



Your partner in orthopaedic implants

Grinding, cutting and finishing tools

English

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. For over 100 years, our innovative tools and solutions have played a crucial role in technological advancements across various industries.

With roots in the heart of the Austrian Alps, Tyrolit combines the strengths of family values with a global vision and over a century of individual corporate and technological experience.

We aim to impress both internal and external target groups and foster fair, enduring partnerships. In pursuit of our goals, we consistently optimise the quality of our products and services while continuously adjusting our business processes to meet evolving market demands.



Tyrolit headquarters in Schwaz (Austria)

Facts & figures



80,000+
standard products



30+
global production sites



4,500+
valued employees



140+
countries within our reach



500+
patents worldwide

| | |
|----|------------------------------------|
| 04 | Competence at a glance |
| 05 | Application technology |
| 06 | Innovative products |
| 09 | Grinding solutions for knee joints |
| 15 | Grinding solutions for hip joints |

Your 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 a wide product range, we therefore are 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.



Competence at a glance

Global
presence



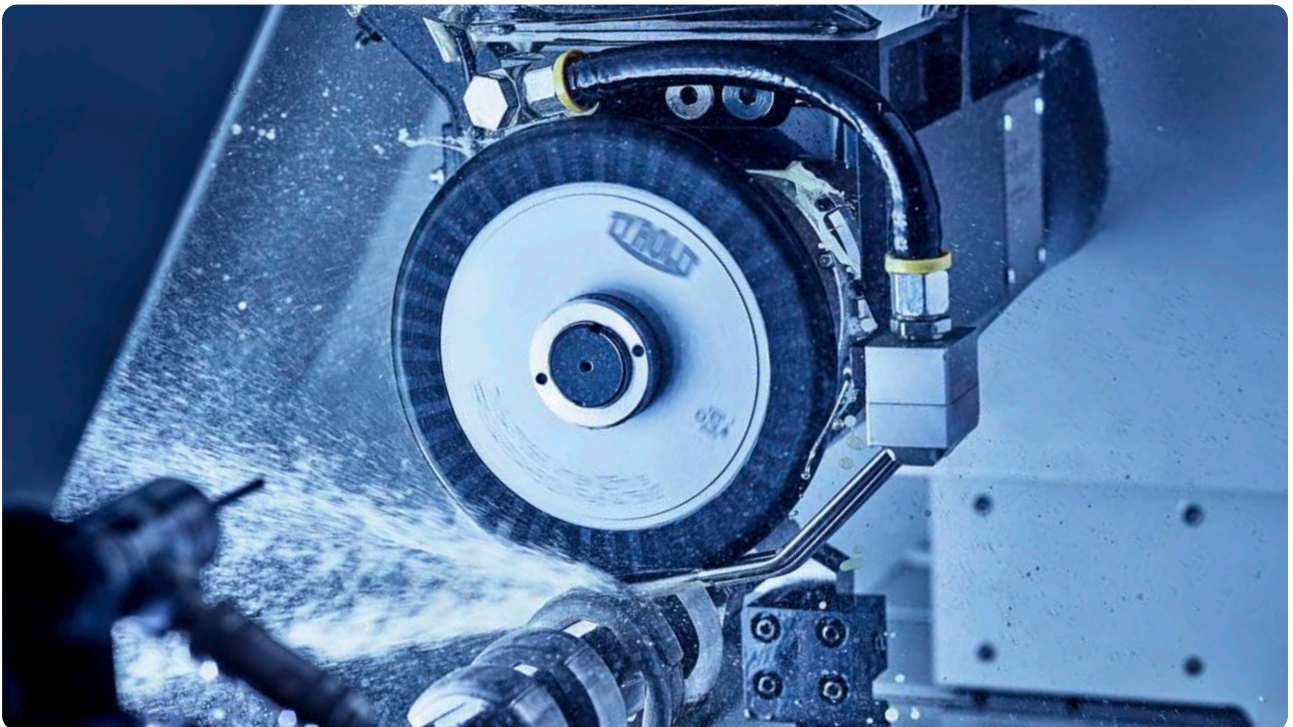
Application
technology



Innovative
products



Customised
solutions



Application technology

The best grinding solutions for your processes

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

Customer-specific solutions

