

**YOUR PARTNER IN
MEDICAL TECHNOLOGY**
Tools and System Solutions

Premium grinding tools since 1919
www.tyrolit.com

TYROLIT

TYROLIT Group

A global company

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

Day in, day out, the experts at TYROLIT work on delivering tailor-made solutions for customers around the world, helping to make their businesses successful. Around 80,000 available products set the standards in a wide variety of industries.



TYROLIT company headquarters in Schwaz, Austria

TYROLIT business units



Metal/Precision

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



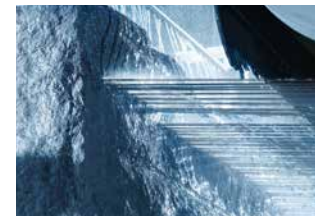
Trade

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



Construction

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



Stone–Ceramics–Glass

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

A competent partner in medical technology

The demands in terms of quality and economic efficiency are continuously rising in the medical technology industry. This in turn means that grinding tools also have to meet higher requirements. TYROLIT has long-standing experience and a high level of expertise in grinding solutions for use in medical technology.

With the wide product range, TYROLIT is therefore able to offer our customers particularly high-quality products for numerous grinding cutting and polishing applications. Furthermore, TYROLIT tools guarantee optimum processes, higher productivity as well as absolute product safety.

Our services for the medical technology industry at a glance

Global presence

Application technology

Innovative products

Customised solutions



Global presence In your vicinity

Global presence

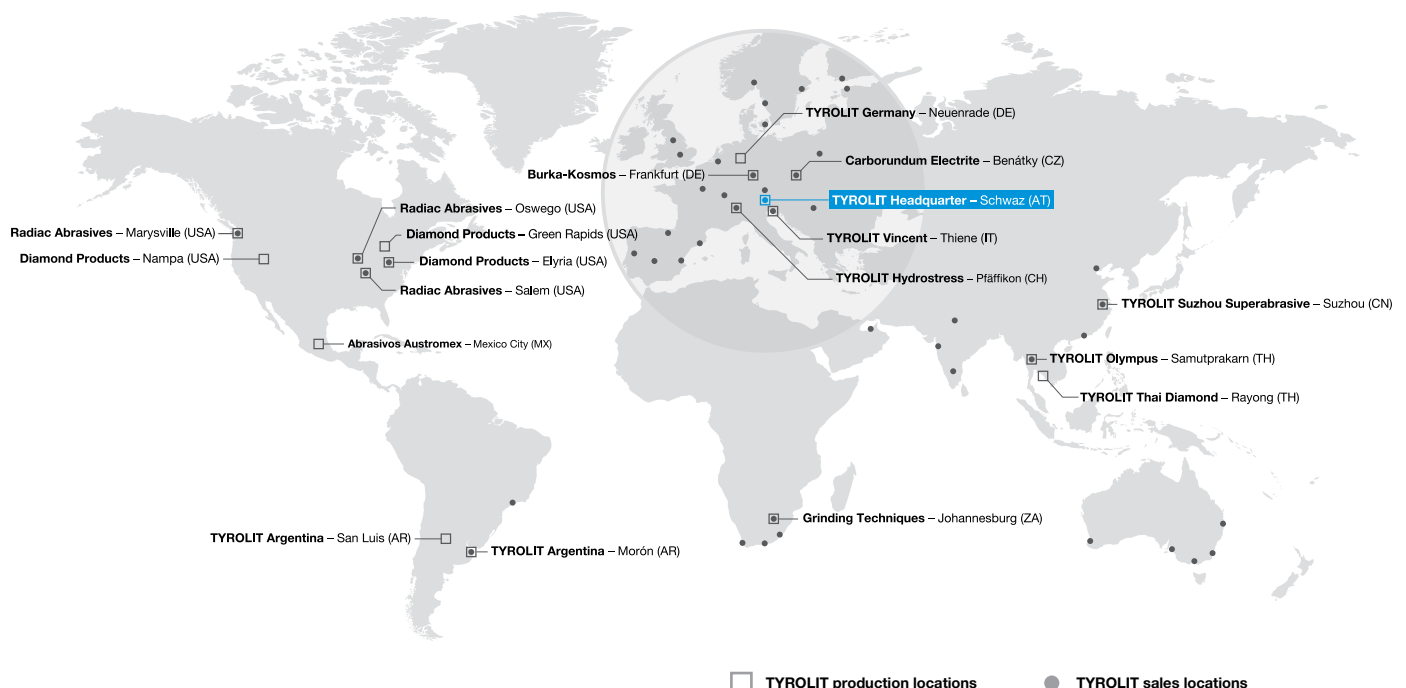
TYROLIT stands for global thinking and activities. With a worldwide sales network currently in 65 countries and with our own production plants in 12 countries on five continents, we offer our customers all the advantages of a globally operating company.

