



GRINDING TOOLS FOR MEDICAL TECHNOLOGY

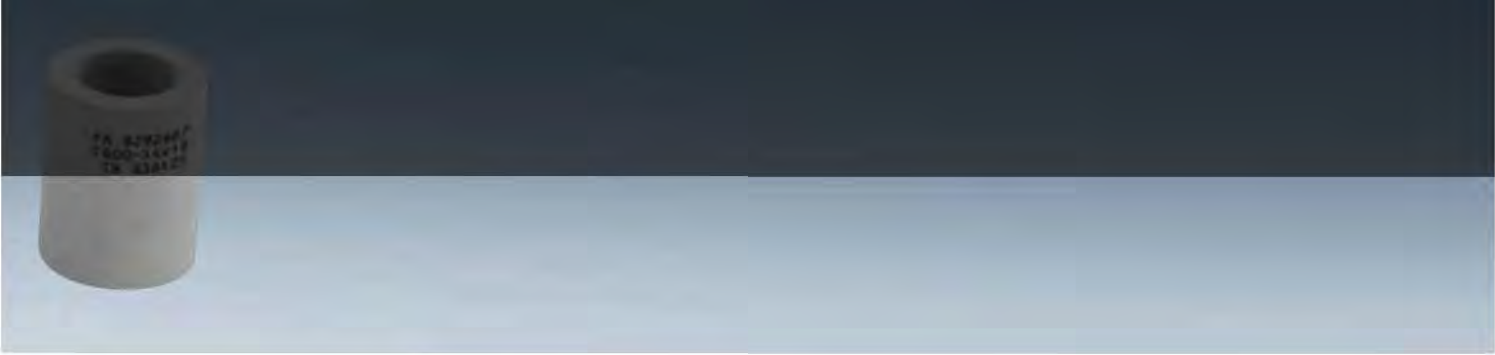
A Company within the SWAROVSKI Group

TYROLIT



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TYROLIT IN GENERAL

TYROLIT is one of the world's largest manufacturers of bonded grinding, cutting, drilling and dressing tools. As the leading brand in innovation and technology, today TYROLIT is a synonym for all conceivable abrasive applications. TYROLIT has 28 production plants in 13 countries, and a global network of sales organisations and distributors. TYROLIT is a company within the Swarovski Group.

This catalogue is intended to give you an overview of different applications in medical technology and in no way covers all machining possibilities.