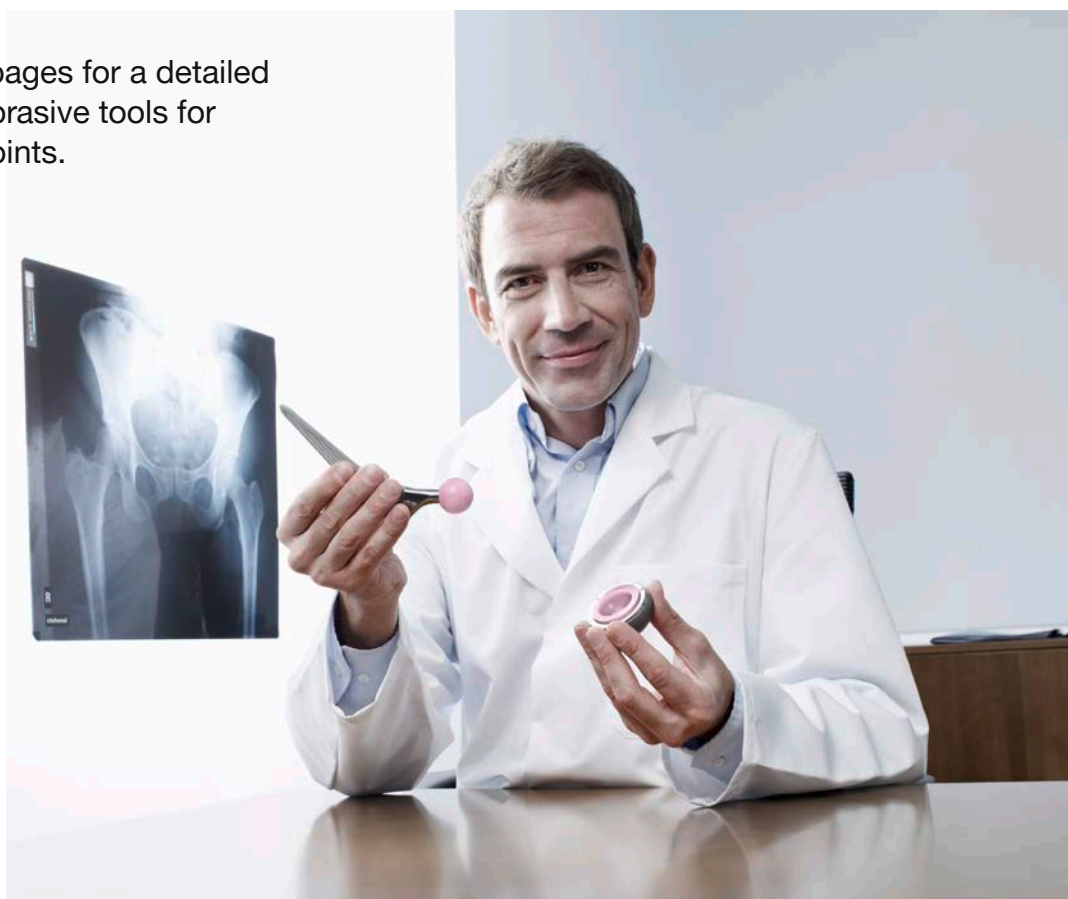
Tailored for your application

In order to ensure the best possible solution for your application, Tyrolit offers individually developed products for a wide range of applications.

Please see the following pages for a detailed description of available abrasive tools for machining hip and knee joints.

Your benefits

- + 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 components

Based on the requirements of our 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 in the medical industry for many years.

Vitrified CBN grinding tools with high grinding layers 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 decrease set-up costs in the grinding process.



ELASTIC fine grinding and polishing tools:

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



Resin bonded honing sleeves for increased productivity:

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





Grinding solutions for knee joints

Joint replacement surgery (hip and knee replacement) is considered the most effective intervention for osteoarthritis.

Tyrolit offers high performance tools for the machining of cast material, grinding and polishing of knee components. These products fulfill the high quality requirements of the manufacturing process.



Metal knee joints



1

Machining of Cast Material

- + Resin bonded cut-off wheels
- + Electroplated super-abrasive wheels
- + Ceramic belts



2

Profile Grinding

- + Electroplated super-abrasive wheels
- + Vitrified bonded CBN wheels
- + Conventional wheels



3

Deburring

- + Elastic wheels
- + Convolute wheels
- + Unitised wheels
- + Surface conditioning belts