Local availability

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

Your benefits

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



Application technology

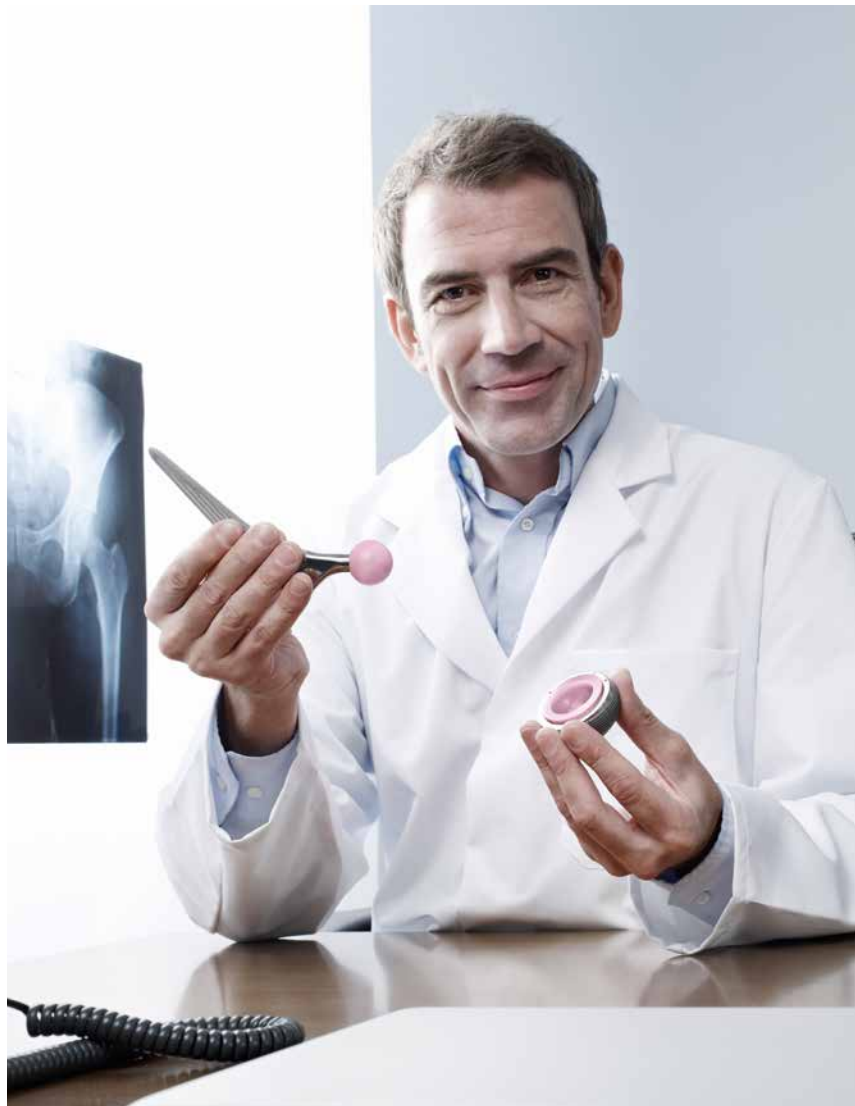
The best grinding solutions for your processes

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

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

Your benefits

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



Innovative products for machining medical workpieces

Based on the requirements of its medical technology customers, TYROLIT continuously produces new, high-quality and particularly cost-efficient products. All the development activities are conducted in close co-operation with machine manufacturers and universities. With numerous innovative products and solutions, TYROLIT has been successful on the medical technology market for many years.

Resin bonded honing sleeve for increasing productivity:

Especially developed for polishing femoral metal heads of the hip joint, the TYROLIT sleeve with the special resin bond system improves your surface quality and shortens the cycle time of your manufacturing process.



Vitrified CBN grinding tools with highest grinding layer for extended wheel life on the machine: Due to the special manufacturing process very high grinding layers on single or double wheels are possible to shorten the setup-costs in the grinding process.



ELASTIC fine grinding and polishing tools: TYROLIT has been producing elastic-bonded grinding tools since 1985. These products have been continuously improved and adapted to the increasing requirements in terms of surface finish and design.



Modern implant technology Developed for people

The growing demand on the part of the general public for health in old age requires a growing number of surgical operations and treatments.

Owing to longer life expectancy, in conjunction with the desire for greater mobility in old age, the demand for surgical implants is ever increasing. Additionally increasing affluence and the ensuing increase in obesity results in a premature need for joint implants.

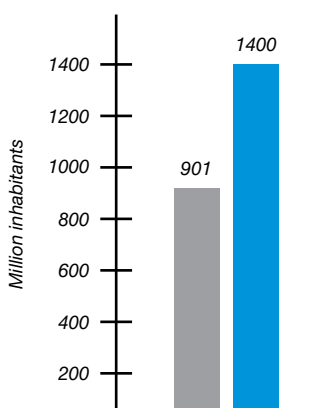
Worldwide orthopaedic product sales volume: 2011: US\$ 43.1 billion
Source: Orthoworld 2015: US\$ 46.6 billion

Implant technology – growth factors

The number of people over 60 will increase worldwide to approx. 1.4 billion until 2030. Life expectancy will increase by ca. 10% until 2030.

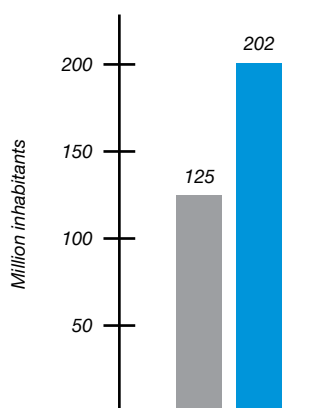
Population aged over 60 years

Worldwide ■ 2015 ■ 2030



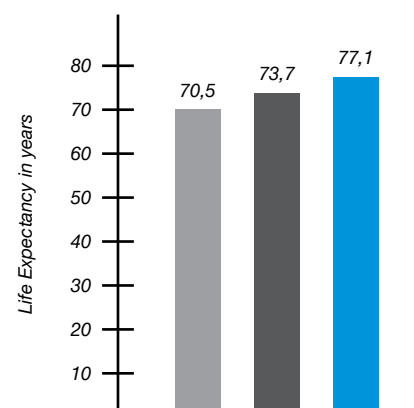
Population aged over 80 years

Worldwide ■ 2015 ■ 2030



Life Expectancy

Worldwide ■ 2015 ■ 2030 ■ 2050



Source: OECD Indicators

Customer-specific solutions Tailored for your industry

In medical technology, in particular for the machining of medical devices like hip and knee joints, trauma implants, surgical instruments or hypodermic needles, customers demand the highest standards with regard to the quality of the tools produced.

In order to ensure the best possible solution for your application, TYROLIT offers individually developed products

for numerous different fields of application. Please see the following pages for detailed descriptions of

these tools as well as their respective fields of application (including stock availability).

