 B 48 AL e.g. Akemat	
	3V9H	580905	200x13x32	2,5-4,4 V70	D 46 C125 B 250 AL tight tooth pitch	
	4B9	369110	125x11,5x32	2,5-1,2 V15	D 54 C75 B 74 AL e.g. Vollmer, Biberach	
		462788	125x12x32	3-3,8 V15	D 54 C125 B 48 AL e.g. Vollmer, Biberach, large tooth pitch	
		820013	125x12x32	3-1,8 V15	D 126 C75 B 70 AL e.g. Vollmer, Biberach	
		34015955	125x12x32	3-2 V15	D 76 C125 B 250 AL e.g. Vollmer, Biberach	
		665040	125x14x32	3-3,8 V15	D 54 C75 B 70 AL e.g. Vollmer, Biberach, large tooth pitch	
	4V2	462630	150x12x32	4-2 V30	D 76 C125 B 48 AL e.g. Vollmer, Biberach	
		462631	150x12x32	4-2 V30	D 46 C125 B 48 AL e.g. Vollmer, Biberach, Akemat	
	4V2H	462898	160x13x32	4-2 V30	D 76 C125 B 48 AL e.g. Walter	
		379577	200x13x32	4-2 V30	D 46 C125 B 48 AL e.g. Vollmer, Biberach, Walter	
		462760	200x13x32	4-2 V30	D 76 C125 B 48 AL e.g. Vollmer, Biberach	
Shape	Type no.	DxTxH	W-X	Specification	Comments	
	4B9N	632932	100x8x25	3-1,8	D 54 C75 B 70 AL e.g. Vollmer, Dornhan, Widma	
Shape	Type no.	DxTxH	U/W-X	Specification		
	4C2	482702	150x10x32	2,5/3-1,5	D 64 C100 B 70 ST	

Resin-bonded diamond grinding wheels for clearance grinding (back grinding) for tungsten carbide



Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
D									●	●

Recommended stock type



This resin-bonded diamond wheel is available as a cup wheel or peripheral wheel. It is also available as a single or D126/D46 double layer. Double layer wheels achieve an excellent level of cutting quality due to a combination of two grit sizes in a high concentration.

This product is available for all standard sharpening machines in 100–125 mm diameters.

Shape	Type no.	DxTxH	U-U1-X V	Specification	Comments
	14B1	462503	127x95x8x32	5-8 V15	DE 544 BS STARTEC-BASIC e.g. Akemat
14M1Z	462514	127x8x32	2,5-2,5-6 V15	D 126 C125 B 48 AL/ D 54 100 B48	e.g. Akemat, two-layer wheels
	462889	150x8x32	2,5-2,5-8 V8	D 126 C100 B 48 AL/ D 76 75 B48	e.g. Walter, two-layer wheels
	462891	200x8x32	2,5-2,5-8 V8	D 126 C100 B 48 AL/ D 46 75 B48	e.g. Walter, two-layer wheels
Shape	Type no.	DxTxH	W-W1-X	Specification	Comments
	12A9Z	286864	125x18x32	5-2,5-6	D 126 C125 B 65 AL/ D 46 100 B65 e.g. Vollmer Biberach, double layer
	390582	125x18x32	5-2,5-6	D 126 C100 B 65 AL/ D 46 75 B65	e.g. Vollmer Biberach, double layer
	387531	125x22x32	5-2,5-6	D 126 C100 B 65 AL/ D 46 75 B65	e.g. Vollmer Biberach, double layer
	6A9	862410	100x40x27	3-10	D 39 75 B52
	6A9Z	389569	100x20x25	5-2,5-6	D 126 C100 B 42 AL/ D 46 75 B42 e.g. Vollmer Dornhan, double layer
	6A2ZH	462829	125x20x50,8	5-2,5-10	D 126 C100 B 65 AL/ D 46 75 B65 e.g. Vollmer Dornhan, double layer



Resin-bonded diamond grinding wheels for flank machining for tungsten carbide

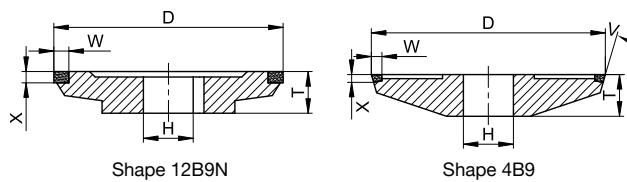


Specifica-	Alumin-	Non and low-alloyed	High-alloyed steels	HSS	INOX	Tungsten	Industrial	Cast iron	Dry	Wet
tion	ium	steels				carbide	ceramics		grinding	grinding
		Unhardened Hardened	Unhardened Hardened							

D

●
●

Recommended stock type



This TYROLIT product is suitable both for repair and production grinding and offers high stock removal rates on tungsten carbide. This is primarily achieved due to a reduced concentration and perfectly tailored bond system.

The diamond wheels are available for all standard sharpening machines in 76–100 mm diameters. It is important to note that diameters of 76–80 mm should be used especially for narrow tooth pitches.

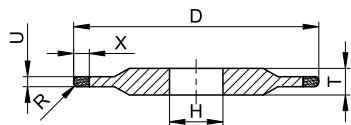
	Shape	Type no.	DxTxH	W-X	Specification	Comments
	12B9N	331135	100x14x32	4.5-4	D 64 C75 B 74 AL	e.g. Vollmer
		474564	100x14x20	4.5-4	D 91 C50 B 53 AL	e.g. Vollmer
	4B9	462794	80x10x32	4-5	D 107 C75 B 53 AL	e.g. Vollmer
		328027	100x10x32	5-4	D 91 C50 B 42 AL	e.g. Vollmer

CBN resin tools for tooth profile grinding for HSS



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
B				●	●					●

Recommended stock type



This TYROLIT product is suitable both for repair and production grinding and offers high stock removal rates on HSS. The CBN tool for tooth profile grinding has been specially designed for wet grinding with emulsion and oil.
The CBN tools are available for all standard sharpening machines in 150–200 mm diameters.

Shape 14F1



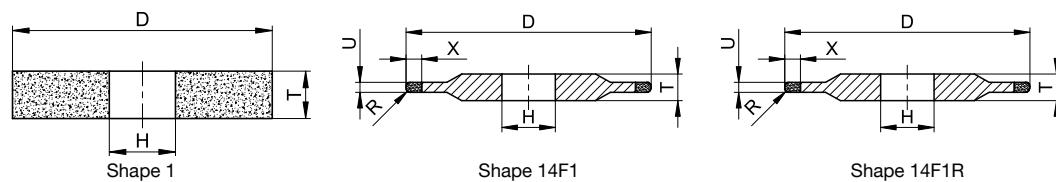
Shape	Type no.	DxTxH	U-X R	Specification	Comments
14F1	462911	150x20x20	1.3-8.4 R0.65	B 126 C125 B 87 ST	e.g. Schmidt-Tempo ECE
	462914	150x20x20	2-8.4 R1	B 126 C125 B 87 ST	
	454693	200x8x32	1.6-8.4 R0.8	B 126 C125 B 87 ST	e.g. Loroch, Rekord, Schmidt-Tempo
	462924	200x8x32	1.3-8.4 R0.65	B 126 C125 B 87 ST	
	462928	200x8x32	2-8.4 R1	B 126 C125 B 87 ST	
	462932	200x8x32	2.5-8.4 R1.25	B 151 C125 B 87 ST	
	462937	200x8x32	3-12.5 R1.5	B 151 C125 B 87 ST	

Vitrified-bonded and CBN resin-bonded profile grinding wheels for tungsten carbide and HSS



Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
		Unhardened Hardened	Unhardened Hardened							
89A, 455A				●					●	
D						●				●
B				●				●	●	

Recommended stock type



For profile grinding of HSS you can use aluminium oxide or CBN wheels. Tungsten carbide should however only be ground using diamond. For pre-grinding we recommend using grit size 54 in aluminium oxide and sintered aluminium oxide mixture.

Grit size 100 should be used for finish grinding and fine profiles, or alternatively B151 in CBN. Finer grit sizes are usually used for tungsten carbide.

Recommended stock type

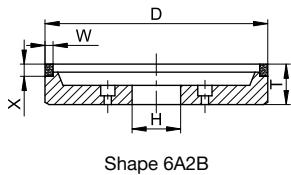
Shape	Type no.	DxTxH	U-X R	Specification	Comments
1	30806	225x5x60		89A 54 I5A V53	Weinig Rondamat for HSS tools
	514038	225x5x60		97A 54 I5A V53	
	102804	225x5x60		89A 100 H5 V111	
1	619872	225x5x60		455A 541 L6 V3 50	
14F1	463137	200x10x31,75	4-7 R2	B 151 C75 B 53 AL	Universal
	462926	200x10x60	3-5 R1,5	DE643BS STARTEC-BASIC	Weinig Rondamat for HM tools
	462939	200x5x60	4-7 R2	DE913BS STARTEC-BASIC	
	462943	200x5x60	2-7 R1	DE463BS STARTEC-BASIC	

Resin tool for regrinding planer knives for tungsten carbide and HSS



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
D									●	●
B						●			●	●

Recommended stock type



These resin tools are cup wheels with special mounting holes for Weinig Rondamats. Planer knives can be reground by wet or dry grinding.
To achieve the required cutting quality, grain B107 is used for HSS and grain D76 for tungsten carbide.

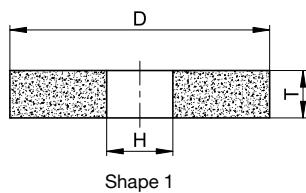
Shape	Type no.	DxTxH	WxX	Specification	Comments
6A2B	34480	125x18x20	3-4	B 107 C50 B 74 AL	Weinig Rondamat (clearance surface/ back grinding)
	590433	125x18x20	3-4	D 76 C75 B 52 AL	

Elastic tool for effect grinding for steel and HSS



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
C		●	●	●	●	●			●	

Recommended stock type



The TYROLIT elastic tool has been specially developed for effect grinding in production or repair. A discolored workpiece often is the result of soldering on tungsten carbide teeth - with this tool discoloration can be removed quickly.
Elastic wheels with silicon carbide are also used for cleaning and touching up used saw blades. Effect grinding is also frequently used on saw blades.



◀

Elastic tool for effect grinding for steel and HSS



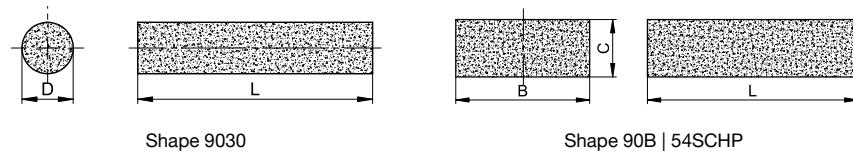
Shape	Type no.	DxTxH	Specification
1	401616	250x25x32	C 46 - BE19 F
	491888	250x25x32	C 46 - BE16

Vitrified-bonded and resin-bonded jointing stones for tungsten carbide and HSS



Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
		Unhardened Hardened	Unhardened Hardened							
55AC, 454A				●						
C				●		●				

Recommended stock type



To achieve the highest planing quality, micro-sized planer heads are levelled with jointing stones. Products from TYROLIT achieve optimum dressing effects.

It is possible to level HSS and tungsten carbide planer knives with this product.

Shape	Type no.	BxCxL	Specification	PU
54SCH	351654	20x15x60	C 320 -55 V18	10
9030	775476	12x32	C 280 J5 V18	10
54SCHP	917288	60x15x160	454A 500 D2 B22	1
90B	34020398	60x15x160	55AC 500 D4 B22	1

1.10 Cutting Stationary cut-off wheels





Cut-off wheels for stationary cutting machines

Stationary cutting machines are most commonly used in workshops. They ensure precision cutting of all materials, regardless of their.

TYROLIT offers two types of cut-off wheels for this application. Firstly, reinforced cut-off wheels, which can be used to cut profiles, pipes and solid material. Secondly, non-reinforced cut-off wheels for laboratory cutting,

for cutting and saw sharpening, and for cutting high speed steel.

Whether for use on steel, stainless steel, stone or rails, thanks to the clear colour coding and application

tips, you will always be able to find the right product for your application and your workpiece. TYROLIT guarantees optimum cutting results and maximum levels of safety in all situations.

Shape



1 Saw sharpening

1A1R Cut-off wheels
(with continuous rim)41N non-reinforced
cut-off wheel)

Application recommendation



Performance level	Specification	Steel	Stainless steel	NF metals	Stone	Cast iron	Page
★★★ PREMIUM	A80, 89A	●					111
	C	●					111
	A60, A80, 89A, 97A	●					112, 113
	B		●				114
	D		●				114

Ordering Example

Dimensions of the cut-off wheel: 250x1.5x32 mm
 Material to be cut: Tool steel workpiece Wst.nr. 1.2312
 (40CrMnMoS8-6)

Hardness: 440 HV / 44.5 HRC
 Result: Type 167205

Hardness		Recommended specification		
Vickers hardness	Rockwell	Hard	Medium	Soft
1 000 HV	72.3 HRC			
700 HV	60.5 HRC			
500 HV	49.1 HRC	●	→	
350 HV	35.5 HRC			
250 HV	22.0 HRC			
150 HV				
120 HV				
80 HV				
50 HV				
30 HV				

Dimension	Type No.	Type No.	Type No.
432x3.0x32		167351	
400x3.0x32		167339	
350x2.5x32		167334	167333
300x2.0x32		167226	
250x1.5x32	●	167207	→ 167205
230x1.5x32		167215	

Specification	A80-BH	A80-BM	A80-BS



LAB for steel and stainless steel

The PREMIUM*** laboratory cut-off wheel is a high-performance cut-off wheel for ferrous metals, such as steel and stainless steel. It is used for cutting laboratory samples that have to be cut quickly and without structural alterations, workpiece deformations or cracks. Assembly is usually carried out on wet cutting systems with a manual or automatic feed, at a maximum operating speed of 50 m/s.

