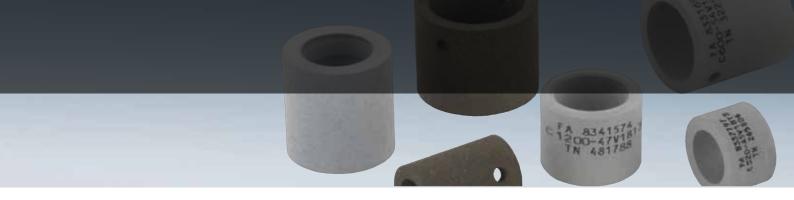


# GRINDING TOOLS FOR MEDICAL TECHNOLOGY





# **CONTENTS**

TYROLIT in general State-of-the-art implant technology – for humans Implant technology – Market growth factors	3 3 3
Diamond grinding tools for ceramic-insert cup	4
Diamond grinding tools for ceramic-heads (hip joint)	5
CBN/Diamond and SiC grinding tools for ceramic-heads (hip joint), metal	6
Ceramic grinding tools for knee joints (metal)	7
Grinding tools for scalpel machining	8
Grinding tools for scissor machining	9
Elastic Fine grinding tools for implants (splints & discs)	10
Elastic Grinding tools for surgical instruments (tweezers, forceps, brackets)	11
Grinding tools for hypodermic needles	12
CBN grinding tools for medical instruments (bone drill, cold chisel, threaded pins)	13
Application technology – solution expertise	14
Precision data sheet	15



#### **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.

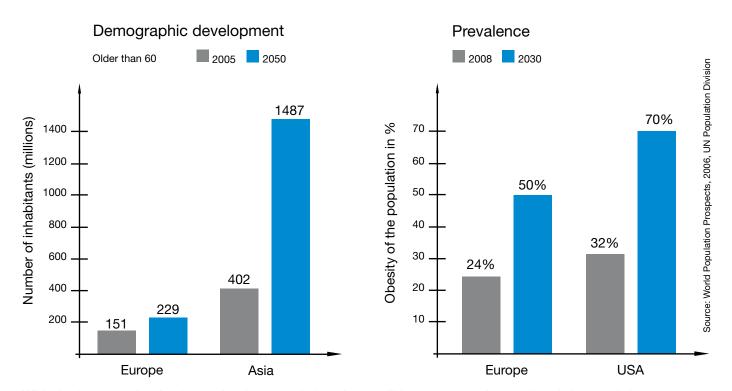
Global implant market volumes:

# 2007: 21 billion US\$

2008: 24 billion US\$

## **IMPLANT TECHNOLOGY - GROWTH DRIVER**

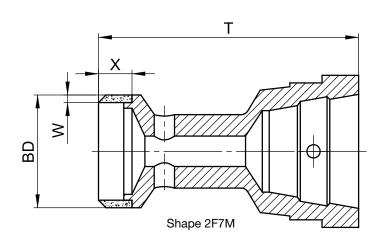
**The number** of people over 60 in Europe and Asia will increase to approx. 1.7 billion in 2050 **Obesity** will increase by 50 - 70% by 2030



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	т	Specification	Comments
2F7M	20.5	2.75	9	78	D35L8VD46ST	
2F7M	24.0	3	9	78	D35L8VD46ST	Diamond, ceramic
2F7M	29.2	2.6	9	78	D35L8VD46ST	bonded
2F7M	38.1	3	9	78	D35L8VD46ST	



## Use:

Machining of ceramic-insert cups

## Machine types:

e.g. Monnier & Zahner, Thielenhaus

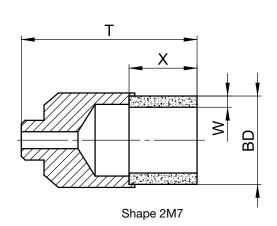
Wet grinding (oil)

Other dimensions and specifications on request



# **DIAMOND GRINDING TOOLS**

FOR CERAMIC-HEADS (HIP JOINT)





## Recommendation for ball machining (ceramic)

Shape	BD	W	х	Т	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

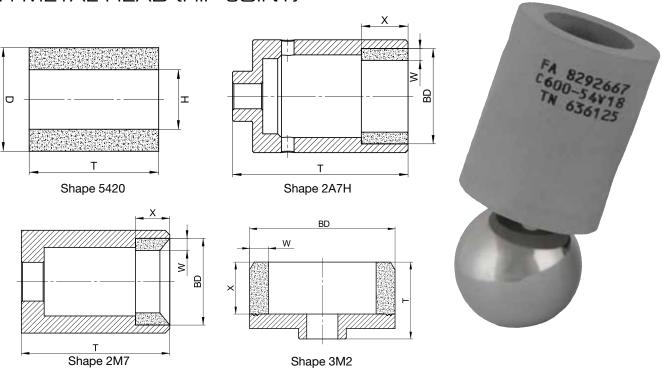
Wet grinding (oil)