4

Finishing

- + Elastic wheels
- + Cloth belts

1 Machining of cast material

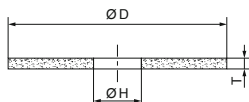
2 Profile grinding

3 Deburring

4 Finishing

Cut-off cast material

Sample product portfolio



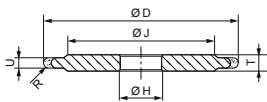
Shape 41



| Application material | Shape | Coolant | Comment |
|----------------------|----------|-------------------------|---|
| Stainless steel | 41F, 41N | With or without coolant | resin bonded fiber-reinforced |
| Cobalt chrome | 41F | With or without coolant | resin bonded 1x or 2x fiber-reinforced Also available for low powered machines (15kW) |
| Titanium | 41F, 41N | With or without coolant | resin bonded 1x or 2x fiber-reinforced |

Fettling / de-gating

Sample product portfolio



Shape 14FF1



| Application material | Shape | Coolant | Comment |
|-----------------------------------|-------|-----------------|-----------------------------|
| Stainless steel and cobalt chrome | 14FF1 | With coolant | Electroplated CBN wheel |
| Titanium | 14FF1 | With coolant | Electroplated diamond wheel |
| Stainless steel and cobalt chrome | Belt | Without coolant | Ceramic belt |

Customer-specific grinding tools can be produced upon request.

1 Machining of cast material

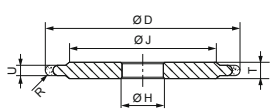
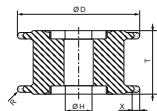
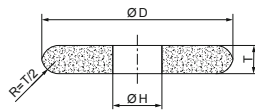
2 Profile grinding

3 Deburring

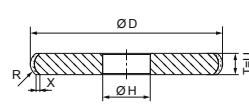
4 Finishing

A. HAAS machines

Sample product portfolio





Shape 14FF1S -
single wheelShape 14FF1S -
double wheel

Shape 1F



Shape 1FF1






| | Shape | Body | Comment |
|---|--------|--|---|
|  | 14FF1S | Carbon fiber* Steel Aluminium Fibre-reinforced composite* | Vitrified CBN wheel Retipping possible |
|  | 1F | | Conventional vitrified bonded |
|  | 1FF1 | Steel | Electroplated CBN-wheel Removal of runners and bridges |
|  | 14F1M | Steel | Dressing wheel |

Schuette and ANCA machines

Sample product portfolio



| | Shape | Body | Comment |
|---|---------------|--|---|
|  | 1FF1S, 14FF1S | Carbon fiber* Steel Aluminium Fibre-reinforced composite* | Vitrified CBN wheel Retipping possible |
|  | 1F | | Conventional vitrified bonded |
|  | 14F1M | Steel | Dressing wheel |

Customer-specific grinding tools can be produced upon request.

* double layer wheel available

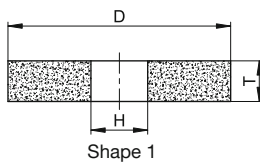
1 Machining of cast material


2 Profile grinding

3 Deburring

4 Finishing

Elastic wheels



| | Operation | Grit size | Vmax [m/s] | Comment |
|---|-----------|-----------|------------|-----------|
|  | Deburring | C46 | 20 | Very soft |

SCM belts



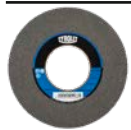
| Shape | Surface conditioning | Ra (µm) | Surface conditioning | Ra (µm) |
|-------|----------------------|---------|----------------------|---------|
| Belt | HD COARSE | 1,60 | A FINE | 0,50 |
| | HD MEDIUM | 1,10 | A VERY FINE | 0,40 |
| | A COARSE | 1,00 | S ULTRA FINE | 0,30 |
| | A MEDIUM | 0,60 | | |

Unitised compact wheels



| Shape | Dimension | Grade | Max. RPM | Rec. speed |
|-------|----------------|-------------------------|----------|------------|
| 1CW | 127 × 6 × 22,2 | 3 S FINE and 6 A MEDIUM | 10 000 | 6 000 |
| | 152 × 3 × 25,4 | 2 S FINE to 8 A COARSE | 7 500 | 4 500 |
| | 152 × 6 × 25,4 | 2 S FINE to 8 A COARSE | 5 000 | 3 000 |

Convolute compact wheels



| Shape | Dimension | Grade | Max. RPM | Rec. speed |
|-------|-----------------|------------------------|----------|------------|
| 1CW | 152 × 13 × 25,4 | 7 S FINE to 9 S FINE-H | 6 000 | 3 600 |
| | 152 × 25 × 76,2 | 7 S FINE to 9 S FINE-H | 6 000 | 3 600 |
| | 203 × 25 × 76,2 | 7 S FINE to 9 S FINE-H | 4 500 | 2 700 |
| | 203 × 50 × 76,2 | 7 S FINE to 9 S FINE-H | 4 500 | 2 700 |

Customer-specific grinding tools can be produced upon request.