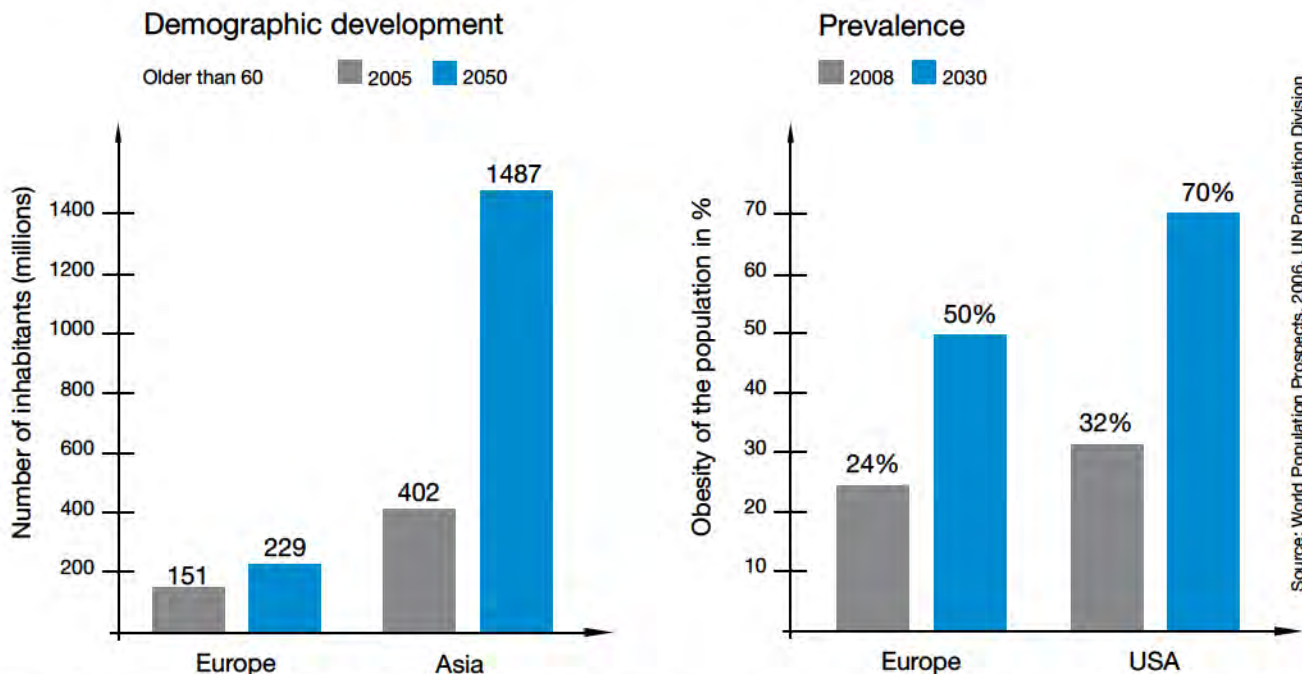
STATE-OF-THE-ART IMPLANT TECHNOLOGY - FOR HUMANS

The quality of health expected by the entire world population feeds the need for operations and treatments for everyone. This creates new challenges in the production of medical tools. These need to be cost effective in their manufacture while also fulfilling essential durability requirements demanded by the industry.

Global implant market volumes: 2007: 21 billion US\$ 2008: 24 billion US\$

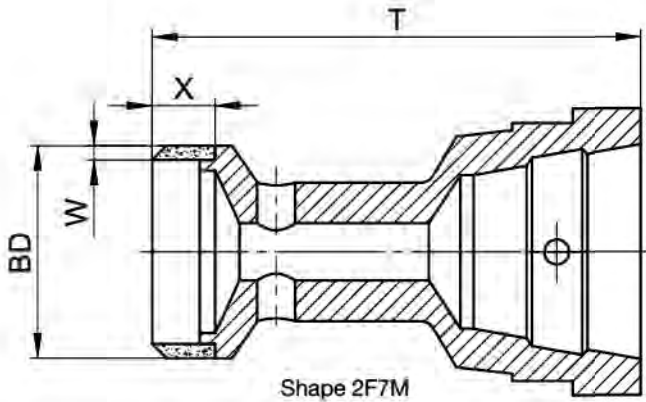
IMPLANT TECHNOLOGY - GROWTH DRIVER

The number of people over 60 in Europe and Asia will increase to approx. 1.7 billion in 2050
Obesity will increase by 50 - 70% by 2030



With the increase in obesity and aging population there will be a greater demand for joints and therefore a growing requirement for implants!

DIAMOND GRINDING TOOLS FOR CERAMIC-INSERT CUP



Dimensions for cup machining (ceramic)

Shape	BD	W	X	T	Specification	Comments
2F7M	20.5	2.75	9	78	D35L8VD46ST	Diamond, ceramic bonded
2F7M	24.0	3	9	78	D35L8VD46ST	
2F7M	29.2	2.6	9	78	D35L8VD46ST	
2F7M	38.1	3	9	78	D35L8VD46ST	



Use:

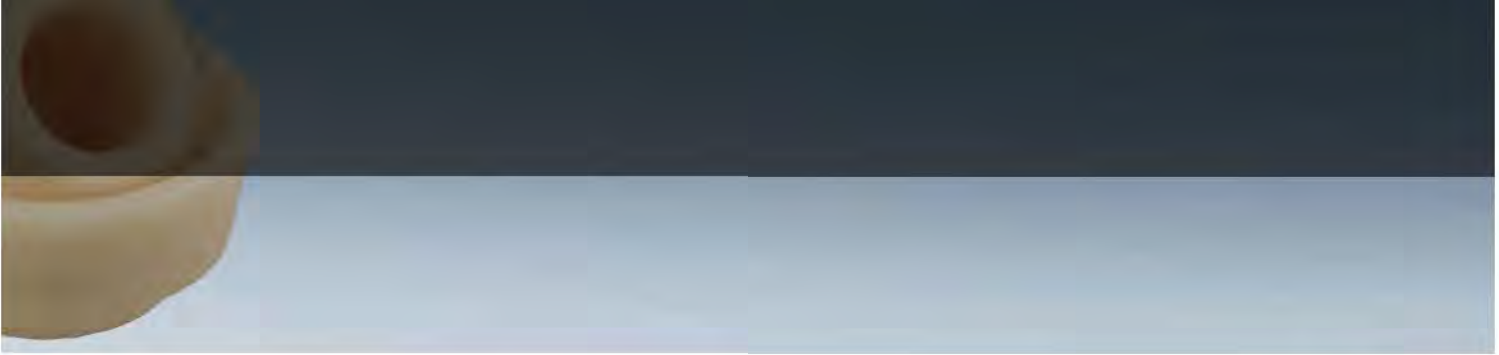
Machining of ceramic-insert cups

Machine types:

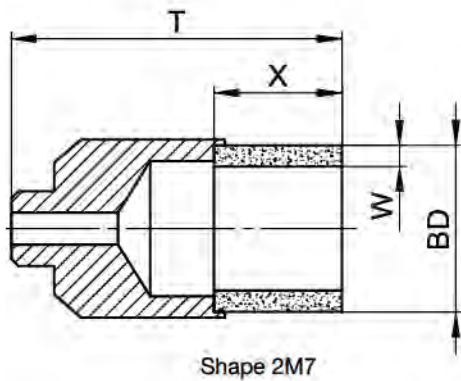
e.g. Monnier & Zahner, Thielenhaus

Wet grinding (oil)

Other dimensions and specifications on request



DIAMOND GRINDING TOOLS FOR CERAMIC-HEADS (HIP JOINT)



Recommendation for ball machining (ceramic)

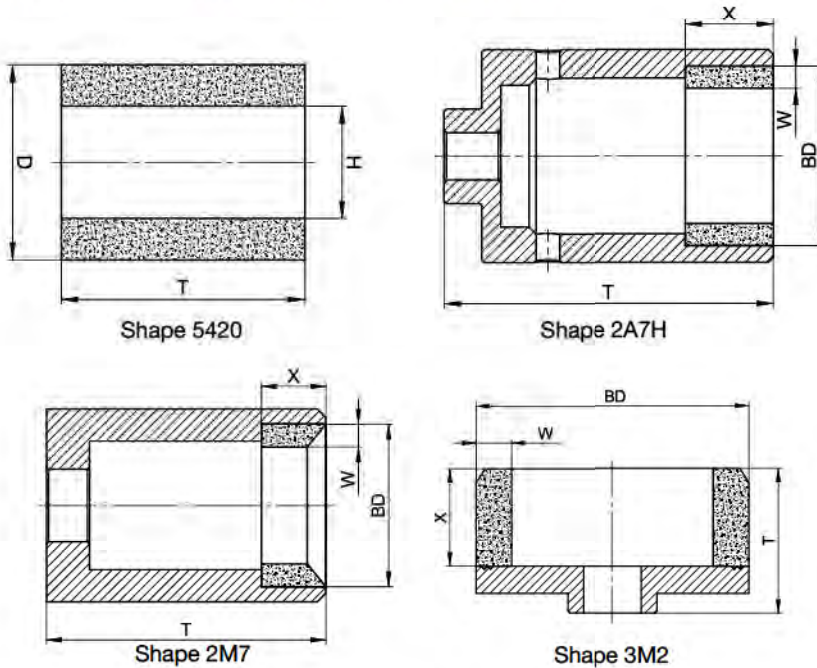
Shape	BD	W	X	T	Pre-grinding	Fine grinding	Polishing	Comments
2M7	16.3	1.6	6	20	D 126 - V/M			Diamond, ceramic or metal bonded
2M7	21.0	3	8	33		D 35L8VD46		Diamond, ceramic bonded
2M7	30.6	5.3	12	85			D 0.5 - 2 B	Diamond, resin bonded



- Use:**
Machining of ceramic-heads (hip joint)
- Machine types:**
e.g. Monnier & Zahner, Thielenhaus
- Wet grinding (oil)
- Other dimensions and specifications on request



CBN/DIAMOND AND SIC GRINDING TOOLS FOR METAL-HEAD (HIP JOINT)



Standard dimensions for ball machining (metal)

Shape	D	T	H	Pre-grinding	Fine grinding	Polishing	Comments	
5420	27	14	12	C320-85V83T3 C600-45V18T3	C800-45V83T3 C1200-45V83T3	36A800F5B9 36A1000H5B9	Pre-grinding and fine grinding: SIC, ceramic bonded Polishing: Resin bonded	
5420	32	20	20					
5420	38	20	32					
5420	45	20	32					
5420	55	20	30					
	65	20	30					
Shape	BD	T	W	X	Pre-grinding	Fine grinding	Polishing	Comments
2A10	23.3	30	2.1	15	B126C100B54AL			CBN, resin bonded
2A7H	37.5	50	3.3	15		B91L8VD49AL		CBN, ceramic bonded
2M7	40	50	4	15	B107C100B54AL	B91C100B54AL		CBN, resin bonded
3M2	33	20	5	12	B126C100B54AL	B46C100B54AL	D5C50B60AL	CBN/diamond, resin bonded

Use:

Machining of metal-head (hip joint)

Machine type:

e.g. Monnier & Zahner, Thielenhaus

Wet grinding (emulsion)

Other dimensions and specifications on request

Ordering example (conventional)