Medical device	Medical component	Application	Our product recommendation	Page
Orthopedics	Knee Joint	Cut off cast material	Resin bonded cut off tool	12
		Profile grinding	Vitrified bonded CBN tool Conventional tool Electro-plated Diamond tool	13-14
		Deburring and polishing	ELASTIC	14
	Hip Joint (Metal)	Spherical grinding	SiC conventional Resin bonded CBN sleeve	15
		Spherical polishing	Resin bonded polishing sleeve	16
	Hip Joint (Ceramic)	Spherical grinding	Metal and vitrified bonded diamond sleeve	16
		Spherical polishing	Resin bonded diamond sleeve	17
	Trauma Implants	Polishing	ELASTIC	18

Medical device	Medical component	Application	Our product recommendation	Page
Surgical Instruments	Scalpel	Side grinding	COOL CUT	20
		Sharpening	Resin bonded sharpening tool	21
		Polishing	ELASTIC	21
	Scissor	Side grinding	COOL CUT	22
		Sharpening	Resin bonded sharpening tool	23
		Polishing	ELASTIC	23
	Tweezer, forceps and clamps	Polishing	ELASTIC	24
	HSS tools	Flute grinding	STARTEC XPP+	25
		Face surface grinding	STARTEC XPP	26
	Bone rasp	Flute grinding	Resin bonded conventional tool	27
Dental	Dental file	Flute grinding	Resin bonded CBN / Diamond grinding tool	30
Hypodermic Needles	Needle	Cut off	Resin bonded cut off tool	34
		Facet grinding	Resin bonded grinding tool	35
Guide Wires	Guide wire	Centerless grinding	CSS REGULATOR CSS CENTERLESS	38







Grinding solutions for Orthopedics

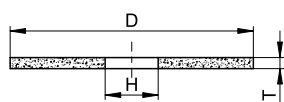
Metal Knee Joint

Joint replacement surgery (hip and knee replacement) is considered the most effective intervention for osteoarthritis. Therefore, various medical devices like knee or hip implants with high quality standard are needed. TYROLIT offers high performance tools for grinding and polishing of knee components, with which high quality requirements in the manufacturing process can be fulfilled.



CUT OFF Cast material

Standard dimensions and specifications



Shape 41

	Shape	Reference TN	D [mm]	T [mm]	H [mm]	Specification	Machine	Comments	Stock
	41	523671	400	3	32	M505A30R4BF71M	Stationary cut off machine	Cut-off cobalt chrome	
	41	647218	400	4	40	MA24Q4BF97M	Stationary cut off machine	Cut-off Stainless steel, Ni-alloys,	●

● ... Available ex stock, customer-specific grinding tools can be produced on request.

Profile grinding

	Shape 14FF1S - single wheel		Shape 14FF1S - double wheel		Shape 1F		Shape 1FF1	
Shape	D [mm]	T [mm]	H [mm]	X [mm]	R [mm]	Specification	Body	Comments
	14FF1S	240	20	51	Up to 20 mm	6 B91V	Carbon Fiber Steel Aluminum	vit. CBN single wheel Max. wheel speed 160 m/s Retipping possible
	14FF1S	250	125	51	Up to 20 mm	6 B91V	Carbon Fiber	vit. CBN double wheel Max. wheel speed 160 m/s Retipping possible
	1F	250	15	51	-	-	SU33A60HH11VB1	Pre-grinding Conventional vitrified bonded
	1F	250	15	51	-	-	SU65A80II10VB1	Fine-grinding Conventional vitrified bonded
	1FF1	175	16	51	-	8	B181G	Steel Electroplated CBN-wheel for removing runners and bridges

*Customer-specific grinding tools can be produced on request.
Additionally we offer various dressing wheels for vitrified CBN and conventional wheels.*

Standard dimensions and specifications for SCHÜTTE machines

	Shape	D [mm]	T [mm]	H [mm]	X [mm]	R [mm]	Specification	Body	Comments
	1F1	175	16	25.4	Up to 20mm	8	B91V	Carbon Fiber Steel Aluminium	Vit. CBN single wheel Max. wheel speed 160 m/s Retipping possible
	1F	175	15	25.4	-	-	SU33A60HH11VB1		Pre-grinding conventional vitrified bonded
	1F	175	15	25.4	-	-	SU65A80II10VB1		Fine-grinding conventional vitrified bonded

Customer-specific grinding tools and conventional wheels can be produced on request.

Application recommendation - vitrified CBN wheel

Wheelspeed [m/s]	Traverse speed [mm/min]	Infeed [mm]	Path-offset [mm]	Dressing
90 – 120	7,000 – 10,000	1 – 4.5 at once	0.10 – 0.15	every 1st-4th part for 2-5 µm

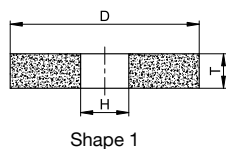
Application recommendation - conventional wheel

Wheelspeed [m/s]	Traverse speed [mm/min]	Infeed [mm]	Path-offset [mm]	Dressing
25-35	5,000 – 10,000	0.03	0.10 – 0.15	Each part

Machine Manufacturer: HAAS, Schütte, Hermle, Makino, Anca

Deburring and polishing

Standard dimensions and specifications



	Shape	Reference TN	D [mm]	T [mm]	H [mm]	Specification	Machine	Operation	Stock
	1	34072957	200	15	25	C80-BE15	Stationary machine	Deburring	
	1	22411	200	15	32	C400-BE15	Stationary machine	Polishing	●

● ... Available ex stock, customer-specific grinding tools can be produced on request.

Hip Joint

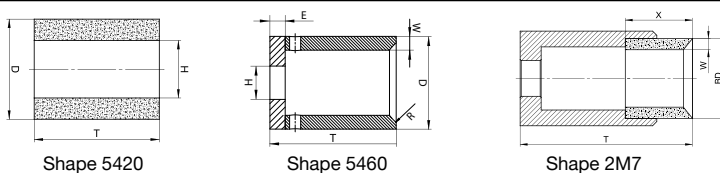
Age is the strongest predictor of the development and progression of osteoarthritis, where joint replacement surgery (hip and knee replacement) is considered the most effective intervention. TYROLIT offers high performance tools for hip grinding and polishing, with which the highest qualities in the manufacturing process of various implants and productivity increase of up to 50% can be achieved.



Machining of metal femoral head and acetabular shell

Spherical grinding

Standard dimensions and specifications



Operation	Shape	Specification	Comments	Semi-finished stock
Pre-grinding	2M7	B126C100B54AL	CBN resin bond	
	5420	C320-85-V83 T3	SiC vit bond	●
Fine-grinding	2M7	B29C75B54	CBN resin bond	
	5420	C600-74V18 T3	SiC vit bond	●
	5420	C800-45V83 T3	SiC vit bond	●
	5420	C1200-66V18 T3	SiC vit bond	●

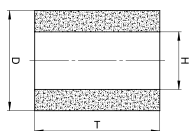
● ... Available ex stock. To calculate the dimensions of the grinding tool, please provide a drawing of the hip ball.
Customer-specific grinding tools can be produced on request.