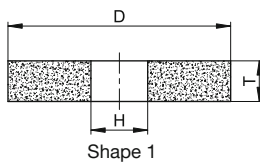
1 Machining of cast material


2 Profile grinding

3 Deburring

4 Finishing


Elastic wheels




| | Operation | Grit size | Vmax [m/s] | Comment |
|---|---------------------|-----------|------------|-------------|
|  | Matting | C80 | 16 | Soft |
| | Fine grinding | C150 | 20 | Medium |
| | Ultra-fine grinding | C240 | 20 | Medium-hard |
| | Pre-polishing | C400 | 32 | Hard |

Tyrolit Trine

| Grit size [µm] | A6 | A16 | A30 | A45 | A65 | A80 |
|----------------|----|-----|-----|-----|-----|-----|
|----------------|----|-----|-----|-----|-----|-----|

| Belts | Width | Length |
|---|-------------------------------|---|
|  | 5mm - 450mm 1mm Increments | 90mm - 10.800mm 1mm Increments for L < 1.000mm 5mm Increments for L ≥ 1.000mm |

Length < 200mm: min. width = 50mm

| Discs | Diameter | Backing |
|---|--------------------------------|---|
|  | 20mm - 450mm 5mm Increments | TFC (Velcro) self-adhesive (PSA) plain |

Standard: 115mm | 125mm | 150mm

Micro-replicated structure (pyramids), resin bond system, aluminium oxide, suitable for dry and wet grinding.



Customer-specific grinding tools can be produced upon request.




Grinding solutions for hip joints

Tyrolit offers high performance tools for the hip implant manufacturing process, with which the highest qualities and an increase in productivity of up to 50% can be achieved.



Metal and ceramic hip joints


| | | | | |
|--|--|--|--|--|
|  |  |  |  |  |
| <p>Chamfer and taper grinding</p> <ul style="list-style-type: none"> + Vitrified bonded superabrasive wheels | <p>Spherical grinding/honing</p> <ul style="list-style-type: none"> + SiC conventional sleeves + Metal, resin or vitrified bonded superabrasive sleeves | <p>Spherical pre-polishing</p> <ul style="list-style-type: none"> + Resin bonded pre-polishing sleeves | <p>Machining of acetabular liner</p> <ul style="list-style-type: none"> + Vitrified bonded superabrasive discs + Metal, resin or vitrified bonded superabrasive sleeves | <p>Stem finishing</p> <ul style="list-style-type: none"> + Convolute wheels + Elastic wheels + Cloth belts and discs |

Machining of metal hip joints

Metal femoral head

Spherical grinding

Sample product portfolio

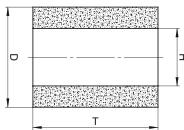
| | Operation | Shape | Comment | Semi-finished stock |
|---|----------------|-------|--------------------|---------------------|
|  | Rough-grinding | 2M7 | CBN resin bond | |
| | | 2M7 | CBN vitrified bond | |
| | | 5420 | SiC vitrified bond | ● |
| | Fine-grinding | 2M7 | CBN resin bond | |
| | | 5420 | SiC vitrified bond | ● |

● ... Available ex stock. To calculate the dimensions of the grinding tool, please provide a drawing of the hip ball.

Machine Manufacturers: A. HAAS, ANCA, Monnier & Zahner, Schuette, Studer, Thielenhaus.
We recommend the use of dedicated honing machines with force control.

Spherical pre-polishing

Sample product portfolio

| | Operation | Shape | Comment | Semi-finished stock |
|---|---------------|-------|------------|---------------------|
|  | Pre-polishing | 5420 | resin bond | ● |

● ... Available ex stock. To calculate the dimensions of the grinding tool, please provide a drawing of the hip ball.

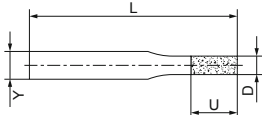
Machine Manufacturers: A. HAAS, ANCA, Monnier & Zahner, Schuette, Studer, Thielenhaus.
We recommend the use of dedicated honing machines with force control.

Customer-specific grinding tools can be produced upon request.

