Telescopic crowns
Precious and non-precious metal alloys and titanium

Tapered crowns
Precious and non-precious metal alloys, titanium and ceramics

Abutments
Titanium/Non-precious metals

Very fine milling and polishing
Precious and non-precious metal alloys and titanium

Channel/shoulder, channel/shoulder/pin and T-attachments
Precious and non-precious metal alloys
We recommend tools with a shank diameter of 3.00 mm (ISO 123).

Compared to tools with a shank diameter of 2.35 mm, the chucking surface is larger, which provides:

- Greater chucking force
- Improved safety

Increased precision of the chucks when clamping tools with a diameter of 3.00 mm:

- Improved radial runout accuracy
Features of the milling device

- Precision spindle
  Maximum concentricity deviation 0.02 mm
- Speed range:
  1.000 - 25.000 rpm
- Shank types:
  103, 104, 123, 124

Auxiliaries

- High-efficiency milling oil 9758
  - guarantees optimum surfaces
  - protects the tools
- Wax
  For ultra-fine milling
- Waxit
  Prevents clogging
- Long-fibre cotton
  For ultra-fine grinding and polishing
- Diamond paste 7 µm, 9301
  For ultra-fine grinding

Milling direction

1 + 2 Milling direction of the tool
1 Milling in rotational direction: in clockwise direction
2 Milling in contra-rotational direction: anti-clockwise rotation
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Precious metal</th>
<th>Precious metal - reduced Non-precious metal</th>
<th>Titanium</th>
<th>Ceramic</th>
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<tbody>
<tr>
<td>Easy to cut</td>
<td></td>
<td>Hard to cut</td>
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<td>Hard to cut</td>
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<tr>
<td>Flow chips</td>
<td></td>
<td>discontinuous chips</td>
<td></td>
<td></td>
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<tr>
<td>Low resistance to penetration</td>
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<td>High resistance to penetration</td>
<td></td>
<td>Very high resistance to penetration</td>
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<tr>
<td>Reduced material hardness</td>
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<td>Increased material hardness</td>
<td></td>
<td>hard, brittle, temperature sensitive</td>
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<tr>
<td>Very shiny, smooth surfaces (R, &lt; 1 µm)</td>
<td>Fine surfaces (R, 1 - 1,5 µm)</td>
<td>Fine surfaces (R, 1 - 1,5 µm)</td>
<td>Fine surfaces (R, &lt; 1 µm)</td>
<td>Less accumulation of material on the blades thanks to the reduction of the speed</td>
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<tr>
<td></td>
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<td>Increased durability of the instruments thanks to speed reduction</td>
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## General information

### Recommended tools/optimum speeds

<table>
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<th>Semi-precious metal</th>
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<th>Zirconium oxide</th>
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<tr>
<td><strong>Rough work</strong></td>
<td>E</td>
<td>E</td>
<td>GE+XE</td>
<td>–</td>
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<tr>
<td></td>
<td>(\omega_{\text{opt}}\ 10.000)</td>
<td>(\omega_{\text{opt}}\ 6.000)</td>
<td>(\omega_{\text{opt}}\ 6.000)</td>
<td>–</td>
</tr>
<tr>
<td><strong>Fine work</strong></td>
<td>F</td>
<td>S</td>
<td>S</td>
<td>M</td>
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<td></td>
<td>(\omega_{\text{opt}}\ 10.000)</td>
<td>(\omega_{\text{opt}}\ 6.000)</td>
<td>(\omega_{\text{opt}}\ 6.000)</td>
<td>(\omega_{\text{opt}}\ 160.000)</td>
</tr>
<tr>
<td><strong>Ultra-fine work</strong></td>
<td>F</td>
<td>S</td>
<td>S</td>
<td>F</td>
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<tr>
<td></td>
<td>(\omega_{\text{opt}}\ 3.000)</td>
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<tr>
<td><strong>Pre-polishing</strong></td>
<td>–</td>
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<tr>
<td><strong>Polishing</strong></td>
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<tr>
<td><strong>High-shine polishing</strong></td>
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</tr>
</tbody>
</table>

