BALIQ for Microtools

Revolutionary smooth coatings for micromachining

BALIQ MICRO ALCRONOS
BALIQ MICRO TISINOS
BALIQ MICRO ALTINOS
BALIQ coatings for microtools redefine the benchmark and process reliability in micromachining

**The technological progress**
- Revolutionary smooth and defect-free coatings with outstanding adhesion
- High coating thickness precision for very sharp edges
- Low susceptibility to sticking of BALIQ® coatings
- High wear resistance of BALIQ® coatings even under severe thermal stress and extreme service temperatures

**The hands-on advantages**
- Smooth chip removal without mechanical post-treatment, high coating surface quality for high component quality
- Ultimate tool precision
- Prevention of adhesion and build-up edges even with difficult-to-machine materials
- High thermal stability and oxidation resistance of tools with small dimensions, highly reproducible tool service life

**BALIQ® coatings for demanding micro cutting applications**

**BALIQ® MICRO ALCRONOS**

**Microdrilling stainless steel**

<table>
<thead>
<tr>
<th>Tool life [number of holes]</th>
<th>0</th>
<th>50</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>350</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool</td>
<td>Microdrill Ø 1.0 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workpiece</td>
<td>Steel 1.4571 X6CrNiMoTi1712 (AISI 316Ti, SUS 316 Ti)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
| Cutting parameters         | $L_c = 20 \times d$  
|                           | Wet |
| Source                     | Tool manufacturer |

**BALIQ® MICRO ALCRONOS**

**Microdrilling steel**

<table>
<thead>
<tr>
<th>Tool life [%]</th>
<th>0</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool</td>
<td>Microdrill Ø 0.6 mm</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Workpiece</td>
<td>Steel 1.3505 100Cr6 (AISI 52100, SUS SUJ 2)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Cutting parameters | $v_c = $ confidential  
|               | $L_c = $ confidential  
|               | Wet |
| Source        | Tool manufacturer |

All given data are approximate values and they depend on application, environment and test conditions.
Even very fine surface structures can be reliably machined

Allows precise, high-performance coatings even for very small tool diameters

Reliable production of critical and expensive components

New manufacturing options with high process reliability and efficiency

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**BALIQ® MICRO TISINOS**

**Micromilling hardened steel**

<table>
<thead>
<tr>
<th>Tool life [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
</tr>
<tr>
<td>55</td>
</tr>
<tr>
<td>50</td>
</tr>
<tr>
<td>45</td>
</tr>
<tr>
<td>40</td>
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<td>35</td>
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<td>30</td>
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<td>25</td>
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<tr>
<td>20</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

**Tool**
Ballnose endmill
Ø 1.0 mm

**Workpiece**
Steel 1.2083
X42Cr13 (AISI 420J2)
52 HRC

**Cutting parameters**

- $v_c = 80$ m/min
- $f_t = 0.02$ mm
- $a_p = 0.04$ mm
- $a_e = 0.04$ mm

Dry

**Source**
Tool manufacturer

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**BALIQ® MICRO TISINOS**

**Micromilling hardened steel**

<table>
<thead>
<tr>
<th>Tool life [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
</tr>
<tr>
<td>120</td>
</tr>
<tr>
<td>90</td>
</tr>
<tr>
<td>60</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

**Tool**
Ballnose endmill
Ø 2.0 mm

**Workpiece**
Steel 1.2379
X155CrVMo121 (AISI D2, JIS SKD11)
62 HRC

**Cutting parameters**

- $v_c = 130$ m/min
- $f_t = 0.04$ mm
- $a_p = 0.1$ mm
- $a_e = 0.1$ mm

Dry

**Source**
Oerlikon Balzers
Cutting laboratory
Discover a new world of possibilities with BALIQ for Microtools
Get in touch with us today!

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