END MILL

SQUARE-END

ROUGHING

BALL-END

CORNER ROUNDELING

CHAMFER MILLS
TWIST DRILLS & REAMERS

- Shank
- Flutes
- Zero Point
- "Shoulder"
- Reamer
- Hole Depth
- Tip
- Shoulder
EDGE FINDER (A.K.A. WIGGLER)
DIAL INDICATOR
FEEDS & SPEEDS
# Cutting Speed Guidelines

<table>
<thead>
<tr>
<th>Material</th>
<th>High-Speed Steel</th>
<th>Carbide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastics</td>
<td>500</td>
<td>800</td>
</tr>
<tr>
<td>Aluminum</td>
<td>300</td>
<td>600</td>
</tr>
<tr>
<td>Brass</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>Mild Steel</td>
<td>75</td>
<td>250</td>
</tr>
<tr>
<td>Stainless</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>

**Speeds in Surface Feet per Minute (SFPM)**
MILL/DRILL SPINDLE SPEED

\[
\text{Spindle Speed} = \frac{4 \times \text{Cutting Speed}}{\text{Tool Diameter}}
\]

gives spindle speed in RPM for cutting speed in feet per minute (FPM) and tool diameter in inches.
FEED RATE

FEED RATE = CHIP LOAD X TEETH X SPINDLE SPEED

GIVES FEED RATE IN INCHES PER MINUTE
FOR
CHIP LOAD IN INCHES PER TOOTH
AND
SPINDLE SPEED IN RPM

TYPICAL CHIP LOADS:
ROUGHING 0.005"
FINISHING 0.001-0.002"
CUTTING DIRECTION

CONVENTIONAL (CHIP)

CUTTING DIRECTION

CLIMB