Machine Manufacturer: Monnier & Zahner, Thielenhaus

Spherical polishing



Standard specifications and parameters



Shape 5420

Operation	Shape	Specification	Wheelspeed [rpm]	Ball speed [rpm]	Direction	Pressure	Comments	Semi-finished stock
Polishing	5420	36A800F5B9	1200	1500	same	70N	resin bond	●
	5420	36A1000H5B9	2500	2000	same	100N	resin bond	

● ... Available ex stock. To calculate the dimensions of the grinding tool, please provide a drawing of the hip ball.
Customer-specific grinding tools can be produced on request.

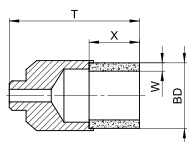
Machine Manufacturer: Monnier & Zahner, Thielenhaus

Machining of ceramic femoral head and acetabular shell

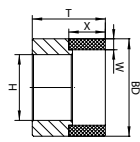


Spherical grinding

Standard specifications and application recommendation



Shape 2M7



Shape 2M9

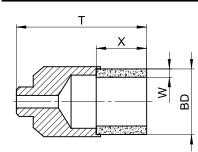
Operation	Shape	Specification	Comments
Pre-grinding	2M7	D126M/V	Metal and vitrified bond for grinding the head
Fine-grinding	2M7	D39V	Vitrified bond for grinding the head
Pre-grinding	2M9	D126M/V	Metal and vitrified bond for grinding the shell
Fine-grinding	2M9	D39V	Vitrified bond for grinding the shell

To calculate the dimensions of the grinding tool, please provide a drawing of the hip ball.
Customer-specific grinding tools can be produced on request.

Machine Manufacturer: Monnier & Zahner, Thielenhaus

Spherical polishing

Standard specification



Shape 2M7

Operation	Shape	Specification	Comments
Polishing	2M7	D15B	Resin bonded diamond

To calculate the dimensions of the grinding tool, please provide a drawing of the hip ball.
Customer-specific grinding tools can be produced on request.

Machine Manufacturer: Monnier & Zahner, Thielenhaus



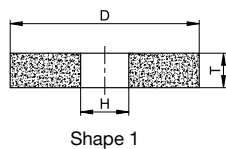
Trauma Implants

Due to our more active young lifestyle and ageing population, more people are having trauma surgery to repair broken bones using metal screws, pins, rods or plates to hold the bone in place. TYROLIT has a wide assortment of elastic grinding wheels for different applications, from deburring to pre-polishing, which ensures benefits such as high quality surface and efficient finishing-processes.



Polishing

Standard dimensions and specifications



Shape	D [mm]	T [mm]	H [mm]	Specification	Vmax [m/s]	Comments
	150	20	20	BE12	20	Very soft
	150	20	20	BE13	16	Soft
	150	20	20	BE14	20	Medium
	150	20	20	BE15	20	Medium-hard
	150	20	20	BE16	32	Hard

Grit size recommendation	Operation	Grit size	Comments
	Deburring	C46	
	Matting	C80	
	Fine grinding	C150	
	Ultra-fine grinding	C240	
	Pre-polishing	C400	

Listed grit sizes
available in all bonds
(BE12 - BE16)

Stock Types

Shape	Type number	D [mm]	T [mm]	H [mm]	Specification	Vmax [m/s]	Stock	Comments
1	7186	150	20	20	C80 - BE15	20	●	Deburring/Matting
	7362	200	25	20	C80 - BE15	20	●	Deburring/Matting
	2661	150	20	20	C150 - BE15	20	●	Fine grinding
	32765	200	25	30	C150 - BE15	20	●	Fine grinding
	320369	200	25	20	C240 - BE15	20	●	Ultra-fine grinding
	22257	150	20	32	C150 - BE16	32	●	Fine grinding
	71212	150	20	20	C400 - BE16	32	●	Pre-polishing

● ... Available ex stock, customer-specific grinding tools can be produced on request.

Application recommendation

Operation	Wheel speed [m/s]	Dressing	Type number
Handheld operation on pedestal grinder	Max. wheel speed 25	90AS 50x20x150 50C24H10V15P2	618541



Grinding solutions for Surgical Instruments

Surgical Instruments

The number of surgeries is constantly increasing, driving demand for the surgical instrument manufacturing industry. The aging population and growing spending on healthcare are key drivers for the growth. TYROLIT provides individual grinding solutions for various surgical instruments.

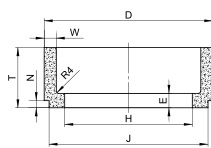
Scalpel grinding

TYROLIT has a wide range of high performance wheels for grinding, sharpening and polishing scalpel blades as they need to be precision ground and extremely sharp to make a clean cut and minimize the scar after operations. For side grinding, TYROLIT offers the well-established COOL CUT products for stable manufacturing process and cool grinding. TYROLIT Elastic wheels ensure highest surface quality in the finishing process.



Side grinding

Standard dimensions and specifications



Shape 6

Shape	D [mm]	T [mm]	H [mm]	W [mm]	J [mm]	E [mm]	N [mm]	Specification	Vmax [m/s]
6	200	90	150	6-20	188	15-22	6	91A150R14BD800	40

Customer-specific grinding tools can be produced on request.

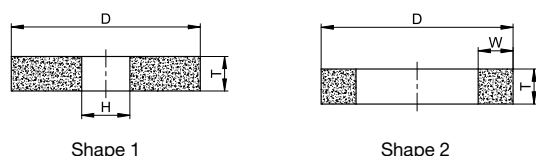
Application recommendation

Wheel speed [m/s]	Traverse speed [mm/min]	Infeed [mm]	Comment
25-35	1,000 - 2,000	0.1 - 0.5	Coolant necessary

Machine manufacturer: Berger, Siepmann

Sharpening

Standard dimensions and specifications



Shape 1

Shape 2

	Shape	Type number	D [mm]	T [mm]	H [mm]	Specification	Vmax [m/s]	Comment
	1	532312	150	6	16	89A120P8BY40	32	
	2	-	200	90	150	89A240L5BD22	40	Pre-grinding
		-	200	90	150	89A600H5B22	40	Finish-grinding

Customer-specific grinding tools can be produced on request.