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	Т	ŀ	1	Pre-grinding	Fine grinding	Polishing	Comments				
5420	27	14	1	2								
5420	32	20	2	0				Pre-grinding and fine grinding:				
F 400	38	20	3	2	C320-85V83T3	C800-45V83T3	36A800F5B9	SIC, ceramic bonded				
5420	45	20	32		32		32		C600-45V18T3	C1200-45V83T3	36A1000H5B9	Polishing:
F 400	55	20	3	0				Resin bonded				
5420	65	20	30									
Shape	BD	Т	W	Х	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	DxTxH	Specification
5420	38 x 20 x 20	C600 – 45V83T3

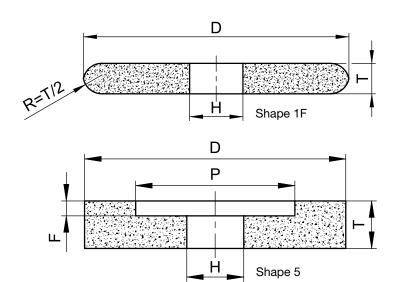
## Ordering example (CBN)

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



# **CERAMIC GRINDING TOOLS**

FOR METAL KNEE JOINTS





## **Standard dimensions**

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

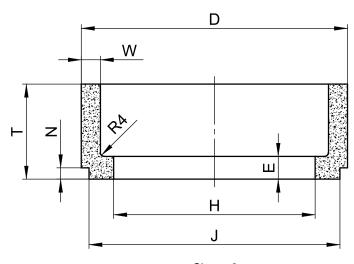
Shape	DxTxH	Specification
1F	200 x 20 x 32	C150 - BE13TF





## **GRINDING TOOLS**

FOR SCALPEL MACHINING



Shape 6



#### Grinding

Shape	D	Т	Н	W	J	E	N	Specification	V <sub>max</sub> .
6 - 1112F	200	90	150	6	188	17	6		
6 - 1112A	200	90	150	8	188	17	6		40 m/s
6 - 1112C	200	90	150	10	188	15	6	91A150R14BD800	
6 - 1112B	200	90	150	15	188	15	6		
6 - 1112E	200	90	150	20	188	22	6		

## Sharpening

1 150 6 16 89A120P6BY40 32 m/s 532312	Shape	D	T	Н	Specification	V <sub>max</sub> .	Type no.
	1	150	6	16	89A120P6BY40	32 m/s	532312

#### Use:

Grinding and polishing medical blades

# Machine types:

e.g. Berger, Siepmann

# Peripheral speed:

V<sub>S</sub> = see table

## **Grinding wheel shapes:** 1, 6

 Wet grinding for grinding and sharpening wheels

Wet and dry grinding for polishing wheels

## **Polishing**

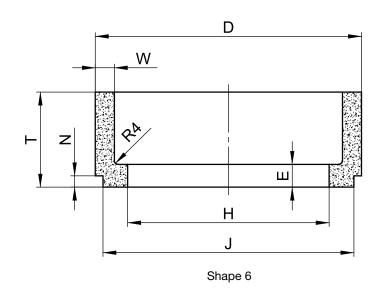
Shape	D	Т	Н	Specification	V <sub>max</sub> .	Type no.
1	150	20	20	C80 - BE15	25 m/s	7186*
1	150	20	20	C150 - BE15	25 m/s	2661*
1	200	25	20	C240 - BE15	25 m/s	320369*
1	200	25	32	C400 - BE15	25 m/s	22411*
1	150	20	20	C400 - BE16	32 m/s	71212*
1	150	20	20	C800 - BE11	25 m/s	669110*
1	175	20	32	C800 - BE11	25 m/s	669109*





# **GRINDING TOOLS**

FOR SCISSOR MACHINING





#### **Standard dimensions**

Shape	D	Т	н	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

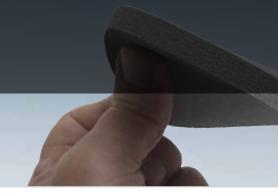
No dressing required

#### Recommendation

Specification		
Easy cutting	Standard	Comments
89A180S14BD780	91A150R14BD800	Resin bonded

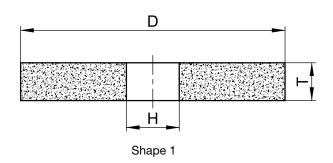
Shape	DxTxH	Specification	
6F - 1112C	200 x 90 x 150	91A150R14BD800	





# **ELASTIC FINE GRINDING TOOLS**

FOR IMPLANTS (SPLINTS & DISCS)