The workpiece must be fixed during machining and the wheel must not be



exposed to lateral load. Laboratory cut-off wheels are available in various specifications:

- soft for 60.5–72.3 HRC
- medium for 22.0–60.5 HRC
- hard up to 22.0 HRC

Avoid high pressure and use sufficient cooling lubricant.



Shape	Type no.	Dimension	Specification	Classification	PU
—	41N	167215	230x1,5x32	A80-BM50	Medium
		167207	250x1,5x32	A80-BH50	Hard
		167205	250x1,5x32	A80-BM50	Medium
		165940	250x1,5x32	A80-BS50	Soft
		596848	250x1,8x32	89A60L5B17/50	Very easy cutting
		167226	300x2,0x32	A80-BM50	Medium
		597041	300x2,0x32	89A60L5B17/50	Very easy cutting
		167334	350x2,5x32	A80-BM50	Medium
		167333	350x2,5x32	A80-BS50	Soft
		597383	350x2,5x32	89A60J5B17/50	Very easy cutting
	167339	400x3,0x32	A80-BM50	Medium	10
	167351	432x3,0x32	A80-BM50	Medium	10



LAB for titanium, nonferrous metals and plastic

The PREMIUM*** laboratory cut-off wheel is a high-performance cut-off wheel for nonferrous metals, titanium and plastic. It is used for cutting laboratory samples that have to be cut quickly and without structural alterations, workpiece deformations or cracks. Assembly is usually carried out on wet cutting systems with a manual or automatic feed, at a maximum operating speed of 50 m/s.

Sufficient coolant with 2–3 % anti-corrosive must be used for machining, and feed values must not be too high in order to prevent a cut deviation. The workpiece must be fixed during machining and the wheel must not be exposed to lateral load.



Shape	Type no.	Dimension	Specification	Classification	PU
—	41N	167336	350x2,5x32	C80-BT50 A2	Titanium





Cut-off wheels for cutting and saw sharpening for steel und HSS



This PREMIUM*** wheel is a non-reinforced high-performance cut-off wheel for stationary machines and automatic saw sharpening machines. As these cut-off wheels are manufactured without reinforcement, they are only suitable for wet cutting on stationary machines.

The workpiece must be fixed during machining and the wheel must not be exposed to lateral load.

Shape	Type no.	Dimension	Specification	PU
	1 591080*	150x3,0x20	A60O5B68	10
	41N 529392	100x1,0x20	A80N4B2	10
	202159	100x1,0x20	A80N4B68	10
	46633	100x1,0x20	A80O4B43	10
	722408	100x1,5x20	A80N4B2	10
	6673	100x2,0x20	A80N4B2	10
	88461*	120x2,0x51	A60N4B2	10
	1197	120x2,0x51	A60O5B43	10
	25590	125x1,0x20	A60O5B43	10
	282079	125x1,0x20	A60N5B68	10
	35917	125x1,0x20	A80O5B43	10
	282110	150x1,0x20	A60N5B68	10
	1211	150x1,0x20	A60O5B43	10
	591103	150x1,0x20	A60O5B68	10
	282111	150x1,0x20	A80N5B68	10
	13695	150x1,0x20	A80O5B43	10
	594360	150x1,0x20	A80O5B68	10
	75306	150x1,0x30	97A54P5B71	10
	39110	150x1,0x32	A80O5B43	10
	8833	150x1,5x20	A60O5B43	10
	282085	150x1,5x20	A60N5B68	10
	591104	150x1,5x20	A60O5B68	10
	79957	150x1,5x20	A80O5B43	10
	662430	150x1,5x32	A80N5B68	10
	42808	150x1,6x20	A60P4B43	10
	227165	150x1,6x32	A60O5B43	10
	58158	150x1,6x32	A60P4B43	10

* Also suitable for saw sharpenening.





Shape	Type no.	Dimension	Specification	PU
	41N	15685	150x2,0x20	A60O5B43
		32023	150x2,0x20	A60N4B2
		594362	150x2,0x20	A60O5B68
		33436	150x2,0x30	A60N4B2
		594357	150x2,0x30	A60Q5B68
		223516*	150x2,5x20	A60N4B2
		591680	150x2,5x30	A60Q5B68
		596520	175x2,0x51	A60P4B68
		607744	175x3,0x51	A60P4B68
		675283	180x1,0x32	A60O5B43
		493199	180x1,6x32	A60O5B68
		282113	200x1,5x20	A60N5B68
		1254	200x1,5x20	A60O5B43
		282114	200x1,5x32	A60N5B68
		6718	200x1,5x32	A60O4B43
		230691	200x1,6x32	A60M4B43
		205822	200x1,6x32	A60P4B43
		6710*	200x2,0x20	A60N4B2
		96205*	200x2,0x32	A60N4B2
		62874	200x2,0x32	A60N4B43
		97442	200x2,5x32	A60N4B2
		12970*	200x3,0x32	A60N4B2
		863284	200x3,0x32	A60P4B68
		599666	230x1,5x22,2	89A60N4B68
		373520	250x1,5x25,4	A60O5B71
		834839	250x1,6x32	89A80L4B43
		549002	300x2,0x31,75	89A80L4B43
		60572	300x2,0x32	A80O5B71
		220394	400x2,8x25,4	89A60L4B59

* Also suitable for saw sharpening.



Cutting rotating tools for HSS



The high-performance cut-off wheel for HSS achieves a perfect cutting performance thanks to its innovative bond system and tailored grain quality. Avoid feed values that are too high during machining, to prevent a cut deviation.

Assembly is usually carried out on wet cutting systems with a manual or automatic feed, at a maximum operating speed of 50 m/s.

Shape	Type no.	Dimension	U-X	Specification	PU
	1A1R	788700	125x1.0x20	1-5	B126 C75 B
		164485	125x1.0x20	1-5	B151 C100 B
		494701	150x1.0x20	1-5	B151 C100 B

Tungsten carbide for tungsten carbide



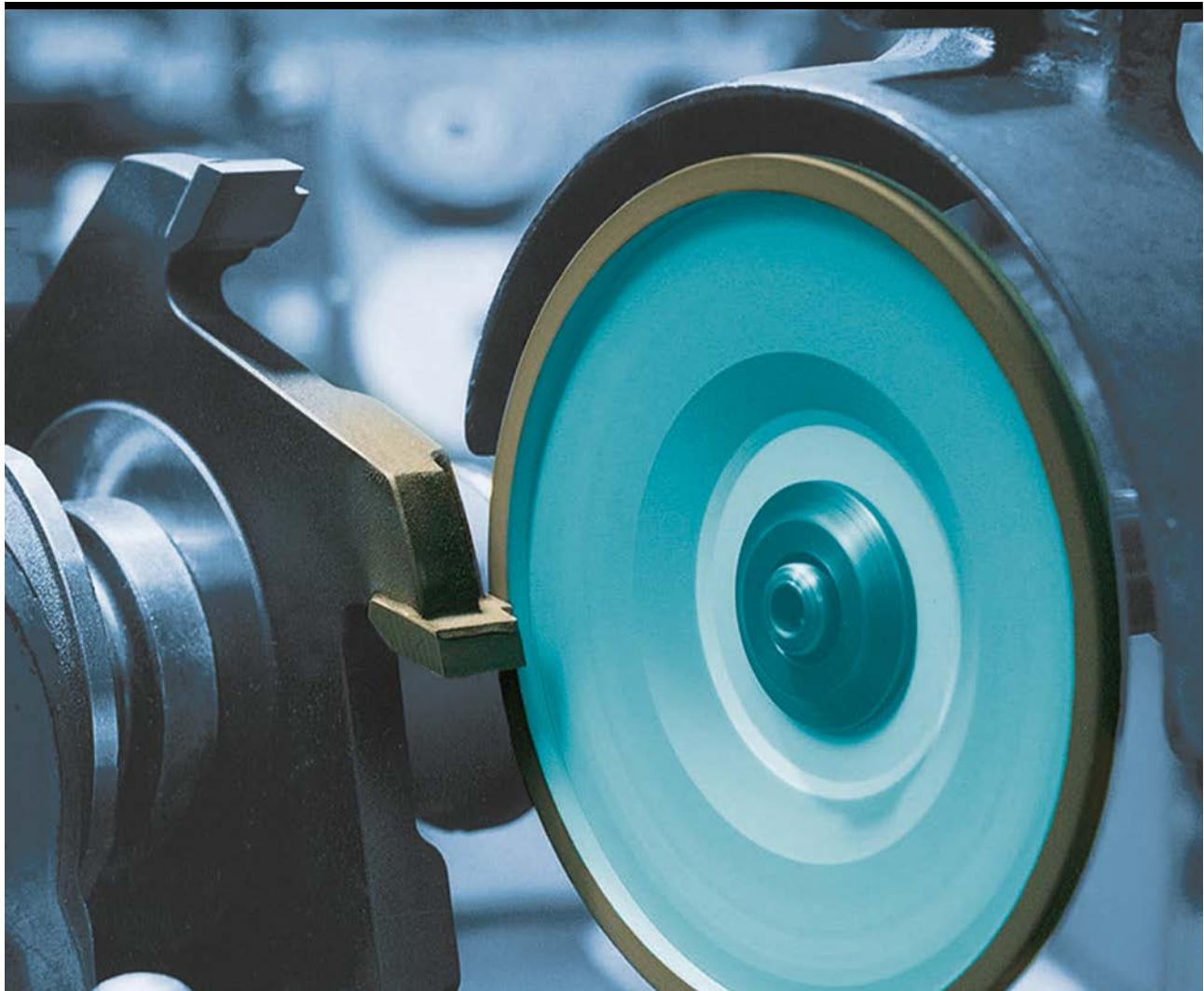
The high-performance cut-off wheel for tungsten carbide achieves a perfect cutting performance thanks to its innovative bond system and tailored grain quality. Avoid feed values that are too high during machining, to prevent a cut deviation.

Assembly is usually carried out on wet cutting systems with a manual or automatic feed, at a maximum operating speed of 50 m/s.

Shape	Type no.	Dimension	U-X	Specification	PU
	1A1R	299109	75x1.0x20	0.8-5	D151 C75 B
		157800	75x0.8x20	0.8-5	D126 C75 B
		119395	100x0.8x20	0.8-5	D126 C100 B
		100660	100x1.0x20	1-5	D126 C100 B
		108728	100x1.5x20	1.5-5	D126 C75 B
		101000	125x1.0x20	1-5	D126 C100 B
		148132	150x1.0x20	1-5	D126 C100 B
		317532	150x1.0x20	1-5	D126 C75 B
		278979	150x1.0x20	1-5	D151 C100 B
		667995	200x1.0x22	1-5	D126 C100 B
		858531	200x1.2x20	1.2-7	D126 C100 B
		603284	200x1.2x30	1.2-7	D151 C100 B



1.11 Tools
Universal tool grinding



Universal tool grinding

TYROLIT offers a comprehensive range of grinding tools for tool grinding. This makes a high-quality range available for tool production as well as tool regrinding.

It includes conventional grinding wheels as well as diamond and CBN grinding tools for wet and dry

grinding. Grain qualities adapted to the grinding process and innovative bond systems combined with efficient

grinding wheel design always guarantee optimum quality of your tools.

Application recommendation



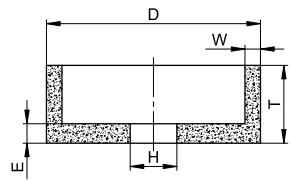
Specification	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding	Page
	Unhardened Hardened		Unhardened Hardened								
89A		●		●	●				●		119, 120, 121
91A				●					●		120
454A			●	●					●		119
C						●			●		121
AMIGO, B		●		●	●				●		122, 123, 124
DIAGO, D						●			●		125, 126

● Extremely suitable

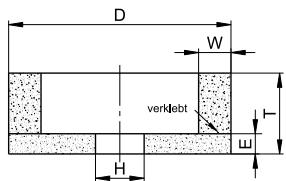
Application tips CBN

- ─ Recommended operating speed for cemented carbide:
16–22 m/s
- ─ Recommended operating speed for HSS: 20–25 m/s

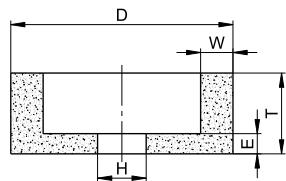
Shapes



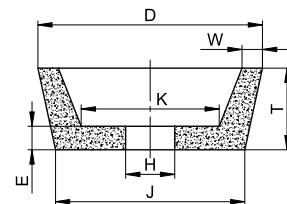
Shape 6



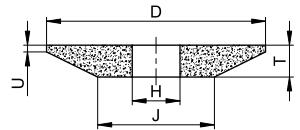
Shape 6BS



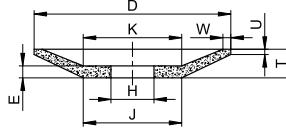
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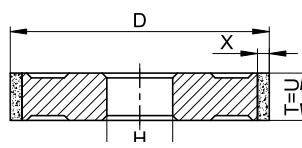
Shape 11