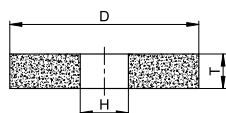
Application recommendation

Wheel speed [m/s]	Traverse speed [mm/min]	Infeed [mm]	Comment
25-35	1,000 - 2,000	0.001 - 0.003	Coolant required

Machine manufacturer: Berger, Siepmann

Polishing

Standard dimensions and specifications



Shape 1

	Shape	Type number	D [mm]	T [mm]	H [mm]	Specification	Vmax [m/s]	Stock	Comments
	1	7186	150	20	20	C80 - BE15	25	●	Deburring/Matting
		2661	150	20	20	C150 - BE15	25	●	Fine grinding
		320369	200	25	20	C240 - BE15	25	●	Ultrafine grinding
		22411	200	25	32	C400 - BE15	25	●	Prepolishing
		71212	150	20	20	C400 - BE16	32	●	Prepolishing
		669110	150	20	20	C800 - BE11	25	●	Whetting
		669109	175	20	32	C800 - BE11	25	●	Whetting

● ... Available ex stock, customer-specific grinding tools can be produced on request.

Application recommendation

Operation	Wheel speed [m/s]	Dressing	Type number
Handheld operation on pedestal grinder	Max. wheel speed 25	90AS 50x20x150 50C24H10V15P2	618541

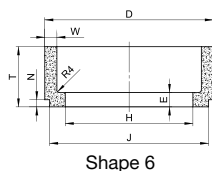
Scissors

Many different types of scissors are used in the operating theatre for instance for bandaging, dissecting and stitching. TYROLIT has a wide range of high performance wheels for grinding, sharpening and polishing such scissors. For side grinding, TYROLIT offers the well-established COOL CUT products for a stable manufacturing process and cool grinding. TYROLIT Elastic wheels ensure highest surface quality in the finishing process.



Side grinding

Standard specifications and range of standard dimensions



Shape 6

Shape	D [mm]	T [mm]	H [mm]	W [mm]	J [mm]	E [mm]	N [mm]	Specification	Vmax [m/s]	Comments
6	200	90-120	140 -150	4 - 20	188 - 190	15 - 22	6	91A150R14BD800	40	Standard
	200	90-120	140 -150	4 - 20	188 - 190	15 - 22	6	89A120R14BD782	32	Cool cutting

Customer-specific grinding tools can be produced on request.

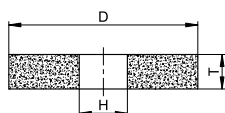
Application recommendation

Wheel speed [m/s]	Traverse speed [mm/min]	Infeed [mm]	Comment
25-40	800 - 2,000	0.2 - 0.5	Coolant necessary

Machine manufacturer: Berger, Siepmann

Sharpening

Standard dimensions and specifications



Shape 1

	Shape	Type number	D [mm]	T [mm]	H [mm]	Specification	Vmax [m/s]
	1	532312	150	6	16	89A120P8BY40	32

Customer-specific grinding tools can be produced on request.

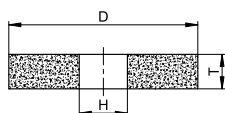
Application recommendation

Wheel speed [m/s]	Comment
25-32	Only cutting edge

Machine manufacturer: Berger, Siepmann

Polishing

Standard dimensions and specifications



Shape 1

	Shape	Type number	D [mm]	T [mm]	H [mm]	Specification	Vmax [m/s]	Stock	Comments
	1	7186	150	20	20	C80 - BE15	25	●	Deburring/Matting
		2661	150	20	20	C150 - BE15	25	●	Fine grinding
		320369	200	25	20	C240 - BE15	25	●	Ultrafine grinding
		22411	200	25	32	C400 - BE15	25	●	Prepolishing
		71212	150	20	20	C400 - BE16	32	●	Prepolishing
		669110	150	20	20	C800 - BE11	25	●	Whetting
		669109	175	20	32	C800 - BE11	25	●	Whetting

● ... Available ex stock, customer-specific grinding tools can be produced on request.

Application recommendation

Operation	Wheel speed [m/s]	Dressing	Type number
Handheld operation on pedestal grinder	Max. wheel speed 25	90AS 50x20x150 50C24H10V15P2	618541

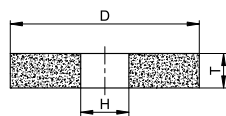
Tweezer, forceps and clamps

As operations get more complex a large variety of forceps are needed. TYROLIT has a wide assortment of elastic grinding wheels for different applications, from deburring to pre-polishing to fulfill the high variety of dimensions and high demands on surface quality for these parts that are also known as tweezers, tongs, pliers, clips or clamps.



Deburring and polishing

Standard dimensions and specifications



Shape 1

Shape	D [mm]	T [mm]	H [mm]	Specification	Vmax [m/s]	Properties	Comments
1	100	5	25	A80 - BD-W	20	Soft	Contour-following
	125	8	25	A150 - BD-M	25	Medium	Standard
	150	10	25	A240 - BD-H	32	Hard	Contouring

Grit size recommendation

	A46, A80	Pre-grinding
	A150, A240	Semi-finish grinding
	A400, A600	Fine grinding
	A800	Pre-polishing
	A1200	Polishing

Tyrolit wheels are available for bench grinder and CNC machines.
Customer-specific grinding tools can be produced on request.

Application recommendation

Operation	Wheel speed [m/s]	Dressing	Type number
Handheld operation on pedestal grinder	Per bond system	90AS 50x20x150 50C24H10V15P2	618541

Machine types: Stationary machines

Medical Tools

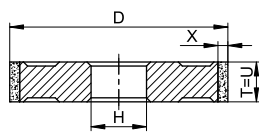
Medical tools such as medical reamers drills bone rasps etc. demand the highest quality. With the wide TYROLIT assortment, highest quality, best surfaces and narrow tolerances can be achieved and lead to cost reduction in the manufacturing process.