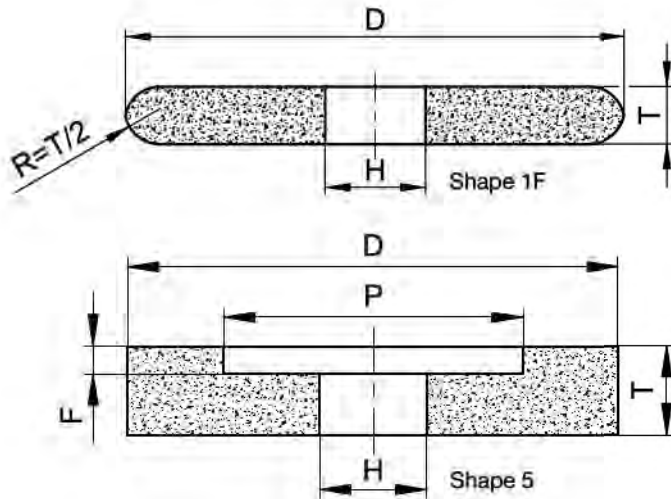
Shape	D x T x H	Specification
5420	38 x 20 x 20	C600 - 45V83T3

Ordering example (CBN)

Shape	BD x T	W x X	Specification
2M7	40 x 50	4 x 15	B91C100B54AL



CERAMIC GRINDING TOOLS FOR METAL KNEE JOINTS



Standard dimensions

Shape	D	T	H	Pre-grinding	Fine grinding	Pre-polishing	Comments
1F	200	10	51	SU33A60HH11VB1	-	-	Ceramic bonded
1F	250	15	51	SU33A60HH11VB1	SU65A80II10VB1	-	
5	400	60	127	SU83A54II9VK8	SU85A80JJ9VK8	-	
1F	200	20	32	-	C150-BE13TF	-	Elastic bonded
1F	200	20	32	-	-	C240-BE12	
1F	200	20	32	-	-	C400-BE12	

Use:

Machining of wide range of metal knee joints

Machine type:

e.g. Schütte, Haas, Hermle, Makino

Wet grinding

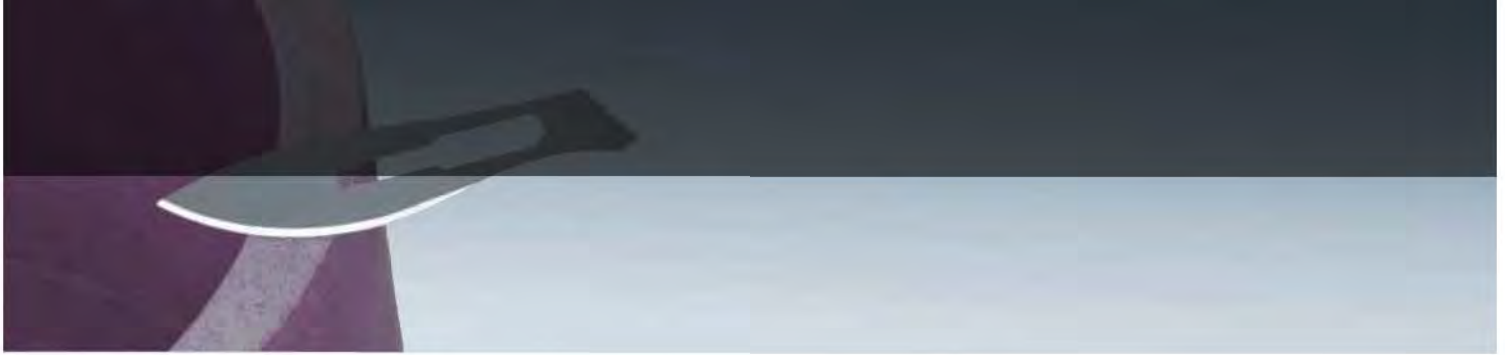
Specifications for machining of ceramic knee joints on request.

Other dimensions and specifications possible.