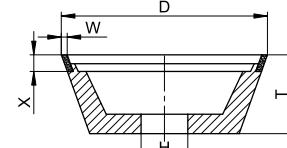
Shape 3



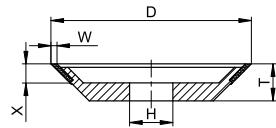
Shape 12



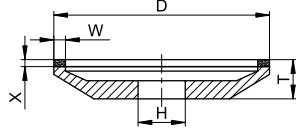
Shape 1A1



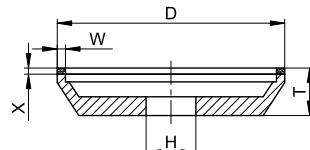
Shape 11V9



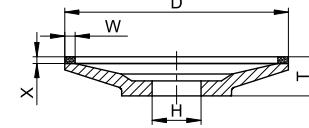
Shape 12V9



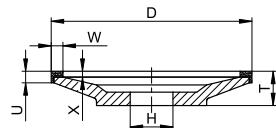
Shape 12A2



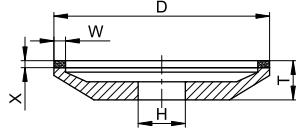
Shape 12A2D



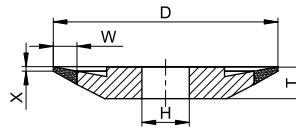
Shape 12A2F



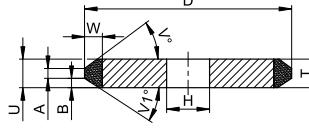
Shape 12C2F



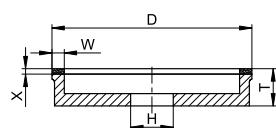
Shape 4C2



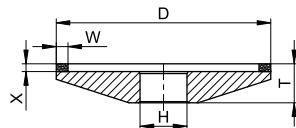
Shape 4BT9



Shape 1BM1



Shape 6A2



Shape 4A2

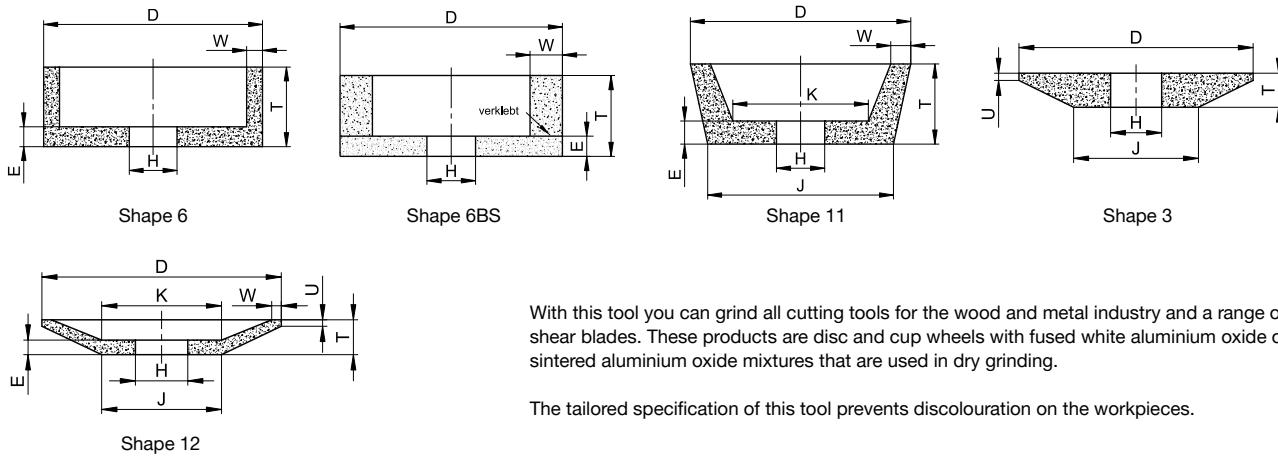
Conventional ceramic for dry grinding

for non and low-alloyed steels, high-alloyed steels and HSS.



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
89A		●		●	●				●	
91A					●				●	
454A				●	●				●	

Recommended stock type



Shape	Type no.	DxTxH	W/E	Specification	Comments
6	34048152	80x40x20	W6/E10	454A 801 N5 V3 U5	With peripheral impregnation
	455038	80x40x20	W6/E8	454A 901 M5 V3 U5	
	34048027	100x50x20	W10/E10	454A 801 K5 V3 U5	
6	34378877	75x50x20	W10/E10	89A 60 J5A V217	With peripheral impregnation
	5843	80x40x20	W6/E10	89A 60 K5A V53	
	376274	90x55x20	W17/E18	69A 80 H10A V217	
	552765	100x40x22	W32/E18	C 240 H4A V18	
	34924	100x50x20	W10/E10	89A 462 K5A V53	
	19040	100x50x20	W8/E10	89A 542 I5A V53	
	5886	100x50x20	W10/E10	89A 60 J5A V53	
	5887	100x50x20	W10/E10	89A 60 K5A V53	
	49273	100x50x20	W10/E10	89A 60 M5A V53	
	9627	100x50x20	W10/E10	89A 80 I7A V53	
	568265	100x50x20	W10/E10	89A 80 I7A V53 U5	With peripheral impregnation
	5889	100x50x20	W10/E10	89A 80 J5A V53	





Shape	Type no.	DxTxH	W/E	Specification	Comments
6	8641	100x50x20	W10/E10	89A 80 K5A V53	
	54820	100x50x20	W10/E10	89A 80 L5 V55	
	131991	125x50x32	W13/E13	89A 60 K5 V53	
	451151	125x63x20	W8/E13	89A 542 I5A V53	
	78847	150x50x32	W12/E15	89A 60 K5 V53	
	77824	150x60x50	W15/E15	89A 36 H7 V217	
	84809	150x70x28	W17/E16	89A 36 H8 V217	
	91350	150x76x28	W17,5/E16	89A 46 J8 V217	
	186445	150x80x32	W10/E16	89A 60 J5A V217	
	365824	150x80x50	W10/E16	89A 461 H7A V53	
	54119	175x75x76,2	W17,5/E17	89A 36 J8 V217	
	126245	175x75x78	W15/E18	89A 36 H7A V217	
	712490	175x75x78	W15/E18	89A 36 J10A V237 P22	
	91441	175x75x78	W15/E18	89A 46 H7 V217	
	587026	175x80x32	W13/E20	89A 46 G10A V217	
	305227	200x80x30	W17,5/E20	89A 60 K7A V227	Mower knife
	210314	200x80x35	W20/E20	89A 46 J8A V53	Sickle
	70128	200x80x78	W20/E20	89A 36 H7 V217	
	798715	200x80x78	W20/E20	89A 36 J10A V237 P22	
6	122989	100x50x20	W10/E10	91A 80 L5A V217	
	438088	150x63x32	W15/E16	91A 46 G9A V217 P3	
	75803	165x60x32	W15/E15	91A 46 G9A V217 P3	
6BS	70092	200x100x51	W25/E25	89A 36 I8A V217	
Shape	Type no.	D/JxTxH	W/E/K	Specification	
11	334166	80/57x32x20	W6/E8/K46	89A 1002 H5A V53	
	338237	80/57x32x20	W6/E8/K46	89A 601 K5A V53	
	4917	100/71x40x20	W8/E10/K56	89A 462 J5A V53	
	4924	100/71x40x20	W8/E10/K56	89A 601 K5A V53	
	631057	100/71x40x32	W8/E10/K56	89A 601 J5A V53	
	63195	100/80x50x32	W9/E13/K67	89A 60 K5 V53	
	31675	125/96x40x20	W8/E10/K81	89A 462 K5A V53	
	182779	125/96x40x20	W8/E10/K81	454A 80 J5 V3	
	331500	125/96x40x32	W8/E10/K81	89A 601 J5A V53	
	182232	125/100x50x19,05	W12/E16/K70	454A 46 K5 V3	
	203176	150/114x50x32	W10/E13/K96	89A 462 I5A V53	
	498229	150/114x50x32	W10/E13/K96	89A 601 J5A V53	





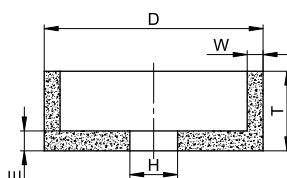
Shape	Type no.	D/JxT/UxH	W/E/K	Specification
3	31009	150/75x8/2x20		89A 601 J5A V53
	41555	200/188x8/4,5x32		89A 46 K5A V217
12	34400603	100/35x12/3x20	W5/E8/K35	455A 60 L5 V3
	9398	150/75x16/3x20	W10/E10/K85	89A 601 J5A V53
	19659	100/50x13/3x20	W5/E7/K50	89A 601 K5A V53
	216789	125/63x13,3/3x20	W6/E7/K63	89A 461 J5A V53
	364685	125/63x13/3x20	W6/E7/K63	89A 601 I5A V53
	9833	175/85x18/3x20	W10/E10/K85	89A 601 I5A V53

Conventional ceramic for dry grinding for tungsten carbide

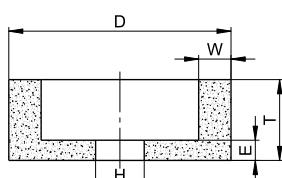


Specifica-	Alumin-	Non and low-alloyed	High-alloyed steels	HSS	INOX	Tungsten	Industrial	Cast iron	Dry	Wet
tion	ium	steels				carbide	ceramics		grinding	grinding
C		Unhardened Hardened	Unhardened Hardened						●	●

Recommended stock type



Shape 6



Shape 6BB

This silicon carbide wheel is a cost-effective variant for machining tungsten carbide for secondary applications. It is primarily used for working on castings and nonferrous metals.

It is ideally suited for grinding mining drills and re-sharpening tools in stonemasons' workshops.

Shape	Type no.	DxTxH	W/E	Specification	Comments
6	139155	100x50x20	W10/E10	C 80 I5 V15	For HM and coated tools
6BB	24299	127x63x32	W22.5/E13	C 46 J5 V15	For mining drill grinding machines
	108479	200x100x32	W25.5/E20	C 46 J5 V15	

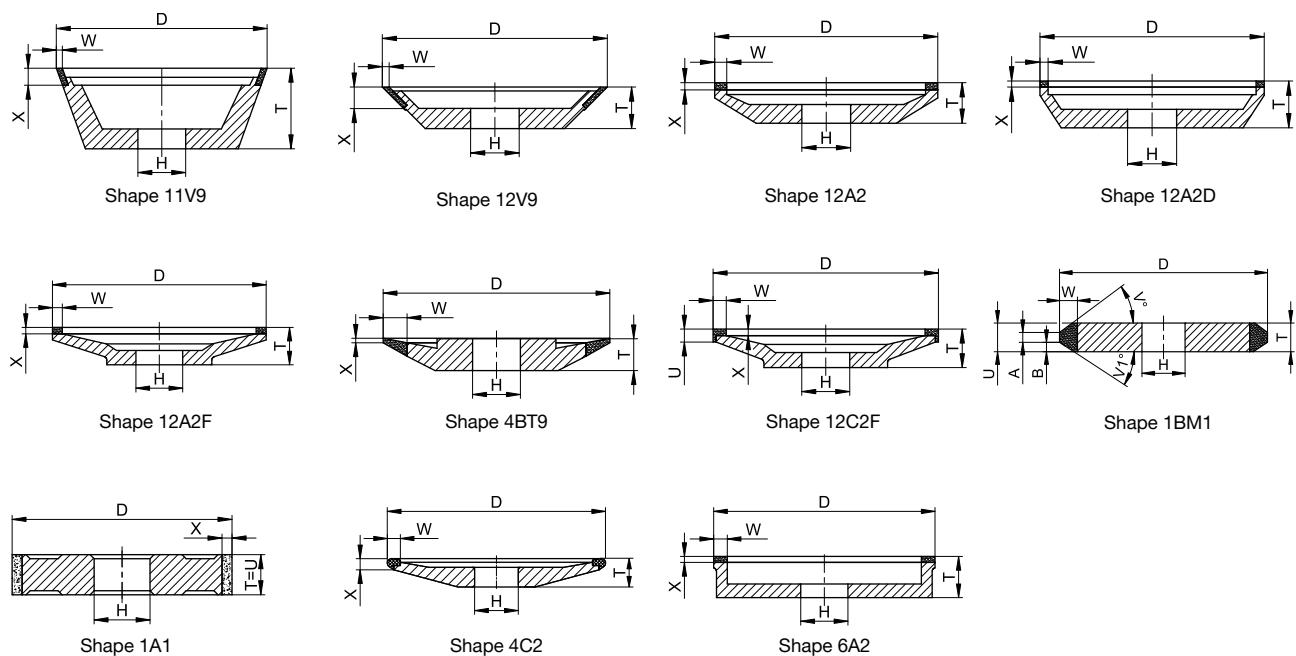
CBN resin-bonded for dry grinding

for non and low-alloyed steels, high-alloyed steels and HSS



Specification	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
		Unhardened Hardened	Unhardened Hardened							
AMIGO, B				●	●	●			●	

Recommended stock type



With this tool you can grind all cutting tools for the wood and metal industry and a range of shear blades. These products are disc and cup wheels in the CBN grit size range B181 - B91.

Compared to conventional aluminium oxide wheels, CBN wheels exhibit significantly less wear and higher dimensional accuracy.