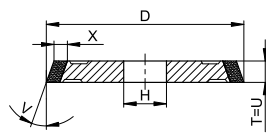
HSS tools

Flute grinding with CBN wheels

Standard dimensions and specifications for flute grinding



Shape 1A1



Shape 1V1

	Shape	Type number	D [mm]	T [mm]	H [mm]	U [mm]	X [mm]	V°	Specification
	1A1	34230222	100	6	20	6	10		STARTEC XP-P+ BC107-4-MXPP+
		34185752	100	10	20	10	10		STARTEC XP-P+ BC107-4-MXPP+
		34230239	100	15	20	15	10		STARTEC XP-P+ BC107-4-MXPP+
		34230226	125	6	20	6	10		STARTEC XP-P+ BC107-4-MXPP+
		34227454	125	10	20	10	10		STARTEC XP-P+ BC107-4-MXPP+
		34181263	125	15	20	15	10		STARTEC XP-P+ BC107-4-MXPP+
		34230230	150	8	20	8	10		STARTEC XP-P+ BC107-4-MXPP+
		34230240	150	15	20	15	10		STARTEC XP-P+ BC107-4-MXPP+
	1V1	34230255	100	10	20	10	10	15	STARTEC XP-P+ BC107-4-MXPP+
		34230256	100	10	20	10	10	45	STARTEC XP-P+ BC107-4-MXPP+
		34230254	100	15	20	15	10	15	STARTEC XP-P+ BC107-4-MXPP+
		34230253	100	15	20	15	10	45	STARTEC XP-P+ BC107-4-MXPP+
		34230234	125	10	20	10	10	15	STARTEC XP-P+ BC107-4-MXPP+
		34230235	125	10	20	10	10	45	STARTEC XP-P+ BC107-4-MXPP+
		34230236	125	15	20	15	10	15	STARTEC XP-P+ BC107-4-MXPP+
		34230251	125	15	20	15	10	45	STARTEC XP-P+ BC107-4-MXPP+
		34230252	150	15	20	15	10	10	STARTEC XP-P+ BC107-4-MXPP+

Customer-specific grinding tools can be produced on request.

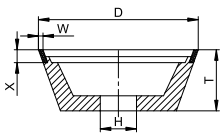
Application recommendation for flute grinding

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

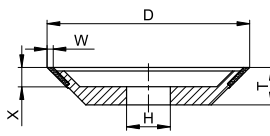
Grinding process	Cutting speed v_c [m/s]	Infeed/ae [mm]	Feed v_t [mm/min]	Grinding direction	Cooling
Flute grinding	26 - 32	2.6 - 8.5		same	Required
Face grinding	28 - 35	Full depth	100 - 200		Required

Face surface grinding

Standard dimensions and specifications for grinding of face and clearance surface



Shape 11V9



Shape 12V9

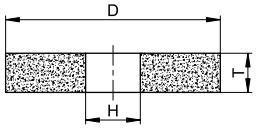
	Shape	Type number	D [mm]	T [mm]	H [mm]	U [mm]	X [mm]	V°	Specification for TC	Stock
	11V9	34211869	75	30	20	3	10	20	STARTEC-XP-P B107-BXPP	●
		34205432	100	35	20	3	10	20	STARTEC-XP-P B107-BXPP	●
		34184813	125	40	40	3	10	20	STARTEC-XP-P B107-BXPP	●
		34161553	150	50	20	3	10	20	STARTEC-XP-P B107-BXPP	●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

● ... Available ex stock, customer-specific grinding tools can be produced on request.

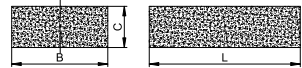
Dressing recommendation for flute and face surface grinding

Specially adapted dressing wheels are available ex stock for dressing.

Roughening using a sharpening stick is necessary prior to initial use.



Shape 1



Shape 90AS

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

● ... Available ex stock, customer-specific grinding tools can be produced on request.

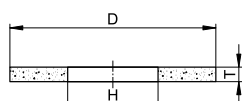
Bone rasp



Source: Studer

Flute grinding

Standard dimensions for flute grinding



Shape 1 FLUTE

	Shapes	D [mm]	T = U [mm]	H [mm]
	1 FLUTE	≤ 180	2 - 20	20 - 76.2
		180 < D ≤ 250	2.5 - 20	20 - 76.2
		250 < D ≤ 305	3 - 25	31.75 - 203.2
		305 < D ≤ 350	3 - 25	31.75 - 203.2
		350 < D ≤ 406	4 - 50	127 - 305
		406 < D ≤ 460	5 - 30	127 - 305
		460 < D ≤ 508	6 - 30	127 - 305

Specification selection

Specification	Max. wheel speed [m/s]	Comment
10A802 S8B25	80	Standard
454A802 R7B16	80	High cutting ability

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

Application recommendation

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

Wheel speed [m/s]	Traverse speed [mm/min]	Infeed [mm]	Direction	Comment
52 - 80	800 - 2,000	Flute depth, one cut	same	Traverse speed according to profile depth Sufficient coolant is necessary (oil)



Grinding solutions for Dental



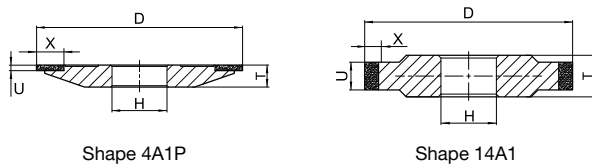
Dental File

The grinding process for dental files requires free-cutting wheels due to the micro dimensions and narrow tolerances. TYROLIT has extensive experience in the dental industry and provides a system solution of high performance tools to increase productivity.



Flute grinding

Range of dimensions and standard specification

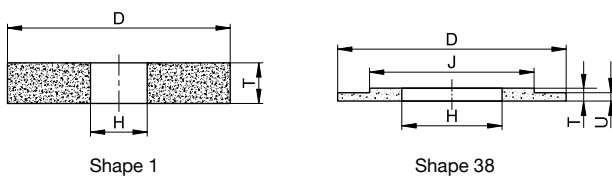


Shape	D [mm]	T [mm]	H [mm]	U [mm]	X [mm]	Specification
4A1P - 14A1	80 - 150	6 - 10	20 - 50	$1.5 \leq 6$	≤ 10	D46B

Customer-specific grinding tools can be produced on request.