- \(\omega_{\text{opt}}\) = optimum speed/rpm
- General information
- Recommended tools/optimum speeds
- Cutters
- Polishing
- Pre-polishing
- High-shine polishing
- Galvanic diamond abrasives
Zirconium oxide

1. Contouring
   - Use in the laboratory turbine, in the milling device
   - Supply water cooling
   - Apply low contact pressure
   - Diamond abrasives, medium
     - ○ ZR373M.025, 0°
     - ○ ZR986M.012, 0°
   - ○ ZR374M.025, 1°
   - ○ ZR371M.025, 2°
   - ⬤ 160.000 rpm

2. Ultra-fine grinding
   - Use in the laboratory turbine, in the milling device
   - Supply water cooling
   - Apply low contact pressure
   - Diamond abrasives, fine
     - ○ ZR373F.025, 0°
     - ○ ZR986F.012, 0°
   - ○ ZR374F.025, 1°
   - ○ ZR371F.025, 2°
   - ⬤ 160.000 rpm
Primary crowns
made of zirconium oxide

3 Pre-polishing
- Use in the laboratory turbine, in the milling device
- Supply water cooling
- Apply low contact pressure

Diamond abrasive, extra-fine
- ZR373EF.025, 0°
- ZR374EF.025, 1°
- ZR986EF.012, 0°
- ZR371EF.025, 2°

Opt. 160.000 rpm

4 High-shine polishing
- Use in the laboratory turbine, in the milling device
- Supply water cooling
- Apply low contact pressure

Diamond abrasive, ultra-fine
- ZR373UF.025, 0°
- ZR374UF.025, 1°
- ZR986UF.012, 0°
- ZR371UF.025, 2°

Opt. 160.000 rpm

Handy hint:
For optimum results, carry out all 4 steps!
1. **Milling of wax**
   - Lubricate cutter with Waxit
   - Milling in rotational direction
   - The surface achieved is very fine, so that the use of the wax scaler 266R can be omitted

2. **Rough milling**
   - Lubricate cutter with milling oil
   - Milling in contra-rotational direction

**H 364 RA.010/015/023**
TC Wax cutter

- rpm: 3,000 rpm
- Wax

**H 364 RE.010/015/023**
Coarse TC cutter for precious metal

- rpm: 10,000 rpm
- Precious metal
Telescopic crowns
made of precious metal alloys

3 Fine milling
- Lubricate cutter with milling oil
- Milling in contra-rotational direction

4 Ultra-fine milling/polishing
- see page

H 364 RF 010/015/023
Fine TC cutter for precious metal

Opt. 10,000 rpm

Precious metal
**1 Milling of wax**

- Lubricate cutter with Waxit
- Milling in rotational direction
- The surface achieved is very fine, so that the use of the wax scaler 266 R can be omitted

**H 364 RA.010/015/023**
TC wax cutter

- *n*_{opt} 3.000 rpm

**2 Rough milling**

- Lubricate cutter with milling oil
- Milling in contra-rotational direction

**H 364 RGE.010/015/023**
Coarse TC cutter for non-precious metal and titanium

- *n*_{opt} 6.000 rpm

Wax

Non-precious metal/titanium
Telescopic crowns
made of non-precious metal alloys/titanium

3 Fine milling
- Lubricate cutter with milling oil
- Milling in contra-rotational direction

4 Ultra-fine milling/polishing
- see page

H 364 R.010/015/023
Fine TC cutter for non-precious and semi-precious metal and titanium

$\omega_{\text{opt}} \ 6.000 \ \text{rpm}$

Non-precious metal/titanium
1 **Milling of wax**
- Lubricate cutter with Waxit
- Milling in rotational direction
- The surface achieved is very fine, so that the use of the wax scaler 355 can be omitted