Shape	Type no.	DxTxH	W-X	Specification	Comments
11V9	640777	75x30x20	2-10	B 126 C75 B AMIGO	
	644532	125x40x20	2-10	B 91 C75 B AMIGO	
	641854	125x40x20	2-10	B 126 C75 B AMIGO	
	649723	100x35x32	2-10	B 126 C75 B AMIGO	
	666288	100x35x20	2-10	B 181 C75 B AMIGO	
	644514	100x35x20	2-10	B 91 C75 B AMIGO	
	617388	100x35x20	2-10	B 126 C75 B AMIGO	
	636398	100x35x20	3-10	B 126 C75 B AMIGO	
	561391	100x35x20	2-10	B 1 C75 B 53 BG	Long-life B53



◀ Recommended stock type

Shape	Type no.	DxTxH	W-X	Specification	Comments
	12V9	703242	75x20x20	2-6	B 126 C75 B AMIGO
		636658	100x20x20	2-10	B 126 C75 B AMIGO
		840506	125x25x20	2-10	B 126 C75 B AMIGO
	12A2	124644	150x18x20	5-3	B 126 C50 B 75 AL
		436484	150x18x20	5-2	B 126 C50 B 75 AL
		337051	150x18x20	4-3	B 126 C75 B 54 AL
		649692	175x20x20	6-2	B 1 C75 B 45 AL
	12A2D	217976	100x25x20	6-2	B 126 C50 B 54 AL
		666137	100x25x20	6-3	B 126 C50 B 54 AL
	12A2F	69502	125x23x20	5-4	B 126 C50 B 75 AL
	4BT9	119325	100x10x20	10-1	B 126 C75 B 75 AL
Shape	Type no.	DxTxH	W/U-X	Specification	
	12C2F	646778	125x23x20	5/5-4	B 91 C75 B AMIGO
		641839	125x23x20	5/5-4	B 1 C75 B AMIGO
		641842	150x23x20	5/5-4	B 1 C75 B AMIGO
Shape	Type no.	DxTxH	U-X	Specification	Comments
	1BM1	463068	75x4x20	4-8	B 91 C75 B 54 AL Drill bit diameter 4 mm





Shape	Type no.	DxTxH	U-X	Specification	Comments
1A1	620464	100x10x20	10-6	B 126 C50 B 54 BA	
Shape	Type no.	DxTxH	W/U R	Specification	
4C2	83827	100x13x20	5.1/6 R2	B 126 C75 B 75 AL	

Shape	Type no.	DxTxExH	W-X	Specification
6A2	735896	100x30x12x20	3-6	B 126 C75 B 74 AL

Diamond resin-bonded for dry grinding for tungsten carbide

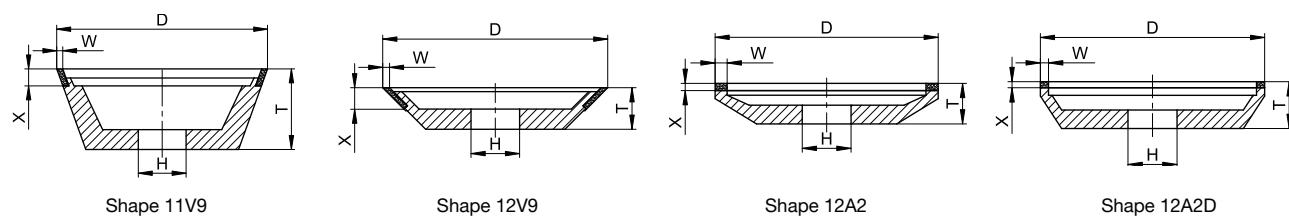


Specifica-	Alumin-	Non and low-alloyed	High-alloyed steels	HSS	INOX	Tungsten	Industrial	Cast iron	Dry	Wet
tion	ium	steels				carbide	ceramics		grinding	grinding
		Unhardened Hardened	Unhardened Hardened							

DIAGO, D



Recommended stock type



Shape	Type no.	DxTxH	W-X	Specification	Comments
	249717	75x30x20	2-6	D 126 C75 B 52 BG	Long-life B52
	679634	75x30x20	2-10	D 126 C75 B DIAGO	
	721301	75x30x20	2-10	D 64 C50 B DIAGO	
	679946	125x40x20	3-10	D 126 C75 B DIAGO	
	335803	100x35x31.75	2-10	D 126B DIAGO	
	5028	100x35x20	3-10	D 126 C75 B 52 BG	Long-life B52
	561390	100x35x20	3-10	D 126 C75 B 53 BG	Long-life B53
	576021	100x35x20	2-10	D 126 C75 B 74 BG	Long-life B74
	675309	100x35x20	2-10	D 126 C75 B DIAGO	
	675318	100x35x20	3-10	D 126 C75 B DIAGO	
	46198	100x35x20	3-10	D 181 C75 B DIAGO	
	676589	100x35x20	2-10	D 181 C75 B DIAGO	
	675272	100x35x20	2-10	D 64 C50 B DIAGO	
	721303	100x35x20	3-10	D 64 C50 B DIAGO	
	681915	100x35x20	2-10	D 91 C75 B DIAGO	
	696324	75x20x20	2-6	D 126 C75 B DIAGO	
	721319	75x20x20	2-6	D 64 C50 B DIAGO	
	311250	125x25x20	2-10	D 126B DIAGO	Long-life B73
	90998	125x25x20	2-6	D 54 C65 B 73 BA	
	689930	100x20x20	2-10	D 126 C75 B DIAGO	
	194540	100x20x20	2-10	D 91B DIAGO	
	43588	100x20x20	2-10	D 91 C75 B 52 BG	
	19220	125x16x20	6-2	D 126 C75 B 52 AL	
	291603	150x18x20	5-3	D 91 C75 B 52 AL	





Shape	Type no.	DxTxH	W-X	Specification	Comments	
	12A2D	28162	100x25x20	6-2	D 126 C75 B 52 AL	
		38012	100x25x20	6-2	D 64 C50 B 52 AL	
		104376	100x25x20	5-3	D 91 C75 B 52 AL	
		779789	100x25x20	10-3	D 91 C75 B 52 AL	
		462949	100x27x20	6-4	D 64 C50 B 52 AL	
	12A2F	97868	125x23x20	5-4	D64B DIAGO	Long-life B73
		102902	125x23x20	5-4	D126B DIAGO	
		731387	125x23x20	5-4	D 64 C50 B DIAGO	
		731399	125x23x20	5-4	D 151 C75 B DIAGO	
		842923	125x23x20	5-4	D 151 C75 B 53 AL	Long-life B53
	4BT9	255835	100x10x20	10-1	D 91 C75 B 73 AL	
	1BM1	790783	75x4x20	4-8	D 64 C75 B 52 AL	Drill bit diameter 4 mm
		848480	75x4.5x20	4.5-7	D 64 C75 B 52 AL	Drill bit diameter 5 and 6 mm
		790784	75x5x20	5-6.5	D 64 C75 B 52 AL	Drill bit diameter 8 mm
		867805	75x6x20	6-6	D 64 C75 B 52 AL	Drill bit diameter 10 mm
	1A1	640978	100x10x20	10-6	D 64 C50 B 52 BA	
	4A2	480500	125x10x20	5-2	D 126 C75 B 52 AL	
		86734	125x10x20	5-2	D 64 C50 B 73 AL	
		215813	150x12x20	5-2	D 126 C50 B 73 AL	
		436472	150x12x20	5-2	D 64 C50 B 73 AL	

A close-up photograph of a man with dark hair and a light beard, wearing a grey shirt. He is focused on operating a CNC tool grinding machine. His hands are positioned around a large, circular grinding wheel. The wheel has some text and numbers visible on its side, including "TIRGUT", "STADTER V-3", "1000", "Vmax 53m/s", and "241050MPP 0782798". The machine itself is dark and metallic, with various hoses and components visible.

1.12 Tools CNC tool grinding



CNC tool grinding

Productivity demands are constantly growing for applications that involve machining an extremely wide range of different materials. At the same time, quality requirements are also increasing. Both of these requirements demand perfectly ground cutting tools that have been manufactured on the most modern CNC tool grinding machines.

For this purpose, TYROLIT provides you with a perfectly tailored range of products. This ensures that you fully exploit the advantages of the CNC machines used in the manufacturing

of cutting tools. You therefore increase your productivity and, at the same time, fulfil the high quality requirements.

In the following, you can find grinding

tools that meet the requirements of the tool manufacturer just as well as those of the tool regrinder.

Application recommendation



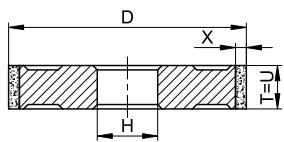
Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding	Page
		Unhardened Hardened		Unhardened Hardened							
STARTEC- BASIC, B				●	●					●	131, 132
STARTEC- BASIC, D						●				●	133, 134
STARTEC- XP-P, B				●	●					●	134, 135
STARTEC- HP, B											
START EC- XP-P, D						●				●	136, 137
STARTEC- HP, D											

● Extremely suitable

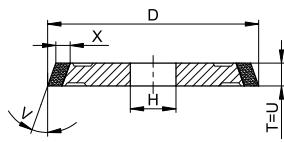
Application tips

- Cutting speed for CBN cup grinding wheels should be up to 30 % higher than for diamond wheels
- Optimum peripheral speed for CBN grinding wheels (for flute grinding) 20–25 m/s
- Cutting speed recommendation for flute grinding
Solid carbide: 16–18 m/s
HSS: 20–25 m/s
- Cutting speed recommendation for cup grinding wheels
Solid carbide: 18–24 m/s
HSS 20–30 m/s
- Use STARTEC XP-P for optimum cutting performance
- Use STARTEC HP for standard applications
- Always ensure enough coolant is available
- Dressing and sharpening instructions see page 140

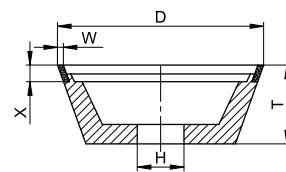
Shapes



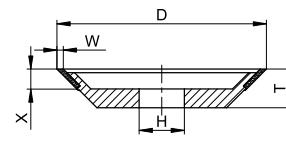
Shape 1A1



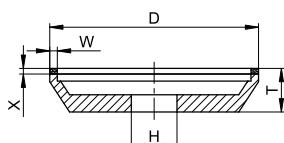
Shape 1V1



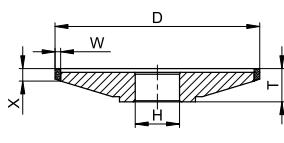
Shape 11V9



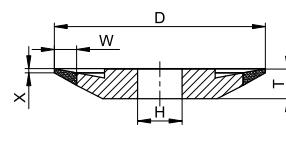
Shape 12V9



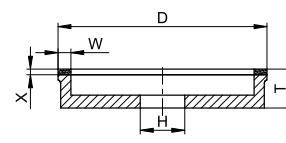
Shape 12A2D



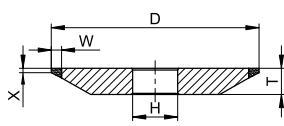
Shape 4B2



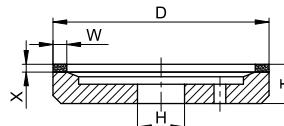
Shape 4BT9



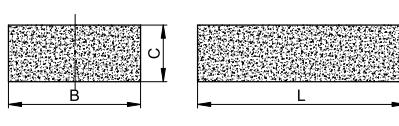
Shape 6A2



Shape 4ET9

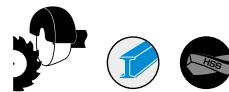


Shape 6A2H



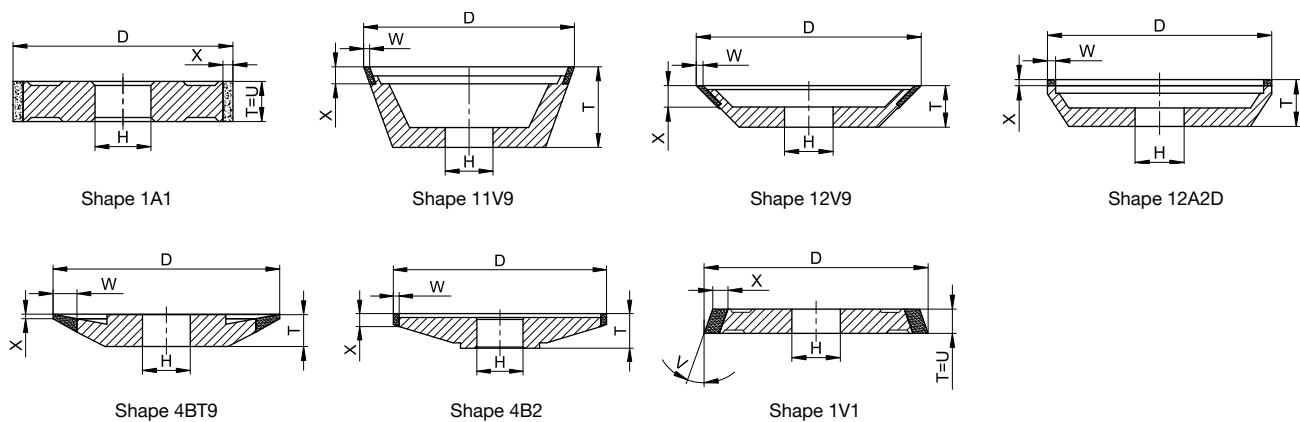
Shape 90AS

**CNC tool grinding with resin-bonded
CBN for wet grinding
for non and low-alloyed steels, high-alloyed steels and HSS**



Specific- ation	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
			Unhardened Hardened	Unhardened Hardened						
STARTEC- BASIC, B					●	●				●

Recommended stock type



With this tool you can grind all cutting tools for the wood and metal industry and a variety of shear blades.

The wear-resistant bond and a high grain concentration significantly increase the lifetime of your tools compared to dry-grinding wheels.