Application recommendation for dressing

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



	Shape	Type number	D [mm]	T [mm]	H [mm]	J [mm]	U [mm]	Vs [mm]	Specification	Comment	Stock
	1	34061809	250	10	51			35	A400 H5 AV	For grit sizes > 15 µm	●
		34157690	250	10	51			20	A800 G5 AV	For grit sizes ≤ 15 µm	●
		34023726	300	10	76.2			35	A240M5AV217		●
		34023728	300	10	76.2			35	A400 H5 AV	For grit sizes > 15 µm	●
		34157689	300	10	76.2			20	A800 G5 AV	For grit sizes ≤ 15 µm	●
	38	34023732	300	10	76.2	140	6	20	A400 H5 AV83	For grit sizes > 15 µm	
		34173471	300	10	76.2	140	6	20	A800 G5 AV83	For grit sizes ≤ 15 µm	●

● ... Available ex stock

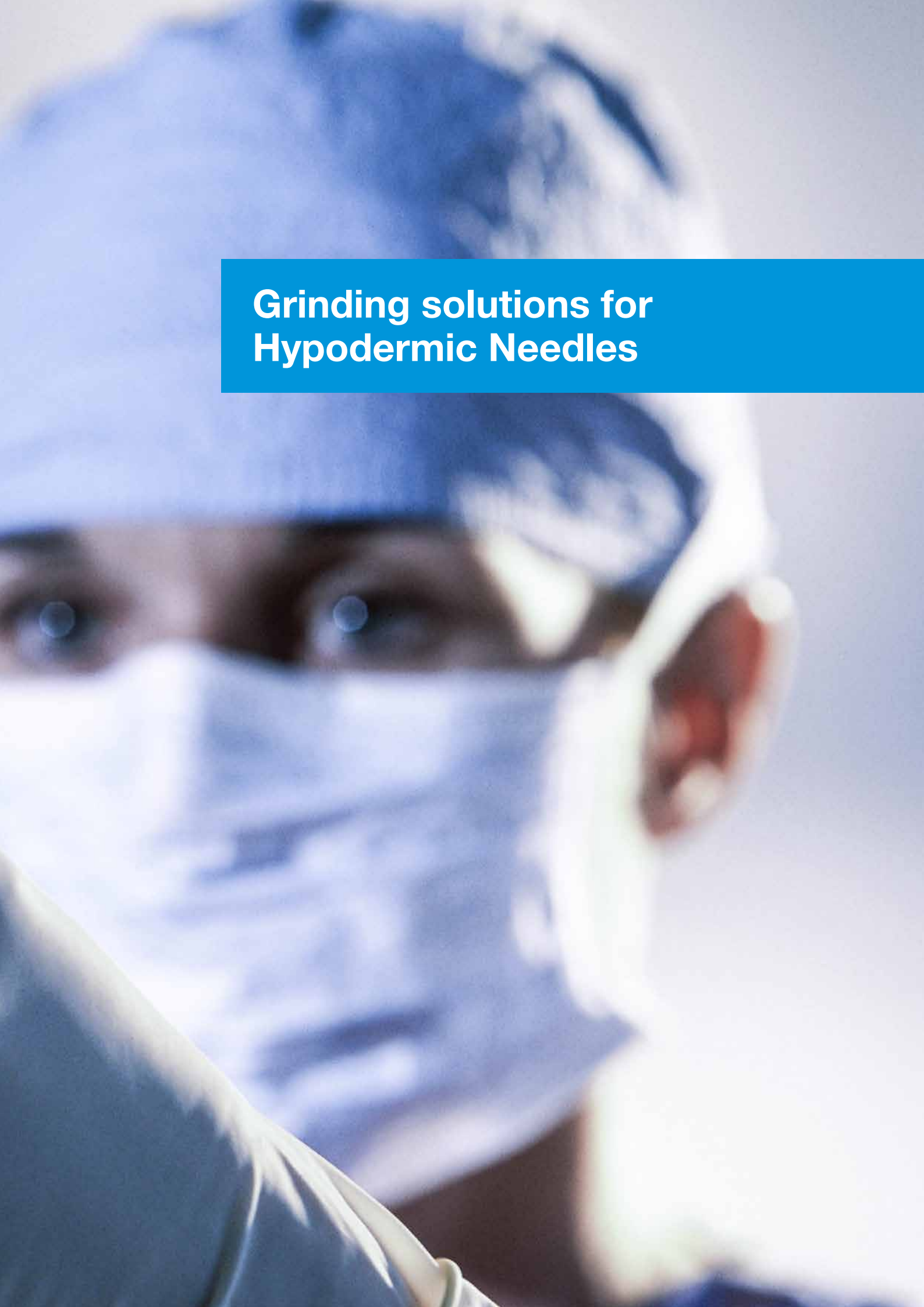
Recommended dressing parameter

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

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







Grinding solutions for Hypodermic Needles

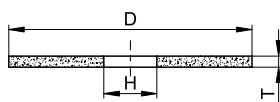
Hypodermic Needle

The main challenges for the grinding of hypodermic needles are productivity, new materials, surface quality and increasing requirements with respect to dimensional and geometrical tolerances. TYROLIT offers various tools for the manufacturing process of hypodermic needles such as cut off wheels with outstanding lifetime or grinding wheels for burr-free pointing.



Cut off

Standard dimension and specification for cutting off needles clamped in packets



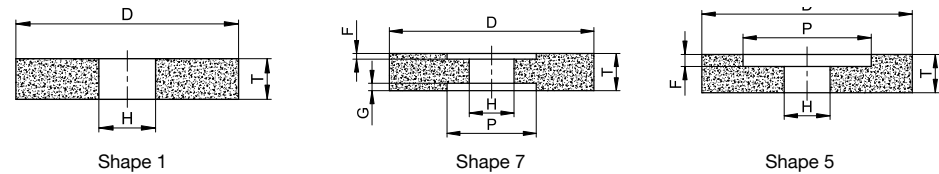
Shape 41N

	Shape	Type Number	D [mm]	T [mm]	H [mm]	Specification	Comments
	41N	586152	180	0.6	25.4	A320-R707	For wet grinding only

Customer-specific grinding tools can be produced on request.

