Hardox® 400 Round Bars – Turning Recommendations

Typical Properties

<table>
<thead>
<tr>
<th>Hardness in Brinell (HBW)</th>
<th>Hardness in Rockwell (HRC)</th>
<th>Tensile Strength, Rm (N/mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>~ 400</td>
<td>~ 40</td>
<td>~ 1250</td>
</tr>
</tbody>
</table>

For more specific information see data sheet for Hardox® 400 Round Bar.

<table>
<thead>
<tr>
<th>Cutting data Turning</th>
<th>Cemented Carbide</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Roughing</td>
</tr>
<tr>
<td>Cutting speed, ( V_c ) (m/min)</td>
<td>70 – 90</td>
</tr>
<tr>
<td>Feed per revolution, ( f_n ) (mm/r)</td>
<td>0.2 – 0.6</td>
</tr>
<tr>
<td>Cutting depth, ( a_p ) (mm)</td>
<td>2 – 4</td>
</tr>
<tr>
<td>Suitable grades</td>
<td>P20 – P35*</td>
</tr>
<tr>
<td></td>
<td>K20 – K30*</td>
</tr>
</tbody>
</table>

* If possible, use a CVD coated cemented carbide.

Note
These cutting data should be seen as a starting values. It is up to each workshop to optimize cutting data for each machine.
Remarks

- It is recommended to use cutting fluid when turning. Insert holder with internal cooling channels can be used.
- Use a tougher carbide grade with interrupted cut or face turning of large workpieces.
- At higher Feed rate, lower the cutting speed.

Formulas and definitions

\[
V_c = \frac{\pi \times d \times n}{1000} \quad \text{n = speed (rpm)}
\]

\[
n = \frac{V_c \times 1000}{\pi \times d} \quad \text{f}_n = \text{feed rate (mm/rev)}
\]

\[
v_f = n \times f_n \quad \text{v}_f = \text{feed rate (mm/min)}
\]

\[
\pi = 3.14 \quad d = \text{workpiece Ø}
\]

\[
V_c = \text{cutting speed (m/min)} \quad a_p = \text{cutting depth (mm)}
\]

Troubleshooting

Vibrations

- Improve the tool and workpiece stability.
- Change cutting speed.
- Increasing feed.
- Reduce the depth of cut.
- Choose a more easy-cutting chipbreaker.
- Select an insert with less nose radius.

Bad surface finish

- Reduce feedrate.
- Increase cutting speed.
- Use coolant.
- Improve the tool and workpiece stability.
- Choose a more easy-cutting chipbreaker.
- Select inserts with larger nose radius.