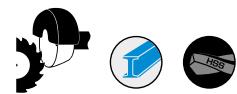
Shape	Type no.	DxTxH	U-X	Specification	V opt. m/s
1A1	906950	100x6x20	6-6	BL1263PD STARTEC-BASIC	20-25
	906951	100x10x20	10-6	BL1263PD STARTEC-BASIC	20-25
	906954	125x10x20	10-6	BL1263PD STARTEC-BASIC	20-25
11V9	75669	75x30x20	2-10	BL1263PD STARTEC-BASIC	25-30
	494983	75x30x20	2-10	BL763PD STARTEC-BASIC	25-30
	494985	100x35x20	2-10	BL763PD STARTEC-BASIC	25-30
	532564	100x35x20	3-10	BL763PD STARTEC-BASIC	25-30



CNC tool grinding with resin-bonded

CBN for wet grinding

for non and low-alloyed steels, high-alloyed steels and HSS



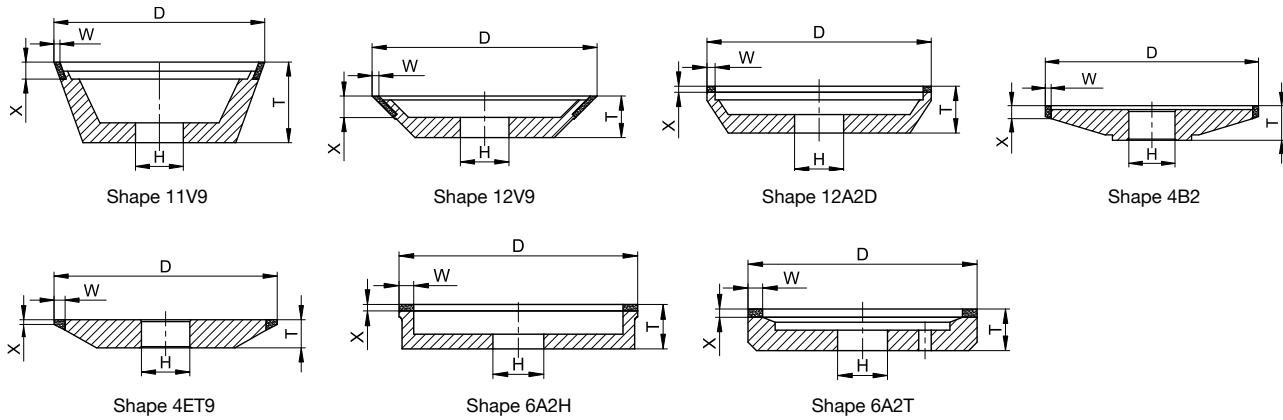
Shape	Type no.	DxTxH	W-X	Specification	V opt. m/s
12V9	75679	100x20x20	2-10	BL1263PD STARTEC-BASIC	25-30
	532571	100x20x20	2-10	BL763PD STARTEC-BASIC	25-30
	75685	125x25x20	2-10	BL1263PD STARTEC-BASIC	25-30
	495027	125x25x20	2-10	BL763PD STARTEC-BASIC	25-30
12A2D	495046	100x25x20	5-3	B 91 C100 B 42 AL	
	173085	125x25x20	15-3	B 91 C100 B 42 AL	
4BT9	495058	125x10x20	10-1	BL1263PD STARTEC-BASIC	
Shape	Type no.	DxTxH	U-X V	Specification	V opt. m/s
1V1	906946	125x12x20	12-6 V45	BL1263PD STARTEC-BASIC	20-25
	906947	150x6x20	6-6 V15	BL1263PD STARTEC-BASIC	20-25
4B2	667930	150x18x20	2-2xV20	B 126 C100 B 53 AL	Chip surface, hob

CNC tool grinding with resin-bonded diamond for wet grinding for tungsten carbide



Specification	Aluminum	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
	Unhardened Hardened		Unhardened Hardened							
STARTEC-BASIC, D									●	●

Recommended stock type



With this diamond wheel you can grind all tungsten carbide cutting tools for the wood and metal industry and a variety of shear blades. Grinding wheel sets for complete machining in the diamond grain size range D126 - D54.

The wear-resistant bond and a high grain concentration significantly increase lifetime compared to dry-grinding wheels.

Shape	Type no.	DxTxH	W-X	Specification	V opt. m/s	Comments
11V9	390970	75x30x20	2-10	DE643BS STARTEC-BASIC	18-25	
	357223	100x35x20	2-10	DE643BS STARTEC-BASIC	18-25	
	532514	100x35x20	3-10	DE643BS STARTEC-BASIC	18-25	
12V9	495020	75x20x20	2-6	DE643BS STARTEC-BASIC	18-25	
	532510	100x20x20	2-10	DE643BS STARTEC-BASIC	18-25	
	532529	100x20x20	3-10	DE643BS STARTEC-BASIC	18-25	
	363993	125x25x20	2-10	DE643BS STARTEC-BASIC	18-25	
	532540	125x25x20	3-10	DE643BS STARTEC-BASIC	18-25	
12A2D	495044	125x25x20	15-3	D 54 C75 B 48 AL		





Recommended stock type

Shape	Type no.	DxTxH	W-X	Specification	Comments
	4ET9	897024	150x14x32	10-1	D 126 C100 B 53 AL
	6A2H	462673	200x30x50	8-4	DE1263BP STARTEC-BASIC
		665142	200x30x50	8-4	D 64 C75 B 52 AL
	6A2T	470272	200x35x75	8-4	D 126 C100 B 52 AL
		665143	200x35x75	8-4	D 64 C75 B 52 AL

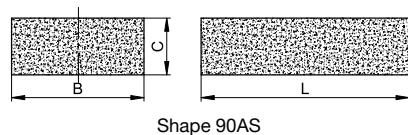
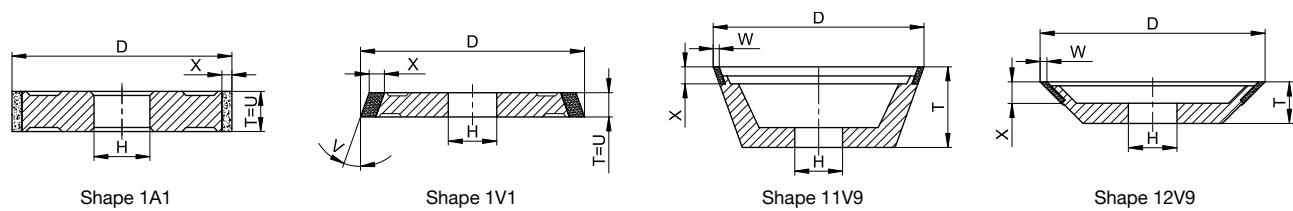
For planer and paper knives; e.g. Göckel, Reform

CNC tool grinding with metal bonded CBN for wet grinding for high-alloyed steels and HSS



Specifica- tion	Alumin- ium	Non and low-alloyed steels	High-alloyed steels	HSS	INOX	Tungsten carbide	Industrial ceramics	Cast iron	Dry grinding	Wet grinding
		Unhardened Hardened	Unhardened Hardened							
STARTEC- XP-P				●	●					●

Recommended stock type



This metal-bonded CBN wheel grinds all cutting tools for the wood and metal industry. Grinding wheel sets for complete machining are available in the CBN grit size range B126 - B76. It is important that this wheel is only used for deep grinding.

The perfect combination of grit size, concentration and bond delivers exceptionally long tool lifetime and a high level of profile accuracy.



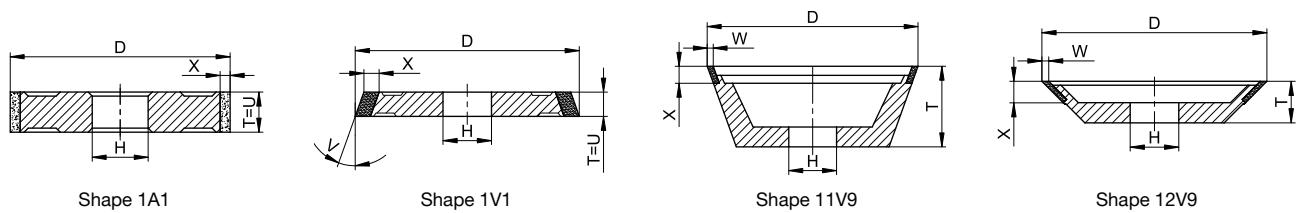
Shape	Type no.	DxTxH	U-X	Specification	V opt. m/s
	759826	75x6x20	6-10	B126MXPP STARTEC-XP-P	20-25
	740383	75x10x20	10-10	B126MXPP STARTEC-XP-P	20-25
	751424	100x6x20	6-10	B126MXPP STARTEC-XP-P	20-25
	763854	100x15x20	15-10	B126MXPP STARTEC-XP-P	20-25
	772440	100x12x20	12-10	B126MXPP STARTEC-XP-P	20-25
	740382	100x10x20	10-10	B126MXPP STARTEC-XP-P	20-25
	772442	125x6x20	6-10	B126MXPP STARTEC-XP-P	20-25
	772446	125x15x20	15-10	B126MXPP STARTEC-XP-P	20-25
	772443	125x10x20	10-10	B126MXPP STARTEC-XP-P	20-25
Shape	Type no.	DxTxH	U-X V	Specification	V opt. m/s
	772453	75x10x20	10-10 V15	B126MXPP STARTEC-XP-P	20-25
	772455	100x12x20	12-10 V45	B126MXPP STARTEC-XP-P	20-25
	772462	125x15x20	15-10 V15	B126MXPP STARTEC-XP-P	20-25
	772458	125x10x20	10-10 V15	B126MXPP STARTEC-XP-P	20-25
	772461	125x10x20	10-10 V45	B126MXPP STARTEC-XP-P	20-25
	772465	150x12x20	12-10 V10	B126MXPP STARTEC-XP-P	20-25
Shape	Type no.	DxTxH	W-X	Specification	V opt. m/s
	34211869	75x30x20	3-10	B107BXP-P STARTEC-XP-P	20-30
	34205432	100x35x20	3-10	B107BXP-P STARTEC-XP-P	20-30
	34184813	125x40x20	3-10	B107BXP-P STARTEC-XP-P	20-30
	34207564	100x20x20	2-10	B107BXP-P STARTEC-XP-P	20-30
	34163105	125x25x20	3-10	B107BXP-P STARTEC-XP-P	20-30
Shape	Type no.	BxCxL	Specification	PU	Comments
	678953	24x13x200	89A 240 H5A V83	10	Sharpening stick for STARTEC XP-P and HP

CNC tool grinding with metal-bonded diamond for wet grinding for tungsten carbide



Specifica-	Alumin-	Non and low-alloyed	High-alloyed steels	HSS	INOX	Tungsten	Industrial	Cast iron	Dry	Wet
tion	ium	steels				carbide	ceramics		grinding	grinding
		Unhardened Hardened	Unhardened Hardened							
STARTEC-XP-P, D STARTEC-HP, D									●	●

Recommended stock type



With this diamond wheel you can grind all tungsten carbide cutting tools for the wood and metal industry and a variety of shear blades. Grinding wheel sets for complete machining in the diamond grain size range D64 - D46. It is important that this wheel is only used for deep grinding.

The perfect combination of grit size, concentration and bond delivers exceptionally long tool lifetime and a high level of profile accuracy.

Shape	Type no.	DxTxH	U-X	Specification	V opt. m/s
	1A1	662236	75x6x20	6-10 D54MXPP STARTEC-XP-P	16-18
	679931	75x6x20	6-6	D54MXPP STARTEC-XP-P	16-18
	679936	75x10x20	10-6	D54MXPP STARTEC-XP-P	16-18
	742939	75x10x20	10-10	D54MXPP STARTEC-XP-P	16-18
	679938	100x6x20	6-6	D54MXPP STARTEC-XP-P	16-18
	695084	100x6x20	6-10	D54MXPP STARTEC-XP-P	16-18
	675436	100x15x20	15-10	D54MXPP STARTEC-XP-P	16-18
	679942	100x15x20	15-6	D54MXPP STARTEC-XP-P	16-18
	724476	100x12x31.75	12-10	D54MXPP STARTEC-XP-P	16-18
	679940	100x12x20	12-6	D54MXPP STARTEC-XP-P	16-18
	700297	100x12x20	12-10	D54MXPP STARTEC-XP-P	16-18
	694995	100x10x31.75	10-6	D54MXPP STARTEC-XP-P	16-18
	711619	100x10x31.75	10-10	D54MXPP STARTEC-XP-P	16-18
	679939	100x10x20	10-6	D54MXPP STARTEC-XP-P	16-18
	682530	100x10x20	10-10	D54MXPP STARTEC-XP-P	16-18
	679945	125x6x20	6-6	D54MXPP STARTEC-XP-P	16-18
	686906	125x6x20	6-10	D54MXPP STARTEC-XP-P	16-18
	679949	125x15x20	15-6	D54MXPP STARTEC-XP-P	16-18
	683963	125x15x20	15-10	D54MXPP STARTEC-XP-P	16-18
	711866	125x12x31.75	12-10	D54MXPP STARTEC-XP-P	16-18
679948	125x12x20	12-6	D54MXPP STARTEC-XP-P	16-18	
682529	125x12x20	12-10	D54MXPP STARTEC-XP-P	16-18	
685975	125x10x31.75	10-10	D54MXPP STARTEC-XP-P	16-18	