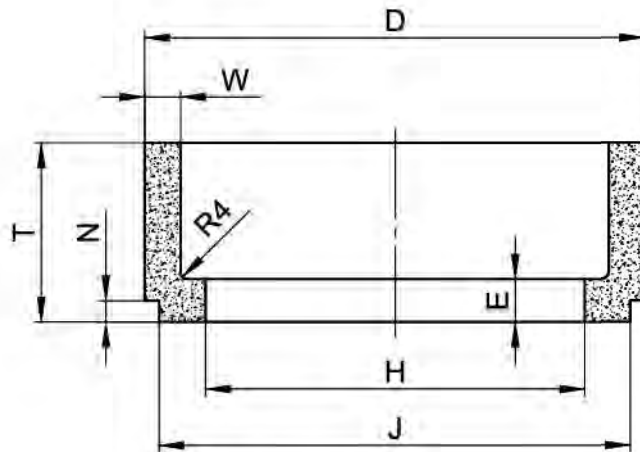


Ordering example

Shape	D x T x H	Specification
1F	200 x 20 x 32	C150 - BE13TF



GRINDING TOOLS FOR SCALPEL MACHINING



Shape 6



Grinding

Shape	D	T	H	W	J	E	N	Specification	V _{max.}
6 - 1112F	200	90	150	6	188	17	6	91A150R14BD800	40 m/s
6 - 1112A	200	90	150	8	188	17	6		
6 - 1112C	200	90	150	10	188	15	6		
6 - 1112B	200	90	150	15	188	15	6		
6 - 1112E	200	90	150	20	188	22	6		

Use:

Grinding and polishing medical blades

Machine types:

e.g. Berger, Siepmann

Peripheral speed:

V_s = see table

Grinding wheel shapes: 1, 6

Wet grinding for grinding and sharpening wheels

Wet and dry grinding for polishing wheels

Sharpening

Shape	D	T	H	Specification	V _{max.}	Type no.
1	150	6	16	89A120P6BY40	32 m/s	532312

Polishing

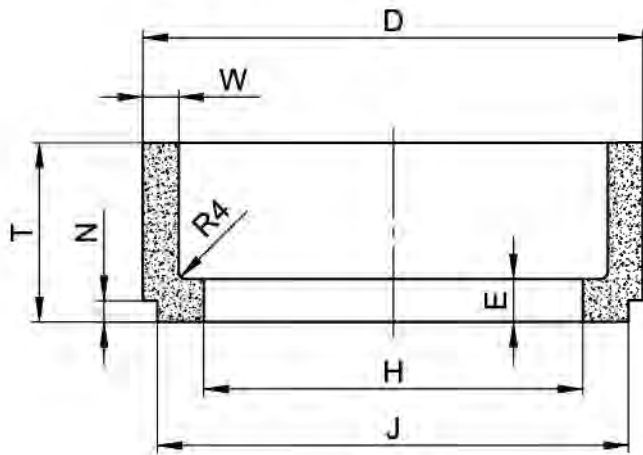
Shape	D	T	H	Specification	V _{max.}	Type no.
1	150	20	20	C80 - BE15	25 m/s	7186*
1	150	20	20	C150 - BE15	25 m/s	2661*
1	200	25	20	C240 - BE15	25 m/s	320369*
1	200	25	32	C400 - BE15	25 m/s	22411*
1	150	20	20	C400 - BE16	32 m/s	71212*
1	150	20	20	C800 - BE11	25 m/s	669110*
1	175	20	32	C800 - BE11	25 m/s	669109*



* stock types



**GRINDING TOOLS
FOR SCISSOR MACHINING**



Shape 6



Standard dimensions

Shape	D	T	H	J	W	E	N
6 - 1112D	200	90	150	188	4	17	6
6 - 1112D	200	90	150	188	5	17	6
6 - 1112F	200	90	150	188	6	17	6
6 - 1112A	250	90	150	188	8	17	6
6 - 1112C	200	90	150	188	10	15	6
6 - 1112B	200	90	150	188	15	15	6
6 - 1112E	200	90	150	188	20	22	6
6 - 1302B	200	110	150	188	5	17	6
6 - 1302A	200	110	150	188	8	17	6
6 - 1302C	200	110	150	188	20	22	6
6 - 1223B	200	120	140	190	15	20	6

Use:

Grinding medical scissors

Machine types:

e.g. Berger, Siepmann

Peripheral speed:

$V_s =$ up to 40 m/s

Grinding wheel shape: 6

For wet grinding only

No dressing required

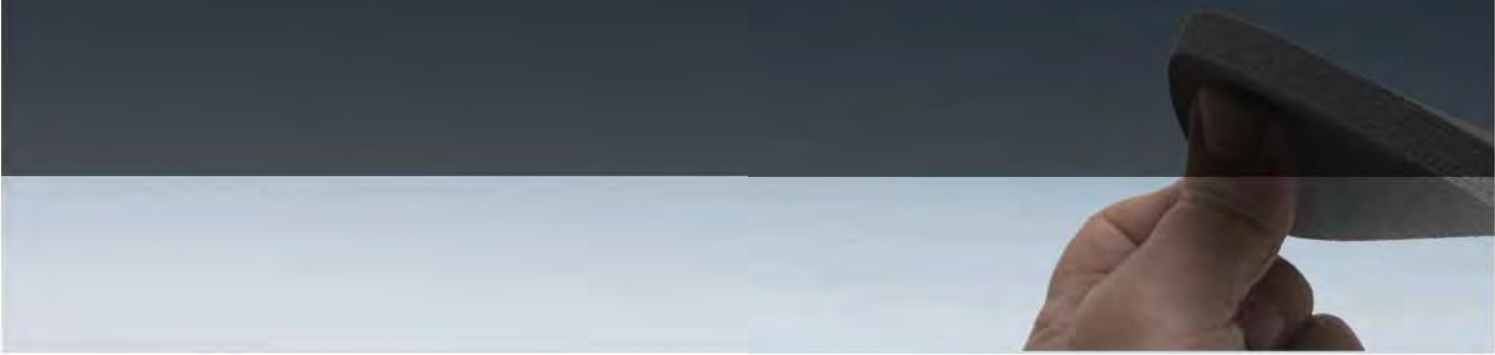
Recommendation

Specification		
Easy cutting	Standard	Comments
89A180S14BD780	91A150R14BD800	Resin bonded

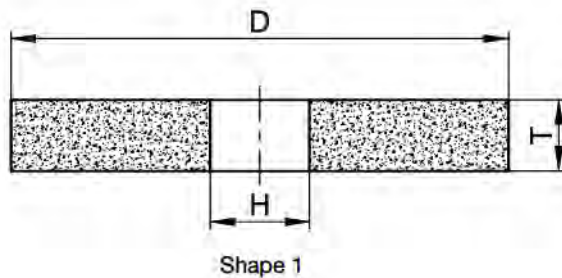
Ordering example

Shape	D x T x H	Specification
6F - 1112C	200 x 90 x 150	91A150R14BD800





ELASTIC FINE GRINDING TOOLS FOR IMPLANTS (SPLINTS & DISCS)



Standard dimensions

Shape	D	T	H	Specification	V _{max.}	Properties
1	150	20	20	C46 - BE12	20	Very soft
1	150	20	20	C80 - BE13	16	Soft
1	150	20	20	C150 - BE14	20	Medium
1	150	20	20	C240 - BE15	25	Medium-hard
1	150	20	20	C400 - BE16	32	Hard
Grit size recommendation						
Listed grit sizes available in all bonds (BE12 - BE16).				C46		Deburring
				C80		Matt finishing
				C150		Fine grinding
				C240		Ultra-fine grinding
				C400		Pre-polishing

Use:

Fine grinding and polishing of all kinds of implants and bone splints

Machine types:

Handheld and stationary machines

Peripheral speed:

$V_s = 16 - 32$ m/s

Grinding wheel shape: 1

Dry grinding

No dressing required, profiling of the wheel is possible by using a dressing stone in ceramic bond

e.g. 50 x 20 x 150, 50C24H10V15, TN 545066

50 x 20 x 150, C-COARSE, TN 9009*

Recommendation

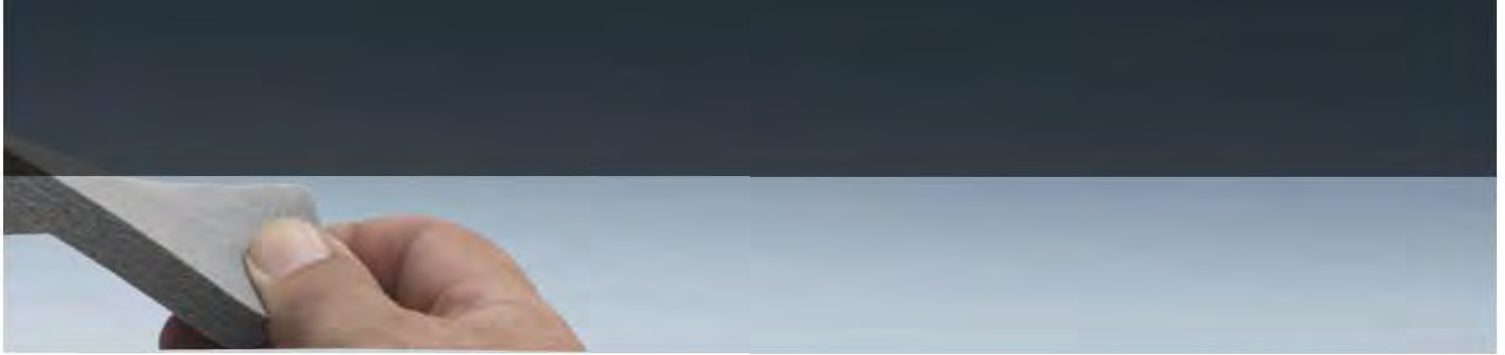
Specification	
Standard	Sturdier and harder
C150 - BE13	C150 - BE14