H 356 RA, 1°/2°/4°/6°
TC wax cutter

<table>
<thead>
<tr>
<th>rpm</th>
<th>3.000 rpm</th>
</tr>
</thead>
</table>

Wax

2 **Rough milling**
- Lubricate cutter with milling oil
- Milling in contra-rotational direction

H 356 RSE, 1°/2°/4°/6°
Coarse TC cutter for precious metal

<table>
<thead>
<tr>
<th>rpm</th>
<th>10.000 rpm</th>
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Precious metal
Tapered crowns
made of precious metal alloys

3 Fine milling
- Lubricate cutter with milling oil
- Milling in contra-rotational direction

4 Ultra-fine milling/polishing
- see page

H 356 RF, 1°/2°/4°/6°
Fine TC cutter for precious metal

Opt. 10,000 rpm

Precious metal
1. **Milling of wax**

- Lubricate cutter with Waxit
- Milling in rotational direction
- The surface achieved is very fine, so that the use of the wax scaler 355 can be omitted

**H 356 RA, 1°/2°/4°/6°**  
TC wax cutter  

**rpm**  3.000

**Wax**

2. **Rough milling**

- Lubricate cutter with milling oil
- Milling in contra-rotational direction

**H 356 RGE, 2°/4°/6°**  
**H 356 RXE, 1°/2°**  
Coarse TC cutter for non-precious metal, titanium

**rpm**  6.000

**Non-precious metal/titanium**
Tapered crowns
made of non-precious metal alloys/titanium

3   Fine milling

- Lubricate cutter with milling oil
- Milling in contra-rotational direction

H 356 RS, 1°/2°/4°/6°
Fine TC cutter for non-precious and semi-precious metal and titanium

4   Ultra-fine milling/polishing

- see page

Non-precious metal/titanium
Titanium/non-precious metal

1. Coarse cutters
   - Use in the micro-motor, in the milling device
   - Lubricate cutter with milling oil
   - Soak cotton wool in milling oil

2. Fine cutter
   - Use in the micro-motor, in the milling device
   - Lubricate cutter with milling oil
   - Soak cotton wool in milling oil

- $\bullet\bullet$ H364KRXE, $0^\circ$
- $\bullet\bullet$ H347RXE, $2^\circ$

- H364KRS, $0^\circ$
- H347RS, $2^\circ$

$\omega_{max}$ 6.000 rpm
Implant abutments
made of titanium/non-precious metal alloys

1. Coarse cutters
- Use in the laboratory turbine with water cooling
- Milling in contra-rotational direction
- Equally suitable for primary crowns, bars etc.

   H373Q, 0°
   H371Q, 2°
   H376Q, 4°

   ○opt. 160,000 rpm

2. Fine cutter
- Use in the laboratory turbine with water cooling
- Milling in contra-rotational direction
- Equally suitable for primary crowns, bars etc.

   H373F, 0°
   H371F, 2°
   H376F, 4°

   ○opt. 160,000 rpm

Handy hint:
For optimum results use with spray cooling
1. Very fine milling
   - Work with last bur used
   - Fill chip spaces with wax
   - Lubricate cutter with milling oil
   - Milling in contra-rotational direction

2. Polishing
   - Work with last bur used
   - Cover bur with cotton wool
   - Apply diamond paste (7µm)
   - Soak cotton wool in milling oil

3. High-shine polishing
   - Work with last bur used
   - Cover bur with fresh cotton wool
   - Soak cotton wool in milling oil

Precious metal/non-precious metal/titanium

Opt. 3,000 rpm
Very fine milling/polishing
with cotton wool or special polishers for use in the milling device

1  Pre-polishing
To protect the polishers:
- Do not start polishing until the surface is very finely ground
- Work without pressure
- Polish without irrigation