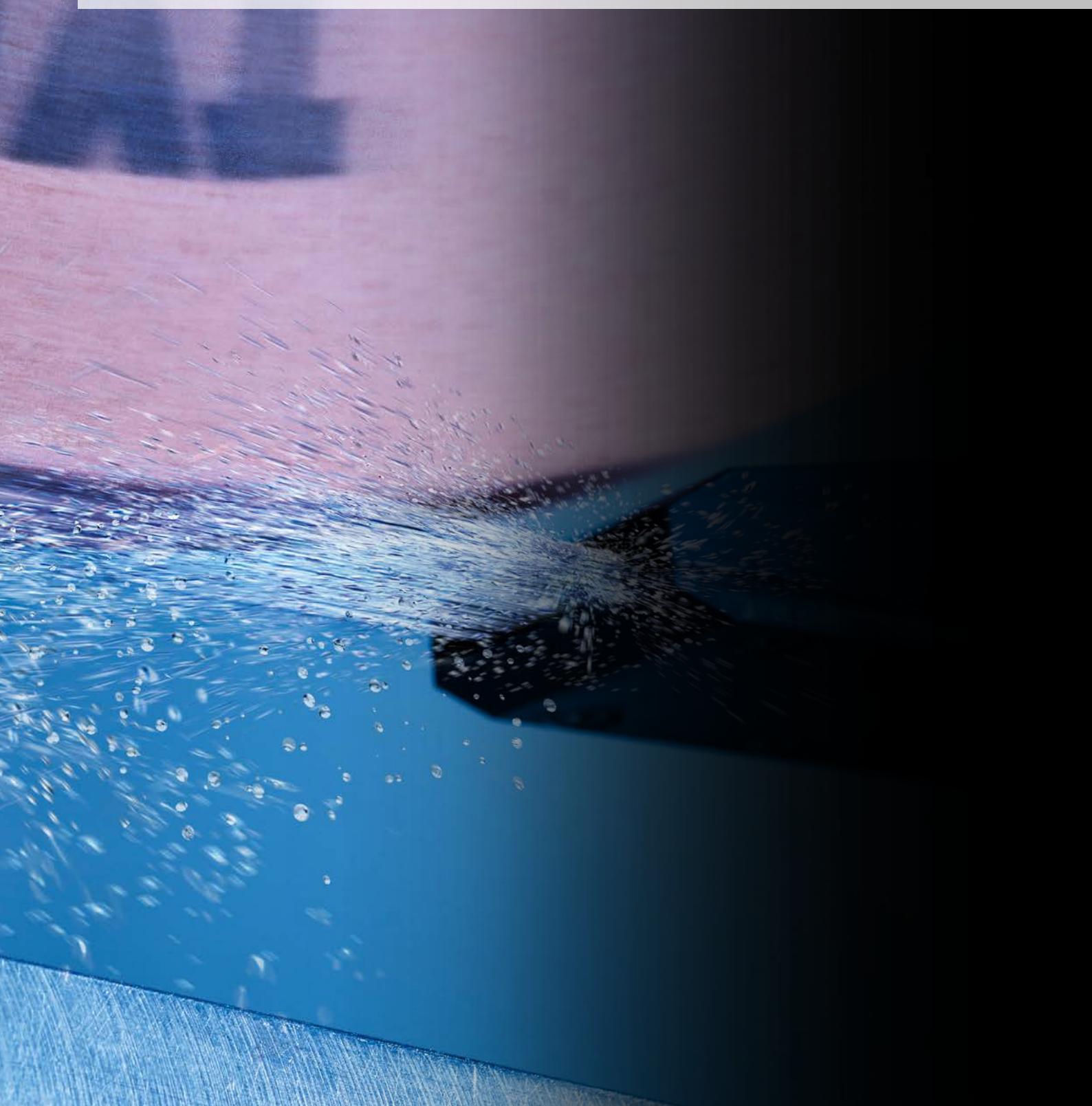


Shape	Type no.	DxTxH	U-X	Specification	V opt. m/s
	702678	125x10x31.75	10-6	D54MXPP STARTEC-XP-P	16-18
	679947	125x10x20	10-6	D54MXPP STARTEC-XP-P	16-18
	682527	125x10x20	10-10	D54MXPP STARTEC-XP-P	16-18
	684827	150x8x20	8-10	D54MXPP STARTEC-XP-P	16-18
	679953	150x15x20	15-10	D54MXPP STARTEC-XP-P	16-18
	679952	150x12x20	12-10	D54MXPP STARTEC-XP-P	16-18
	679951	150x10x20	10-10	D54MXPP STARTEC-XP-P	16-18
	572731	75x6x20	6-6	DN543MH STARTEC-HP	16-18
	474444	100x6x20	6-6	DN543MH STARTEC-HP	16-18
	490259	100x15x20	15-6	DN543MH STARTEC-HP	16-18
	556715	100x12x20	12-6	DN543MH STARTEC-HP	16-18
	408972	100x10x20	10-6	DN543MH STARTEC-HP	16-18
	572741	125x10x20	10-6	DN543MH STARTEC-HP	16-18
Shape	Type no.	DxTxH	U-X V	Specification	V opt. m/s
	680097	75x6x20	6-6 V15	D54MXPP STARTEC-XP-P	16-18
	680098	75x8x20	8-10 V15	D54MXPP STARTEC-XP-P	16-18
	680099	75x10x20	10-10 V15	D54MXPP STARTEC-XP-P	16-18
	680100	100x6x20	6-10 V15	D54MXPP STARTEC-XP-P	16-18
	680102	100x10x20	10-10 V15	D54MXPP STARTEC-XP-P	16-18
	680104	100x12x20	12-10 V15	D54MXPP STARTEC-XP-P	16-18
	680107	100x12x20	12-10 V45	D54MXPP STARTEC-XP-P	16-18
	680110	100x15x20	15-10 V15	D54MXPP STARTEC-XP-P	16-18
	680112	125x6x20	6-10 V15	D54MXPP STARTEC-XP-P	16-18
	680114	125x10x20	10-10 V15	D54MXPP STARTEC-XP-P	16-18
	680115	125x10x20	10-10 V45	D54MXPP STARTEC-XP-P	16-18
	680116	125x12x20	12-10 V15	D54MXPP STARTEC-XP-P	16-18
	680118	125x12x20	12-10 V45	D54MXPP STARTEC-XP-P	16-18
	680120	125x15x20	15-10 V15	D54MXPP STARTEC-XP-P	16-18
	680123	150x10x20	10-10 V10	D54MXPP STARTEC-XP-P	16-18
	680124	150x12x20	12-10 V10	D54MXPP STARTEC-XP-P	16-18
Shape	Type no.	DxTxH	W-X	Specification	V opt. m/s
	34039198	75x30x20	3-10	D64BXPP STARTEC-XP-P	18-24
	34065405	75x30x20	3-10	D46BXPP STARTEC-XP-P	18-24
	34039199	100x35x20	3-10	D64BXPP STARTEC-XP-P	18-24
	34065402	100x35x20	3-10	D46BXPP STARTEC-XP-P	18-24
	34065409	125x40x20	3-10	D46BXPP STARTEC-XP-P	18-24
	34065410	125x40x20	3-10	D64BXPP STARTEC-XP-P	18-24
	34044248	100x20x20	3-10	D64BXPP STARTEC-XP-P	18-24
	34065415	125x25x20	3-10	D46BXPP STARTEC-XP-P	18-24
	34056064	125x25x20	3-10	D64BXPP STARTEC-XP-P	18-24



TYROLIT

1.13 Dressing and sharpening





Dressing and sharpening

Grinding is an unsteady process, due to wheels wearing out - this results in changes in the bond, the abrasive grain and the shape of the grinding wheel.

The changes affect grinding forces, workpiece surfaces and geometric accuracy. To ensure the grinding wheel is always able to provide optimum grinding results, a periodic

conditioning cycle must be maintained. This cycle enables the grinding capability of the grinding body to be reproduced. By "conditioning" a grinding wheel correctly, the

subsequent grinding process can be optimised in terms of performance, efficiency and surface finish.

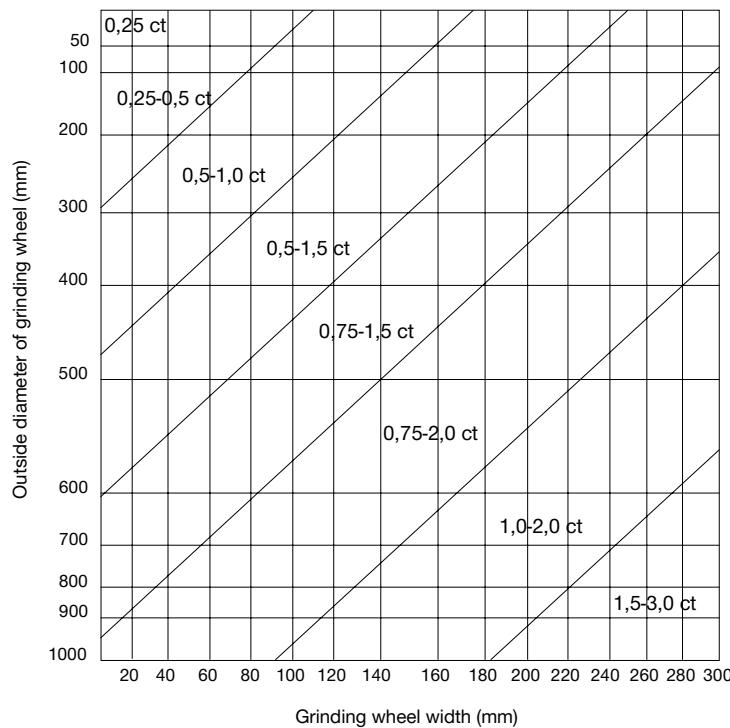
Choosing the right dresser

	Dressing tool	Grinding wheel profile	Grinding process/production type
Photo	Detailed description		
Single-edge	Single-grain dresser	 Linear (cylindrical, conical) Single-profile (convex, concave radii)	External cylindrical, surface, internal cylindrical and centreless grinding Single and small-lot production
	Profile diamond	 Multi-profile (complex profiles with steep flanks and narrow radii)	External cylindrical, surface and centreless grinding Single and small-lot production
	Multi-set diamond dresser	 Linear (cylindrical, conical)	Surface and external cylindrical grinding Single and small-lot production
	Multi-grain diamond dresser	 Linear (cylindrical, conical)	Surface and external cylindrical grinding Single and small-lot production
Multi-edge	Diamond grain dressing plate	 Linear (cylindrical, conical) Single-profile (convex, concave radii)	External cylindrical, surface and centreless grinding Single to large-scale production
	Needle dressing plates	 Linear (cylindrical, conical) Single-profile (convex, concave radii)	External cylindrical, surface and centreless grinding Single to large-scale production
	Dressing plates with MCD rods	 Linear (cylindrical, conical) Single-profile (convex, concave radii)	External cylindrical, internal cylindrical, surface and centreless grinding Single to large-scale production

Prevention of common mistakes when dressing

- + Return strokes with the dressing tool smoother the grinding wheel surface and reduce the cutting ability.
- + The free clamping length of the dresser is too large. Vibrations arise and the grinding wheel surface becomes irregular. This topography is reproduced on the workpiece in the subsequent grinding process.
- + The dressing infeed selected ($ae > 0.03 \text{ mm}$) is too high. This results in fracture of the bond bridges in the grinding wheel and the grains break out prematurely. The consequences are: a rough workpiece surface and increased dressing tool wear.
- + The cooling system is switched on too late: high temperatures lead to thermal deterioration and high wear. Remedy: the cooling system must be switched on before the first contact with the dressing tool.
- + Strongly rounded single-grain diamonds permanently alter the dressing results and the cutting ability of the wheel is consequently reduced.

Diamond size (carat) in relation to grinding wheel dimensions



Interrelationship of profile radius | grit size

The table below provides an overview of which grit size can achieve a minimum profile radius. As a standard value, it can be assumed that three abrasive grains are required to maintain a minimum profile radius. To achieve a profile radius of 0.3 mm, an approximate grit size diameter of 0.1 mm is required.

Grit size	36	46	60	80	100	120	150	180	220	
Min. profile radius	mm	1	0.80	0.60	0.45	0.30	0.20	0.15	0.12	0.10
	Inches	0.04	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.00

Interrelationship of surface roughness | grit size

The table below will help you select the right grit size to achieve the required surface roughness result. Variable process parameters (e.g. the dressing method) have a significant effect as to which surface roughness can be achieved with a certain grit size. For this reason, the following table also lists the surface areas/grit size.

You should take into account that large grit sizes facilitate the removal of chips (material). It is not necessary to select the finest grain for each initial selection of the grit size.

Surface	Micro inch CLA µm Ra	Grit size									
		36	46	60	80	100	120	150	180	220	
42	1.10	●									
32	0.80	●	●								
26	0.70		●								
21	0.50		●	●							
16	0.40			●							
14	0.35			●	●						
11	0.25				●						
8	0.20				●	●					
7	0.17					●					
6	0.14					●	●				
5	0.12						●	●			
4	0.10							●	●		
3	0.08								●	●	
2	0.05									●	

Application tips

- Ensuring sufficient coolant supply while dressing increases lifetime (to prevent thermal overload of dressing diamonds)
 - The active width (b_d) describes the effective diamond width of the dressing tool for a certain infeed depth when dressing
 - With the overlap rate (U_d), surfaces and stock removal rates can be significantly influenced
- The overlap rate (U_d) defines the number of grinding wheel rotations during which the dressing tool has deployed to its active width
 - An increased overlap rate makes the grinding wheel surface smoother and, as a consequence, the actual surface roughness lower

- Standard values for the overlap rate:
 - Roughing 2–3
 - Standard grinding 4–6
 - Fine grinding ≥7

The formulas specified only apply to dressers with defined effective widths b_d (single-grain dresser, dressing plate)

$$U_d = \frac{\text{Diamond effective width}}{\text{Tool feed}} = \frac{b_d \cdot n_s}{v_d}$$

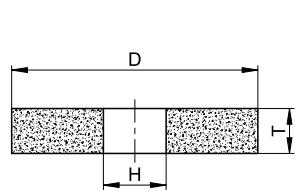
$$v_d = \frac{n_s \cdot b_d}{U_d}$$

b_d = dressing tool effective width

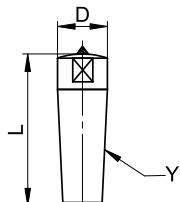
n_s = wheel speed

v_d = feed speed of dresser

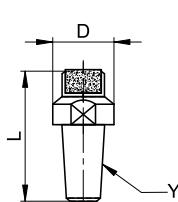
Shapes



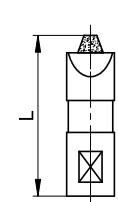
Shape 1



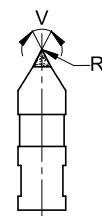
Shape 50EA



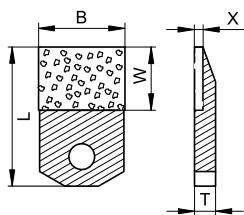
Shape 50MA



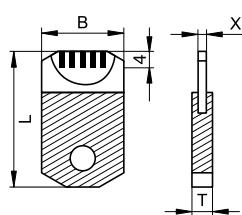
Shape 50PD



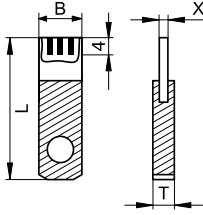
Shape 50AP 1



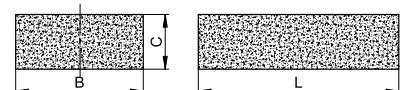
Shape 50AP 2



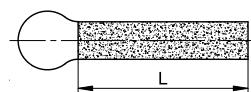
Shape 50AP 3



Shape 50AP 4



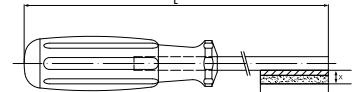
Shape 90AS



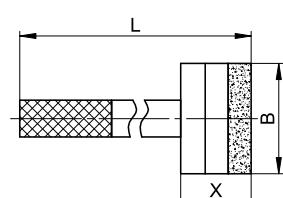
Shape 90AR



Shape STSEG A



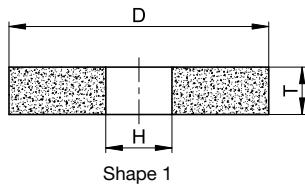
Shape STSEG C



Shape 50HAG

Brake dressing

Dressing wheels for diamond and wheels



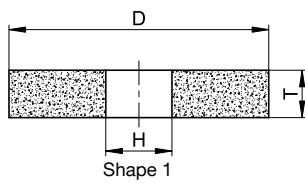
These dressing wheels are used for dressing all types of diamond and CBN grinding wheels, regardless of their bond systems. Sensitive layers can also be dressed with minimal grinding pressure.