Ordering example

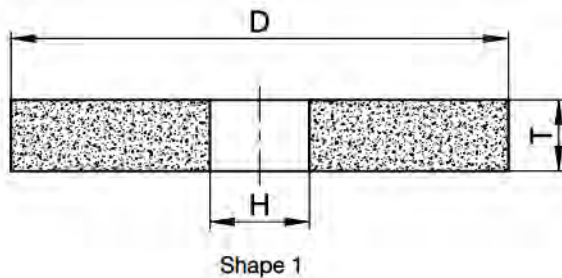
Shape	D x T x H	Specification	Type no.
1	150 x 10 x 25	C150 - BE13	802276*

* stock types





ELASTIC GRINDING TOOLS FOR SURGICAL INSTRUMENTS (TWEEZERS, FORCEPS, BRACKETS)



Standard dimensions

Shape	D	T	H	Specification	V _{max.}	Properties
1	100	5	25	A80 - BD-W	20	Soft
1	125	8	25	A150 - BD-M	25	Medium
1	150	10	25	A240 - BD-H	32	Hard
Grit size recommendation						
				A46, A80		Pre-grinding
				A150, A240		Semi-finish grinding
				A400, A600		Fine grinding
				A800		Pre-polishing
				A1200		Polishing

Use:

Hard-elastic grinding tools for fine grinding, matt finishing and polishing surgical tools

Machine types:

Handheld and stationary machines

Peripheral speed:

$V_s = 20 - 32$ m/s

Grinding wheel shape: 1

Predominantly dry grinding

No dressing required, profiling of the wheel is possible by using a dressing stone in ceramic bond
e.g. 50 x 20 x 150, 50C24H10V15, TN 545066
50 x 20 x 150, C-COARSE, TN 9009*

Recommendation

Specification		
Contour-following	Standard	Contouring
BD soft	BD medium	BD hard

Ordering example

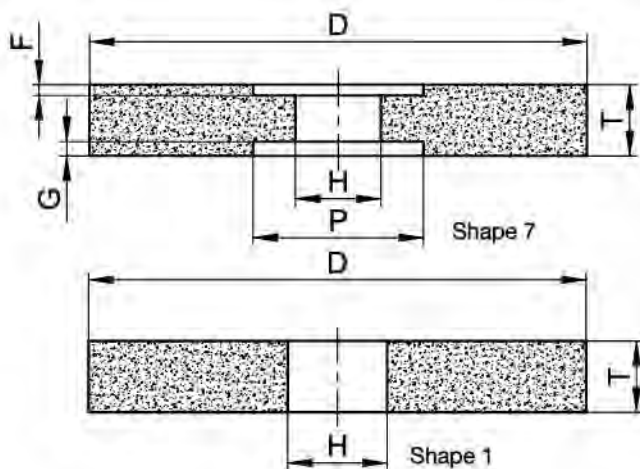
Shape	D x T x H	Specification
1	150 x 8 x 125	A150 - BD medium

* stock types





GRINDING TOOLS FOR HYPODERMIC NEEDLES



Standard dimensions

Shape	D	T	H	P x F/G
1	450	40	127	-
1	455	76	127	-
1	455	80	127	-
1	455	100	203.2	-
1	457	129	127	-
1	406	127	127	-
1	406	102	203.2	-
1	406	150	203.2	-
1	356	102	203.2	-
1	300	129	127	-
7	508	102	203.2	280 x 21/21
1	508	203	304.8	-

Grinding hypodermic needles

- Machine types:
e.g. Tacchella, Justur
- Peripheral speed:
 $V_s = 32 - 50 \text{ m/s}$
- Grinding wheel shape: 1 and 7
- For wet grinding only
- No dressing required

Cutting needles clamped in packets

- Cut-off wheel shape: 41N
- Dimensions:
e.g. 180 x 0.6 x 25.4
- Specification:
e.g. A320 - R707 or A400F-BE65
- For wet grinding only
- Other dimensions and specifications on request