Facet grinding

Specifications and range of standard dimensions



Needle Diameter	Shape	D [mm]	T [mm]	H [mm]	Specification	Wheel speed [m/s]	Coolant	Comment
Needles Ø 0.25 - 1.5 mm	1, 5, 7	300 - 508	40 - 203	127/203.2/304.8	C5001 L6 BY34 / 50	32 - 50	Emulsion	Standard
					C5001 K6 BY35 / 50			Long life
Needles Ø 0.2 - 0.4 mm					C800 K6 BY35 / 50			
Needles Ø 0.4 - 1.2 mm					C600 K6 BY35 / 50			
Needles Ø 1.2 - 1.6 mm					C500 K6 BY35 / 50			
Lancets Ø 0.3 - 1.5 mm					C400 M6 BY34 / 50			The smaller the diameter the finer the grit size
					C500 L6 BY34 / 50			
					C600 K6 BY 34 / 50			

Customer-specific grinding tools can be produced on request.

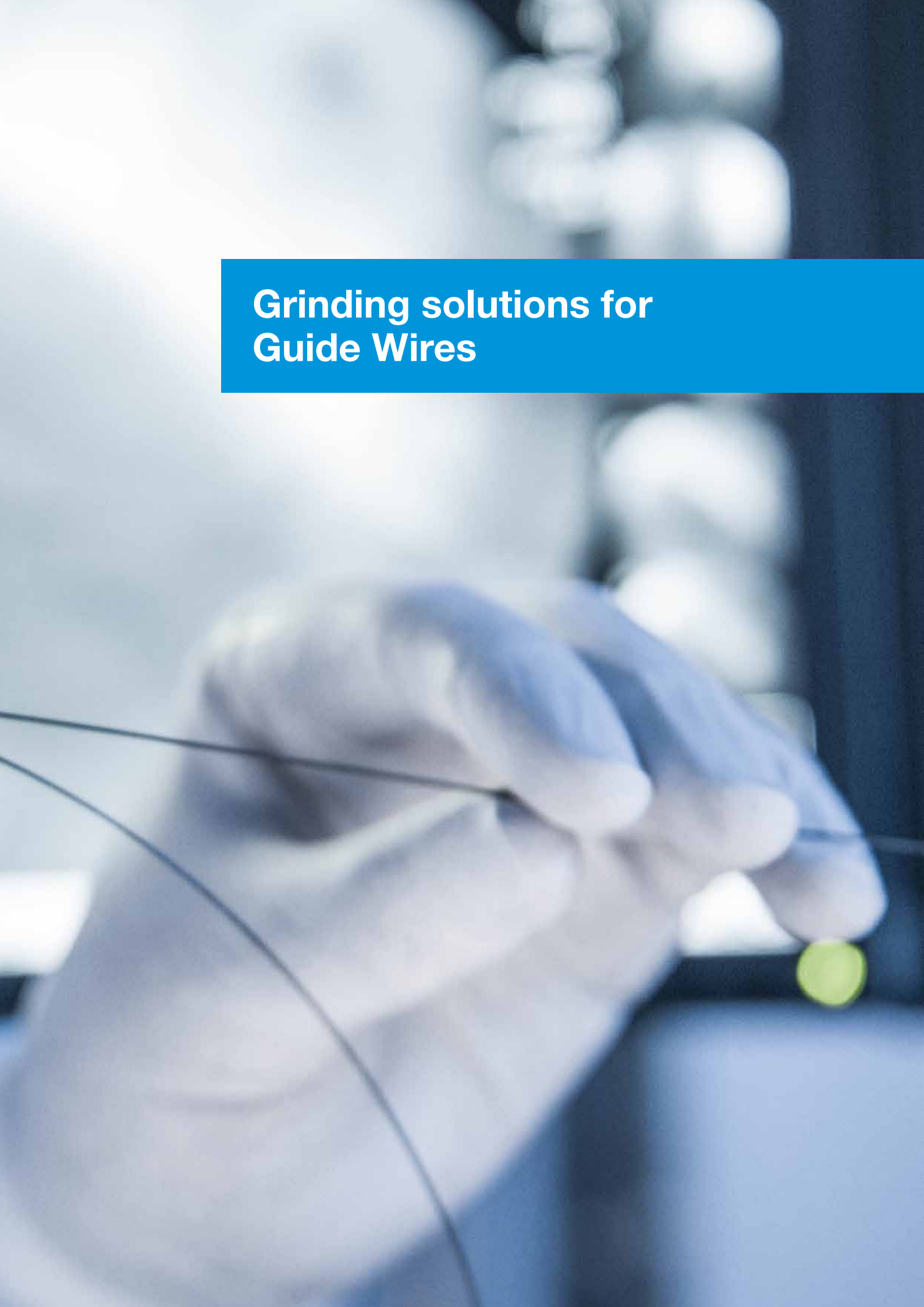
Application recommendation

Wheel speed [m/s]	Traverse speed [mm/min]	Infeed	Comment
32 - 50	1,000 - 5,000	One pass/ 3 - 4 positions	Coolant necessary

Machine manufacturer: Tacchella, Justur, Cincinnati







Grinding solutions for Guide Wires

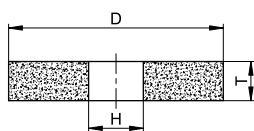
Guide Wire

Guide wires are wires or springs used as a guide for placement of a larger device or prosthesis, such as a catheter or intramedullary pins and are typically difficult to grind materials such as Nitinol (NiTi) and Triton. For centreless operation, TYROLIT offers the complete system solution consisting of grinding, regulating and dressing tools for highest stock removal and high quality surfaces.

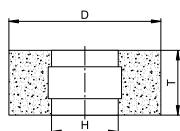


Centerless grinding

Standard dimensions



Shape 1



Shape 1 CES

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

Multi-part version from width $T=U > 150$ mm. Customer-specific grinding tools can be produced on request.

Standard specifications

	Specification	Comments
	CRA80-BR63	Control wheel CSS Regulator
	C220K5AV18	Grinding wheel for Nitinol/Triton
	89A240K5AV217	Grinding wheel for stainless steel

Customer-specific grinding tools can be produced on request.

Machine manufacturer: Glebar, Royal Master

Application recommendation

Application recommendation for dressing

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

Application recommendation for centreless grinding

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

TYROLIT SCHLEIFMITTELWERKE SWAROVSKI K.G.

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