9440 C.060, 0°

2  Polishing
To protect the polishers:
- Do not start polishing until the surface is very finely ground
- Work without pressure
- Polish without irrigation

9440 M.060, 0°

3  High-shine polishing
To protect the polishers:
- Do not start polishing until the surface is very finely ground
- Work without pressure
- Polish without irrigation

9440 F.060, 0°

Precious metal/non-precious metal/titanium

○ opt. 6.000 rpm  ○ opt. 6.000 rpm  ○ opt. 6.000 rpm
Precious metal

1. **Milling of the channels**
   - Feed (A) with feed slide (0.05 mm at max.)
   - Axial feed (B) with milling spindle

   **H 21 XL 007/010/012**
   TC channel cutter
   \( \text{min.} 3.000 \text{ rpm} \)

2. **Milling of the shoulder**
   - Lubricate cutter with milling oil

   **H 294.029**
   TC shoulder cutter
   \( \text{min.} 3.000 \text{ rpm} \)
Channel/shoulder and channel/shoulder/pin attachments
made of precious metal alloys

3 Punch marking
- Axial feed with milling spindle
- Punch marking to centre the twist drill

4 Drilling
- Lubricate drill with milling oil
- Drill with low pressure
- Remove chips frequently (lift drill)

5 Fine work of the bore hole
- Lubricate drill with milling oil
- Drill with low pressure
- Remove chips frequently (lift drill)

H 370.009 TC Centring bur
- min. 5.000 rpm

H 206.007/010/012 TC spiral drill
- min. 10.000 rpm

H 210.007/010/012 TC tube bur
- min. 10.000 rpm
1. **Punch marking**
   - Axial feed with milling spindle
   - Punch marking to centre the twist drill

2. **Drilling**
   - Lubricate drill with milling oil
   - Drill with low pressure
   - Remove chips frequently (lift drill)
   - Axial feed with milling spindle

3. **Adjusting the shoulder**
   - Lubricate drill with milling oil
   - Axial feed with milling spindle

4. **Milling of the T-groove**
   - Feed (A) with feed slide (0.05 mm at max.)
   - Axial feed (B) with milling spindle

**Tools**
- **H 370.009** TC centring bur
  - Speed: 5.000 rpm
- **H 206.010** TC spiral drill
  - Speed: 6.000 rpm
- **H 294.029** TC shoulder cutter
  - Speed: 3.000 rpm
- **H 33 XLQ.009** TC groove cutter
  - Speed: 3.000 rpm

Non-precious metal alloy
"T" attachment
made of non-precious metal alloys

4. **Fine milling** of the T-groove
- Feed (A) with feed slide (0.05 mm at max.)
- Axial feed (B) with milling spindle
- Lubricate the drill with milling oil
- Fill chip spaces with wax

H 33 XLQ.009/012/014/017
TC groove cutter

\( \omega_{opt} = 2.000 \text{ rpm} \)

5. **Milling** of the passage
- Feed (A) with feed slide (0.05 mm at max.)
- Axial feed (B) with milling spindle

H 33 XLQ.009
TC groove cutter

\( \omega_{opt} = 3.000 \text{ rpm} \)

Non-precious metal alloy
Milling block
for clamping laboratory implants
and retention pins

- Two-piece construction, suitable for cylindrical and slightly tapered laboratory implants (clamping range: 1.0 - 6.5 mm)
- For use on a model table

150.555
German utility model DE 20 2008 006 553
Dressing block
for polishers

1. Dressing polishers
   - Dressing of the radius on the upper side of the block
   - Dressing the polisher to the desired angle at the appropriate diamond coated, inclined surface of the block
   - Perform rotary movements in order to avoid scratches on the polisher

2. Smoothing polishers
   - Smoothing of the radius
   - Smoothing of the circumferential surface of the polisher in order to prevent the transmission of scratches onto the workpiece

Attention: Very slim polishers should only be dressed on block 150.461F!

Accessories