Recommendation

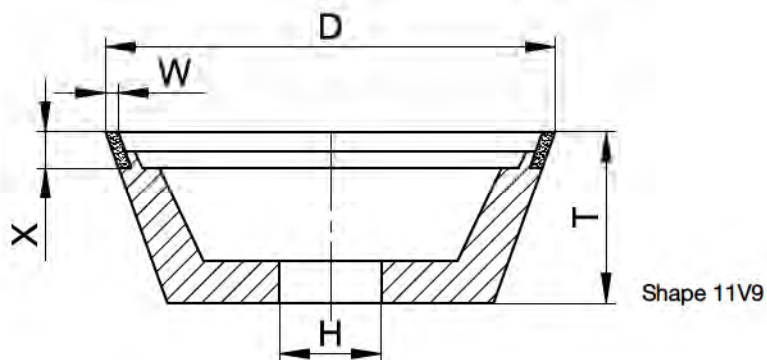
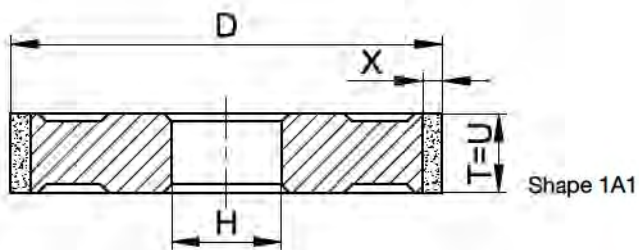
Specification	Standard	
	Standard	Long life
Needles	C500 J6 BY34	C500 K6 BY35/50
Lancets	C500 J6 BY34	C600 K6 BY34/50

Ordering example

Shape	D x T x H	Specification
1	450 x 40 x 127	C500 K6 BY35/50



CBN GRINDING TOOLS
FOR MEDICAL TOOLS (BONE DRILLS,
COLD CHISELS, THREADED PINS)



Machining recommendations

Shape	D	T	H	U/W	X	Specifications	Type no.	Comments
1A1	100	6	20	6	6	STARTEC-BASIC-BL126 3PD B126C50B54BA	906950	Threaded pins
	100	10	20	10	6		620464*	
11V9	75	30	20	2	10	AMIGO-B126C75B	640777*	Cold chisel
	100	35	20	2	10	AMIGO-B126C75B	617388*	
	100	35	20	2	10	AMIGO-B91C75B	644514*	Bone drill
	125	40	20	2	10	AMIGO-B126C75B	641854*	

* stock types

Use:

Grinding metal tools
e.g. bone drills and cold chisels

Machine types:

Rollomatic, Anca, Walter, Schütte, Haas

Wet grinding with oil and emulsion

Other dimensions and specifications on request.





APPLICATION TECHNOLOGY – SOLUTION EXPERTISE

In addition to an outstanding product, successful companies also expect process expertise and comprehensive consultancy services from their partners for their various requirements.

Focussing on the production and supply of high-quality tools is not enough. "Hardware" also includes the corresponding "software". The extensive process expertise of our application technology specialists enables us to offer our customers sustainable solutions to meet the highest technical and commercial expectations.



Defining the project

It is highly important to us that we know our customers' objectives. Application technology specialists analyse the definition of the project and create a profile with the client regarding the technical and economic requirements.



Specifying the concept

The team of experienced application engineers defines the solution proposals. According to the requirement, research and development specialist, as well as process specialists from the technical test centre will be involved.



Providing a solution

The process solution is implemented on the relevant machine on the client's premises. As part of sustainable process optimisation, the application engineer thus sets the mode of operation for the grinding tool and the interaction between the machine, component, materials, coolant and setting parameters.



Imparting knowledge

Our expertise in grinding engineering is a key element of successful collaboration. One-time optimisation at the client's site is not enough. Sustainable success is only achieved by widely applying experiences already gained. We also provide additional services for our clients, such as practical data preparation as well as courses and training.

Email address of Application Technology Group: Appleng_SUST@tyrolit.com

Precision data sheet			Attachment by: On:	
Customer	ATDB no.		Country:	
	Target group:		Product family:	
	Requirement of item:			
	Customer: *		Classification:	
	Department:		Customer no.	
	Contact:*		Tel. / Fax	
Customer	Shape: *		1 set = item.:	
	Dimensions (mm): *			
	Dimensions (mm):		Tolerance:	
	Specification:			
	Manufacturer:		Current price:	
	Vs max. (m/s) *		Quantity required:	
Customer	Grinding process:			
	Machine manufacturer:			
	Vs (m/s):			
	Cooling lubricant:			
	Dressing tool:			
	Dressing cycle:		Dressing amount:	
Workpiece	Workpiece: *		Dimensions (mm): *	
	Material group: *		Stock (to be removed) (mm):	
	Condition: *		Hardness: *	
Aim	Surface roughness:		Contact time:	
	Lifetime:			
	Additional:			
Probe	Specification:			
	Specification:			
	Specification:			
Info			Drawing:	
Distributor:				

* COMPULSORY fields are marked in grey

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