Please be aware that electroplated wheels cannot be dressed with them. The silicon carbide wheels are available in 200–250 mm diameters.

Shape	Type no.	DxTxH	Specification	Comments
	1	34382840	C 240 K5A V18	For grit sizes D39 - D20
		34382881	C 240 K5A V18	For grit sizes D39 - D20
	209658	150x6x32	C 150 H5 V18	For grit sizes D54 - D39
	786852	200x12x76,2	C 120 K5 V15	For grit sizes ≤ D91
	34163206	200x20x20	C 120 J5 V15	For grit sizes ≤ D91
	413027	250x12x51	C 120 H5A V18	For grit sizes ≤ D91
	250491	250x12x51	C 80 H8 V15	Standard hardness, for grain sizes D151-D64
	619701	250x12x51	C 80 J5 V15	Harder than standard, for grit sizes D151-D64

Dressing device for brake dressing

Dressing wheels for diamond and CBN grinding wheels



These dressing wheels are used for dressing all types of diamond and CBN grinding wheels, regardless of their bond systems. The AV500 dressing device is ideally suited to dressing resin and metal-bonded wheels during dry grinding.

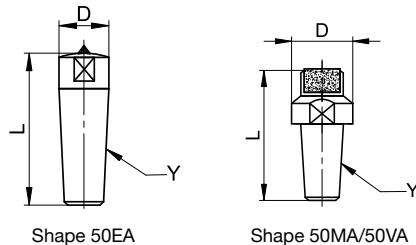
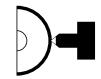
The silicon carbide wheels are available in a 75 mm diameter. Use the 1C70M5V15 specification for robust layers only.

Shape	Type no.	Description	PU	Comments
	96	AV500	3	For concentrically trueing resin and metal-bonded diamond and CBN grinding wheels. Optimum results up to grinding wheel diameter of 250 mm
	34045604	AVB		Replacement brake pads

Shape	Type no.	DxTxH	Specification	PU	Comments
	1	473304	C 120 J5 V15	10	Agathon
	7035	75x25x12.7	1C 70 M5 V15	10	Long life, for wider layers, D151-D64
	443944	75x25x12.7	1C 80 G7 V15	10	Standard hardness, for grain sizes D151-D64
	448482	75x25x12.7	C 80 J5 V18	10	Harder than standard, for grit sizes D151-D64

Stationary dressing

Single-grain dresser, multi-grain dresser, multi-grain diamond dresser



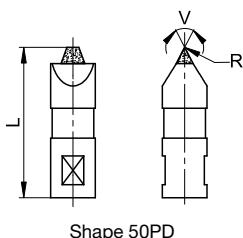
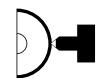
The TYROLIT single-grain, multi-grain and multi-grain diamond dressers are ideal for dressing all aluminium oxide and silicon carbide wheels. Multi-grain and multi-grain diamond dressers are often used for surface and external cylindrical grinding wheels. Large and wide wheels require a higher carat number to reduce diamond wear.

Single-grain dressers are graded according to diamond size. Multi-grain and multi-grain diamond dressers therefore have a higher carat content.

Shape	Type no.	DxL	Y/AUFN	Specification	ct	Comments
50EA	856232	9,3x31,5x8	MK0	DD 10 ST	1,0	For conventional tools; Single dressers for cylindrical and surface grinding machines; Wrench width for MK0 and MK1 only
	331997	14x57x12	MK1	ED 15 ST	1,5	
	313466	12,4x49x10	MK1	BD 5 ST	0,5	
	316272	12,4x49x10	MK1	BD 10	1,0	
	313127	8x90	8ZYL	BD 5 ST	0,5	
	363249	10x90	10ZYL	ED 5 ST	0,5	
	611499	10x90	10ZYL	ED 10 ST	1,0	
50MA	446432	12x50	10x10x37	M65	2,5	Diamond grains set in layers
	446453	12x90	10x10x77	M65	2,5	
	315877	14x57x12	10xMK1	M65	2,5	
	316286	14x57x12	10xMK1	M125	2,5	
50VA	34173161	10x60	10ZYL	V800-8X11	2,4	Irregular distribution of diamond grains
	34172978	14x42x12	11xMK0	V800-8X11	2,4	
	34172980	14x57x12	11xMK1	V800-8X11	2,4	

Stationary dressing

Profile diamonds

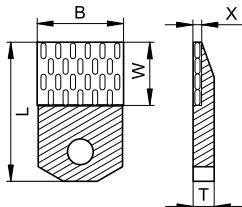


Profile diamonds are used for dressing all conventional profile grinding wheels made of aluminium oxide or silicon carbide. The huge advantage of profile diamonds is that they can be reground using a special process. They are frequently used with Diaform and CNC-controlled grinding machines.

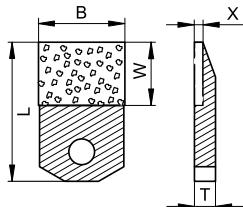
Shape	Type no.	B/L2xY/AUFN/V/R	Specification	ct
50PD	475960	44,5xDF/V40/R250	D 0,4 ST	0,4
	477837	44,5xDF/V60/R750	D 0,4 ST	0,4

Stationary dressing

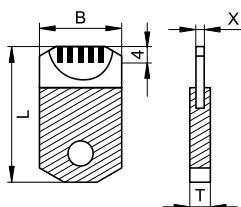
Diamond dressing plates/CSS dressing plates



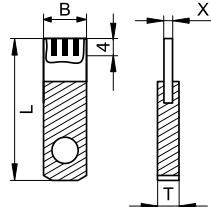
Shape 50AP 1



Shape 50AP 2



Shape 50AP 3



Shape 50AP 4

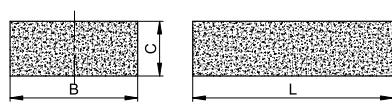
The dressing plates are a high-quality alternative to conventional single-grain diamonds. They are ideal for dressing all aluminium oxide and silicon carbide wheels. They are primarily used for dressing wide wheels and profile wheels with a shallow edge.

By using dressing plates it is possible to achieve maximum precision in the dressing process.

Shape	Type no.	BxLxT	W-X	Specification	Comments
50AP 2	477753	10x33x5	15-1.15	B115	sintered on sides; for cylindrical and surface grinding machines, for straight and simple profile
	477746	20x33x5	15-1.4	A140	
	476859	20x33x5	15-1.15	A115	
50AP 1	477755	10x33x5	15-1.8	B180	Needle dressing plates
	477760	20x28x5	10-1.8	C180	
	477749	20x33x5	15-1.8	A185	
50AP4	853704	10x33x5	10-2	W3R071004	For aluminium oxide wheels; long life; 3 dia rods
50AP3	853680	20x33x5	10-2	W5R071004	For aluminium oxide wheels; long life; 5 dia rods

Hand-operated dressing

Dressing sticks for aluminium oxide and silicon carbide grinding wheels



Shape 90AS

Dressing sticks are ideal for dressing all aluminium oxide and silicon carbide wheels. They can be used as an inexpensive dressing tool for vitrified-bonded bench grinding wheels.

Dressing sticks are only available in black silicon carbide.

Shape	Type no.	BxCxL	Specification	PU
90AS	43311	25x25x150	C COARSE	10
	27627	50x6x200	A240	1
	9009	50x20x150	C COARSE	1
	153	50x25x200	C MEDIUM	1
	6216	50x25x200	C COARSE	1

Hand-operated dressing

Dressing tubes



Shape 90AR

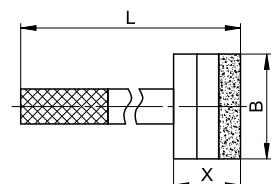


The dressing tubes are ideal for dressing all aluminium oxide and silicon carbide wheels. They can be used as an inexpensive dressing tool for vitrified-bonded bench grinding wheels.
Dressing tubes are only available in green silicon carbide.

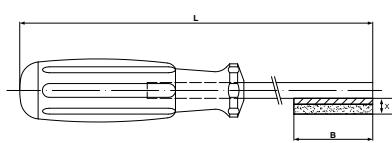
Shape	Type no.	DxL	Specification
90AR	351767	17x290	C 16 - B

Hand-operated dressing

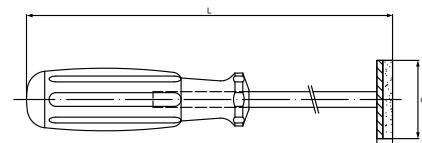
Diamond dresser



Shape 50HAG



Shape STSEG C



Shape STSEG A

This diamond dresser provides you with a high-quality dressing tool for bench grinding wheels in the precision machining sector. Depending on their design they can be used for peripheral or lateral face machining.

The diamond dressers therefore have either a diamond segment soldered on the face or longitudinally.

Shape	Type no.	LxBxX	Specification	Comments
50HAG	477724	185x20x8	D 30 ST	Steel shaft, diamond segment face
	477726	185x30x10	D 26 ST	
	477254	250x40x10	D 35 ST	
STSEG	195112	185x40x8	HA_DIA	Plastic handle, diamond segment face
	34057995	185x40x8	HA_DIA	Plastic handle, diamond segment longitudinally

Hand-operated dressing

Grinding wheel dresser set



This dresser set is used primarily for large resin-bonded bench grinding wheels and, above all, is put to good use in the foundry industry. Steel rollers enable you to achieve efficient dressing and sharpening of the wheel.

The huge advantage of this dressing tool is that it can be quickly and easily re-equipped with replacement rollers.





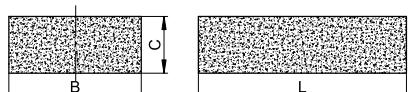
Shape	Type no.	Specification	D	T max	Grit size	Hardness
	100AKO	S3610	120-250	40	24-80	H-Q
	74497	S3611	300-600	63	16-60	H-Q
	117871	S3612	300-600	63	16-60	H-Q
	100AKO	S3613	300-600	70	16-60	H-Q

Replacement parts

Shape	Type no.	DxTxH	Specification	PU	Comments
	100ARO	36x21x8	S3610	1	
	74493	55x39x12	S3611	1	
	75915	55x65x12	S3612	1	Replacement rollers
	100ARO	40x2x10	S3613	1	
	132297		S3613		Replacement part set

Hand-operated dressing

Sharpening sticks for diamond and CBN grinding wheels



Shape 90AS

The TYROLIT sharpening sticks sharpen and clean all CBN and diamond grinding wheels, and are used in production and re-sharpening applications. The sticks are made of aluminium oxide and are available in grit sizes 120-600. They can be used for hand-operated and mechanical applications.

Shape	Type no.	BxCxL	Specification	Grit size	PU
	845593	24x13x100	89A 120 H7A V17	≥ 126	10
	845594	24x13x100	89A 120 J7A V17	≥ 126	10
	845595	24x13x100	89A 240 J7A V17	> 46 and < 126	10
	577953	24x13x200	89A 600 J5A V83	≤ 46	10
	678953	24x13x200	A 240 STARTEC	STARTEC XP-P and HP	10
	33531	25x13x100	89A 600 -25 V83	≤ 46	10
	932780	25x13x200	89A 240 H5A V83	> 46 and < 126	10
	466470	25x25x150	89A 220 I5A V217	> 20 and < 39	10
	58385	30x13x200	89A 240 J7A V17	> 20 and < 39	10
	112055	50x25x200	50C 220 C4 B22	> 46 and < 126	1
	251584	50x25x200	89A 600 -25 V83	≤ 46	1
	391718	50x25x200	89A 240 -35 V83	> 46 and < 126	1
	395773	50x25x200	89A 120 H7A V17	≥ 126	1
	460976	50x25x200	89A 120 J7A V17	≥ 126	1
	464290	50x25x200	89A 240 J7A V17	> 46 and < 126	1





Notes

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Safety cutting and grinding

Safety brand TYROLIT

We strive to provide operators with products with maximum safety. We achieve this through our work as the founder member of the “Organisation for the Safety of Abrasives (oSa)”, through close cooperation with the safety authorities and through practical communication with our operators across the globe.

aim of oSa®

The main aim of oSa® is defined in terms of absolute protection for the users of grinding tools, whereby members undertake to provide a consistently high level of quality, adopt a rigorous approach towards quality assurance and strive to develop new, improved standards of safety.



TYROLIT quality management system

The TYROLIT quality management system has been certified to ISO 9001:2015 for the entire production area by an external authorised body. The products are manufactured and tested in line with European safety standards:

- EN 12413 for grinding wheels made of bonded abrasives
- EN 13236 for grinding wheels made of diamond or boron nitride
- EN 13743 for special abrasives on an underlay such as vulcanised fibre grinding wheels, flap grinding wheels, flap discs and mounted points

On account of the fact that in the approval principles (EN-Standard) very high requirements are set on the grinding tools concerning defined technical grinding parameters, TYROLIT delivers all grinding tools corresponding to these principles. As a result we guarantee a constantly high safety level, even in countries without compulsory approvals.

Final inspection – checks at TYROLIT

TYROLIT carries out final inspections in accordance with EN safety standards. In addition, internal testing procedures are also used to determine efficiency and material properties.

Resin bonded products undergo a final inspection regarding an identification test, as well as a geometry, imbalance, bursting, side load and a visual test, followed by a grinding and cutting testing process.

Resin and ceramic bonded products undergo a final inspection regarding a visual test, an identification test, a geometry, imbalance, bursting and side load test as well as a test run, including a sound test.

Safety

Safety during a grinding process is ensured by the machine manufacturer, the grinding wheel producer and the user.

Grinding wheels are subject to a high load during the grinding process. This is why grinding machines, grinding bodies, handling and application must be optimally harmonised to ensure safe grinding. For the grinding machines, it is especially important to observe the machine conditions and the stipulation of the protection cover.