Machining of ceramic hip joints

Ceramic femoral head

Inside taper grinding

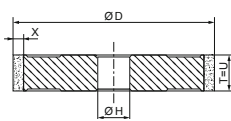


Shape 1A1W

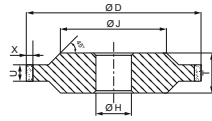


| Shape | Comment |
|-------|-----------------------------------|
| 1A1W | Metal bond diamond mounted points |

Chamfer grinding



Shape 1A1

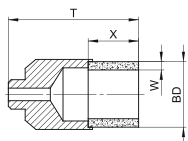


Shape 14A1




| Shape | Comment |
|------------|------------------------|
| 1A1 / 14A1 | Vitrified bond diamond |

Spherical grinding/honing



Shape 2M7



| | Operation | Shape | Comment |
|---|---------------|-------|----------------------------------|
|  | Pre-grinding | 2M7 | Metal and Vitrified diamond bond |
| | Fine-grinding | 2M7 | Vitrified diamond bond |

To calculate the dimensions of the grinding tool, please provide a drawing of the hip ball.

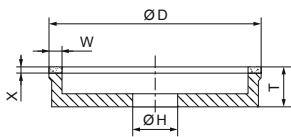
Machine Manufacturers: A. HAAS, ANCA, Monnier & Zahner, Schuette, Studer, Thielenhaus.
We recommend the use of dedicated honing machines with force control.

Customer-specific grinding tools can be produced upon request.

Machining of ceramic hip joints

Ceramic acetabular liner

Double disc surface grinding

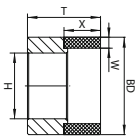


Shape 6A2



| Shape | Comment |
|-------|--|
| 6A2SM | Vitrified diamond bond disc wheels Individual segment design Replating available |

Spherical grinding/honing



Shape 2M9



| Operation | Shape | Comment |
|---------------|-------|----------------------------------|
| Pre-grinding | 2M9 | Metal and Vitrified diamond bond |
| Fine-grinding | 2M9 | Vitrified diamond bond |



To calculate the dimensions of the grinding tool, please provide a drawing of the hip ball.

Machine Manufacturers: A. HAAS, ANCA, Monnier & Zahner, Schuette, Studer, Thielenhaus.
We recommend the use of dedicated honing machines with force control.

Customer-specific grinding tools can be produced upon request.

Finishing of stem

Convolute compact wheels

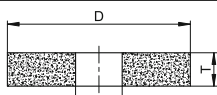


Shape 1CW

| | Shape | Dimension | Grade | Max. RPM | Rec. speed |
|--|-------|-----------------|------------------------|----------|------------|
| | 1CW | 152 × 13 × 25,4 | 7 S FINE to 9 S FINE-H | 6 000 | 3 600 |
| | | 152 × 25 × 76,2 | 7 S FINE to 9 S FINE-H | 6 000 | 3 600 |
| | | 203 × 25 × 76,2 | 7 S FINE to 9 S FINE-H | 4 500 | 2 700 |
| | | 203 × 50 × 76,2 | 7 S FINE to 9 S FINE-H | 4 500 | 2 700 |

Elastic wheels

Standard dimensions and specifications



Shape 1

| | Operation | Grit size | Vmax [m/s] | Comment |
|--|---------------------|-----------|------------|-------------|
| | Fine grinding | C150 | 20 | Medium |
| | Ultra-fine grinding | C240 | 20 | Medium-hard |
| | Pre-polishing | C400 | 32 | Hard |

Cloth belts and discs

Tyrolit Trine

| Grit size [µm] | A6 | A16 | A30 | A45 | A65 | A80 |
|----------------|----|-----|-----|-----|-----|-----|
|----------------|----|-----|-----|-----|-----|-----|

| Belts | Width | Length |
|-------|-------------------------------|---|
| | 5mm - 450mm 1mm Increments | 90mm - 10.800mm 1mm Increments for L < 1.000mm 5mm Increments for L ≥ 1.000mm |

Length < 200mm: min. width = 50mm

| Discs | Diameter | Backing |
|-------|--------------------------------|---|
| | 20mm - 450mm 5mm Increments | TFC (Velcro) self-adhesive (PSA) plain |

Standard: 115mm | 125mm | 150mm

Micro-replicated structure (pyramids), resin bond system, aluminium oxide, suitable for dry and wet grinding.



Customer-specific grinding tools can be produced upon request.

Tyrolit - Schleifmittelwerke Swarovski AG & Co K.G.

Swarovskistraße 33 | 6130 Schwaz | Austria

Tel +43 5242 606-0 | Fax +43 5242 63398

Our **worldwide subsidiary companies** can be found
on our website at www.tyrolit.com



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TYROLITgroup