Shape	D	Т	н	Specification V <sub>max.</sub>		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 <b>32</b>		Hard
Grit siz	e recon	nmenda	tion			
				C46		Deburring
		C80			Matt finishing	
Listed grit sizes available in all bonds (BE12 - BE16).				C150		Fine grinding
				C240		Ultra-fine grinding
				C400		Pre-polishing



Specification	
Standard	Sturdier and harder
C150 - BE13	C150 - BE14

#### Ordering example

Shape	DxTxH	Specification	Туре по.	
1	150 x 10 x 25	C150 - BE13	802276*	





#### Use:

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

#### Machine types:

Handheld and stationary machines

#### Peripheral speed:

 $V_{S} = 16 - 32 \text{ m/s}$ 

#### Grinding wheel shape: 1

Dry grinding

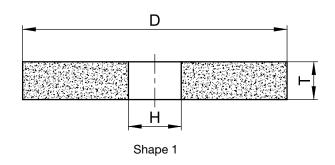
No dressing required, profiling of the wheel is possible by using a dressing stone in ceramic bond

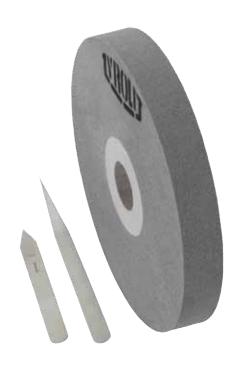
e.g. 50 x 20 x 150, 50C24H10V15, TN 545066 50 x 20 x 150, C-COARSE, TN 9009\*



## **ELASTIC GRINDING TOOLS**

FOR SURGICAL INSTRUMENTS (TWEEZERS, FORCEPS, BRACKETS)





#### **Standard dimensions**

Shape	D	Т	Н	Specification V <sub>max.</sub>		Properties
1	100	5	25	A80 - BD-W <b>20</b>		Soft
1	125	8	25	A150 - BD-M <b>25</b>		Medium
1	150	10	25	A240 - BD-H	32	Hard
Grit siz	e recoi	nmenc	lation			
		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:

 $V_{\rm S} = 20 - 32 \, \text{m/s}$ 

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

Shape	DxTxH	Specification	
1	150 x 8 x125	A150 - BD medium	

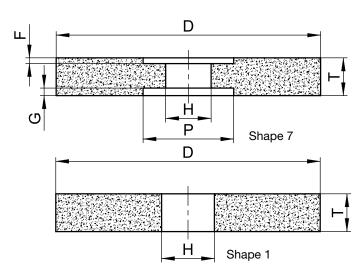
<sup>\*</sup> stock types

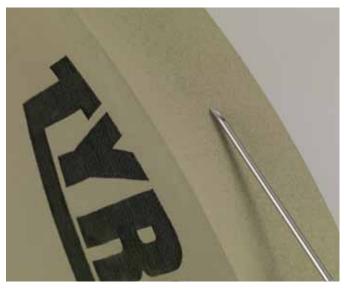




# GRINDING TOOLS

FOR HYPODERMIC NEEDLES





#### Standard dimensions

Shape	D	Т	Н	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

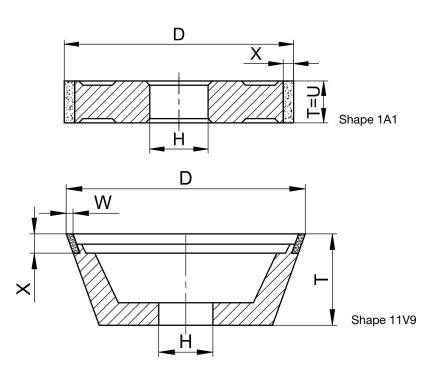
Specification							
	Standard	Long life					
Needles	C500 J6 BY34	C500 K6 BY35/50					
Lancets	C500 J6 BY34	C600 K6 BY34/50					

Shape	DxTxH	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	Т	н	U/W	Х	Specifications	Type no.	Comments
1A1	100	6	20	6	6	STARTEC-BASIC-BL126 3PD	906950	Threaded pine
IAI	100	10	20	10	6	B126C50B54BA	620464*	Threaded pins
	75	30	20	2	10	AMIGO-B126C75B	640777*	Cald abiasi
11V9	100	35	20	2	10	AMIGO-B126C75B	617388*	Cold chisel
1109	100	35	20	2	10	AMIGO-B91C75B	644514*	
	125	40	20	2	10	AMIGO-B126C75B	641854*	Bone drill

<sup>\*</sup> 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.

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	
	Shape: *		1 set = item.:	
Customer	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:				

<sup>\*</sup> COMPULSORY fields are marked in grey



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