Whereas manufacturers implement the safety measures in line with regulations during the production of the grinding machine and grinding wheels, the user is responsible for safety when grinding by using the grinding machine for the intended purpose, as well as by correct handling and application of the grinding wheels.

The following must be considered:

- Examine the grinding tools on delivery
- Correct handling and storage of grinding tools
- Labelling, matching with machine data
- Examination of the grinding wheels prior to clamping
- Choose correct methods for grinding wheels
- Test run of grinding tools prior to start-up
- Eye protection and protective clothing (see also FEPA safety code)

Storage of the grinding wheels

Grinding wheels are to be stored in suitable racks or containers, to avoid damage and so that it is easily possible to remove wheels without disturbing the storage setup. Older stock should be used first.

During storage, the following must be noted

Store the grinding wheels in a dry, and protected environment to avoid rusting and do not expose grinding wheels to large temperature fluctuations.

Storage for different types of grinding tools

- Store cut-off wheels on a level underlay without intermediate layers and weigh them down with a steel or cast iron plate
- Store large straight grinding wheels in an upright position and make sure they cannot roll away
- Stack cylinder wheels, cylindrical grinding discs and grinding plates by using soft intermediate layers
- Stack cone-shaped grinding discs, shape 11, together by either their front or bottom side
- Store small grinding wheels in suitable containers

Checking of grinding wheels on delivery

Check packaging on delivery. If damage is visible on the packaging, the grinding wheel should be checked particularly thoroughly for any possible transport damage.

Identification of the grinding wheels

The purpose of the identification is to give people, in particular those who carry out the clamping of the grinding wheels, information for safe use and proper application.

Grinding wheels may only be used if they are identified with the following minimum information

- Manufacturer
- Dimensions of grinding wheel
- Material (at least the type of bond)
- Maximum permissible RPM of new grinding wheel and maximum operating speed in m/s

The user is obliged to match the machine speed to the maximum permissible speed given in the identification.

Checking of grinding wheels prior to clamping

Each time before clamping, the grinding wheels must be cleaned and checked visually for damage.

The sound test should be repeated. Damaged grinding wheels must not be mounted.

For the sound test, lightweight grinding wheels are put onto a mandrel or a finger, heavy grinding wheels are placed on firm ground.

The grinding wheel is tapped with a non-metal object on several points.

An undamaged grinding wheel gives a clear ring, while a damaged one gives a dull or clanking sound.

All contact surfaces on grinding wheels, intermediate layers and wheel flanges must be level (flat) and be free of foreign bodies. Foreign particles between grinding wheels and wheel flanges create pressure points and tension, which can lead to the grinding wheel breaking.

Clamping methods for grinding wheels

Depending on the type of machine and grinding method, as well as the grinding wheel shape, a distinction can be made between the following clamping methods

- Mounting by the central bore using wheel flanges
- Mounting by using embedded fixing elements
- Mounting by using support plates
- Mounting by using clamping head

Mounting by the central bore using wheel flanges

A distinction should be made between the following wheel flange types for central bores

- Recessed wheel flange
- Straight wheel flanges for portable grinding machines
- Special flanges
- Stepped flanges
- Locating flanges and tapered wheel flanges

The purpose of the wheel flanges is to transfer drive forces. They must therefore be in such a condition that there is no deformation of the wheel flange during clamping. The contact surfaces must be level (flat) and must not show any burring, and the run-out of the grinding wheel must be safeguarded.

Only wheel flanges that have the same external diameter and the same shape on the contact side may be used. They must be recessed so that only a ring-shaped area of the wheel flange is on the surface.

Clamping by using embedded fixing elements

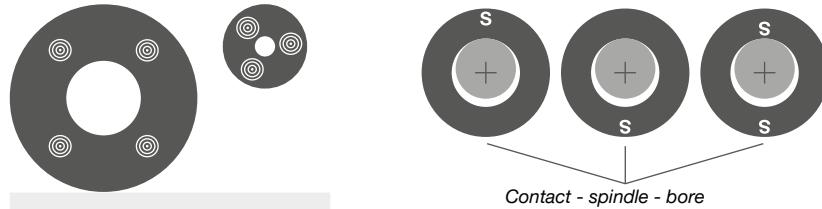
The grinding wheels are fixed by using embedded fixing elements on the grinding machine. Examples of this are the clamping of cylindrical and taper cup wheels, or the fixing of mounted points with embedded steel shafts in collets on portable grinding machines.

Clamping of grinding wheels on support plates

Grinding wheels will be either screwed or stuck together with the support disc.

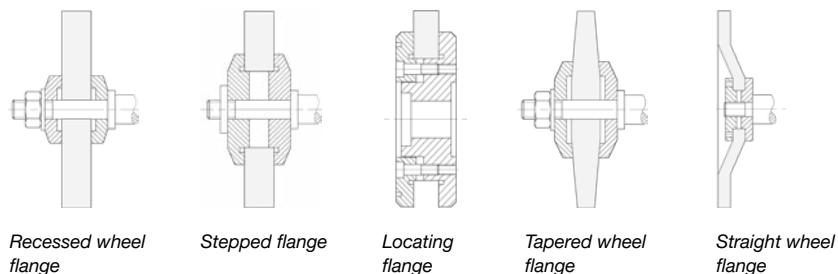
Clamping of grinding segments in clamping heads

Grinding segments are clamped to one grinding unit (segment head) in clamping heads. On the contact surfaces between the grinding segments and the clamping pieces, adhesive strips can be placed on the grinding segments to avoid tension in the grinding segments.



Examples of tapping points
during the sound test

Examples of identifying wheel orientation



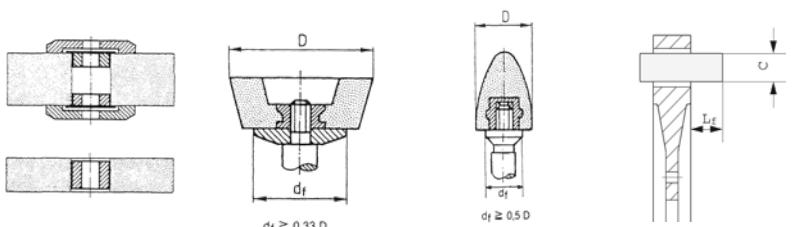
Recessed wheel flange

Stepped flange

Locating flange

Tapered wheel flange

Straight wheel flange



Example of the correct
way to use reducing
rings

Clamping of taper cup
wheels with a thread
insert

Clamping of a grinding
cone, shape 16, with a
thread insert

Clamping of grinding
segments in clamping
heads $L_f = 1.5 C$

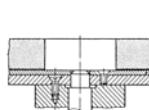


Figure 1

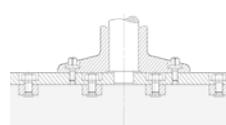


Figure 2

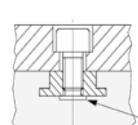


Figure 3

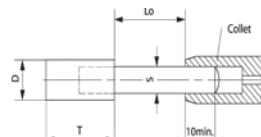


Figure 4

Fig. 1: Grinding wheel, stuck together

Fig. 2: Grinding wheel screwed together with the support disc

Fig. 3: Correct bolt connection, bolt end must not touch the base of the grinding wheel

Fig. 4: Clamping of mounted points

Test run prior to start-up

Every grinding wheel without a diameter restriction must undergo a test run at maximum operating speed before being used for the first time and after every re-clamping.

The duration of a test run is one minute.

The test run may only be carried out once the danger zone has been secured and once the protective cover, if necessary, is attached. The grinding wheel can only be used for the intended work once the test run has been passed without complaint.

Summary

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

- Adjustment of the machine data to the identification data
- Checking of grinding wheels prior to mounting
- Knowledgeable mounting
- Checking the functionality of the protective cover
- Test run of grinding wheels prior to grinding work
- Personal safety

Eye protection and protective clothing

All grinding tasks where people are at risk of flying particles off of grinding wheels or workpieces must only be carried out using eye protection (safety glasses) and, if necessary, other protective clothing (e.g. leather apron and leather gloves).

Safety information



Use gloves



Use dust mask



Wet grinding



Not permitted for side grinding



Use eye protection



Declaration of conformity,
EN safety standard



Dry grinding



No freehand work



Use ear protection



Pay attention to the safety recommendations



Do not use damaged wheels



Free from Fe, S, Cl

Do's & don'ts

- ✓ 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 before mounting.
- ✓ Make sure that the speed of the machine (RPM) does not exceed the maximum operating speed specified on the packaging or on the grinding tool.
- ✓ 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 between the grinding wheel and wheel flanges.
- ✓ Only use machines with protective covers 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 the protective cover is mounted correctly. In doing so, ensure 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 are recommended.
- ✓ When working with cut-off or rough-grinding 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.
- ✓ Only use machines that are also suitable for grinding tools with hub.
- ✓ Before stopping the machine, cut off the supply of cooling lubricant and remove the excess cooling lubricant from the grinding wheel.
- ✗ 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 the purpose.
- ✗ Never exceed the specified maximum permissible operating speed.
- ✗ Do not use wheel flanges with surfaces that are not free of foreign bodies (e. g. grinding swarf), flat or burrfree.
- ✗ Do not tighten the clamping device or wheel flange too much.
- ✗ Do not use recessed wheel flanges or flanges with recesses for grinding discs or cones.
- ✗ Never use force when clamping and do not make any changes to the grinding tool.
- ✗ Only use one-way adapters (hubs) once.
- ✗ 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 create excessive grinding particles and dust.
- ✗ Avoid mechanical damage to the grinding wheel as a result of force effects, jolting or heating.
- ✗ Never use grinding machines in an improper condition or which contain faulty components.
- ✗ Do not use cut-off wheels for grinding work (do not exert a lateral load on any cut-off wheels of shape 41 or 42).
- ✗ Never mount more than one grinding tool on one shaft.
- ✗ Never use grinding tools after the indicated expiry date. This is expressed as a month and year (e.g. 04/2016) and is usually located on the metal ring around the bore on cut-off or rough-grinding wheels. On other tool types (e.g. cup wheels), the expiry date may also be located on the label.

Speed recommendations

Rotational speeds and peripheral speeds depending on the external diameter $\varnothing=D$ of the grinding wheels.

D in mm	Rotations n per minute min-1 depends on external diameter D of grinding wheel and the maximum operating speed V_s										
	16	20	25	32	35	40	50	63	80	100	125
3											
4	75 300	95 400									
5	61 100	76 300	95 400								
6	50 900	63 600	79 500								
8	38 100	47 700	59 600	76 300	83 500	95 400					
10	30 500	38 100	47 700	61 100	66 800	76 300	95 400				
13	23 500	29 300	36 700	47 000	51 400	58 700	73 400	92 500			
16	19 000	23 800	29 800	38 100	41 700	47 700	59 600	75 200	95 400		
20	15 200	19 000	23 800	30 500	33 400	38 100	47 700	60 100	76 300	95 400	
25	12 200	15 200	19 000	24 400	26 700	30 500	38 100	48 100	61 100	76 300	95 400
32	9 540	11 900	14 900	19 000	20 800	23 800	29 800	37 600	47 700	59 600	74 600
35	8 730	10 900	13 600	17 400	19 000	21 800	27 200	34 300	43 600	54 400	68 200
40	7 630	9 540	11 900	15 200	16 700	19 000	23 800	30 000	38 100	47 700	59 600
50	6 110	7 630	9 540	12 200	13 300	15 200	19 000	24 000	30 500	38 100	47 700
63	4 850	6 060	7 570	9 700	10 600	12 100	15 100	10 000	24 200	30 300	37 800
80	3 810	4 770	5 960	7 630	8 350	9 540	11 900	15 000	19 000	23 800	29 800
100	3 050	3 810	4 770	6 110	6 680	7 630	9 540	12 000	15 200	19 000	23 800
115	2 650	3 320	4 150	5 310	5 810	6 640	8 300	10 400	13 200	16 600	20 700
125	2 440	3 050	3 810	4 880	5 340	6 110	7 630	9 620	12 200	15 200	19 000
150	2 030	2 540	3 180	4 070	4 450	5 090	6 360	8 020	10 100	12 700	15 900
175	1 740	2 180	2 720	3 490	3 810	4 360	5 450	6 870	8 730	10 900	13 600
180	1 690	2 120	2 650	3 390	3 710	4 240	5 300	6 680	8 480	10 600	13 200
200	1 520	1 900	2 380	3 050	3 340	3 810	4 770	6 010	7 630	9 540	11 900
225	1 350	1 690	2 120	2 710	2 970	3 390	4 240	5 340	6 790	8 480	10 600
230	1 320	1 660	2 070	2 650	2 900	3 320	4 150	5 230	6 640	8 300	10 300
250	1 220	1 520	1 900	2 440	2 670	3 050	3 810	4 810	6 110	7 630	9 540
300	1 010	1 270	1 590	2 030	2 220	2 540	3 180	4 010	5 090	6 360	7 950
350	870	1 090	1 360	1 740	1 900	2 180	2 720	3 430	4 360	5 450	6 820
400	760	950	1 190	1 520	1 670	1 900	2 380	3 000	3 810	4 770	5 960
450	670	840	1 060	1 350	1 480	1 690	2 120	2 670	3 390	4 240	5 300
500	610	760	950	1 220	1 330	1 520	1 900	2 400	3 050	3 810	4 770
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900	330	420	530	670	740	840	1 060	1 330	1 690	2 120	2 650
1 000	300	380	470	610	660	760	950	1 200	1 520	1 900	2 380
1 060	280	360	450	570	630	720	900	1 130	1 440	1 800	2 250
1 250	250	310	390	500	550	630	790	1 000	1 270	1 590	1 980
1 500	200	250	310	400	440	500	630	800	1 010	1 270	1 590

A photograph of two men in a workshop setting. One man, wearing a blue Tyrolit jacket, holds a silver iPad and looks at it while the other man, wearing a black Tyrolit hoodie, leans in to look over his shoulder. They are standing next to a workbench with blue tool boxes.

Quick product search

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477755	9003174777557	9009014777558	147
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477837	9003174778370	9009014778371	146
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