



Undercutting Guide

Undercutting end mills, often referred to as lollipop cutters, are extremely versatile tools. Harvey tool offers a variety of reach and wrap angles to provide an answer for even the most difficult of applications. Due to the varying neck lengths and the applications, specific machining parameters must be calculated to avoid breakage.

Speeds & Feeds calculations:

1. Determine the correct SFM and Base Chip Load (IPT) for the cutter, material and application (see application descriptions Figure 1.)
2. Adjust Chip Load to account for neck length to cutter diameter ratio. (see Table 1)
3. Calculate the Speed (RPM) and Linear Feed (IPM)
4. Determine correct number of passes

Example: Tool #22806 to machine for a Deburring application in 4140 steel at 32 Rc.

1. Using Figure 1 (upper right), determine the type of application you will be performing.
From Speeds & Feeds chart (next page), SFM is 200 and Base Chip Load (IPT) for Deburring is .00039.

2. Calculate the neck length to neck diameter ratio for the tool. Calculate adjusted chipload based on values in Table 1.

$$\begin{aligned} \text{Neck Length Ratio} &= (\text{Neck Length} / \text{Neck Diameter}) \\ &= (.375 / .070) \\ &= 5.3 \end{aligned}$$

$$\begin{aligned} \text{Adjusted Chip Load} &= \text{Adjustment Factor} \times \text{Base Chip Load} \\ &= .8 \times .00039 \\ &= .00031 \end{aligned}$$

3. Calculate Speed (RPM) and Linear Feed (IPM)

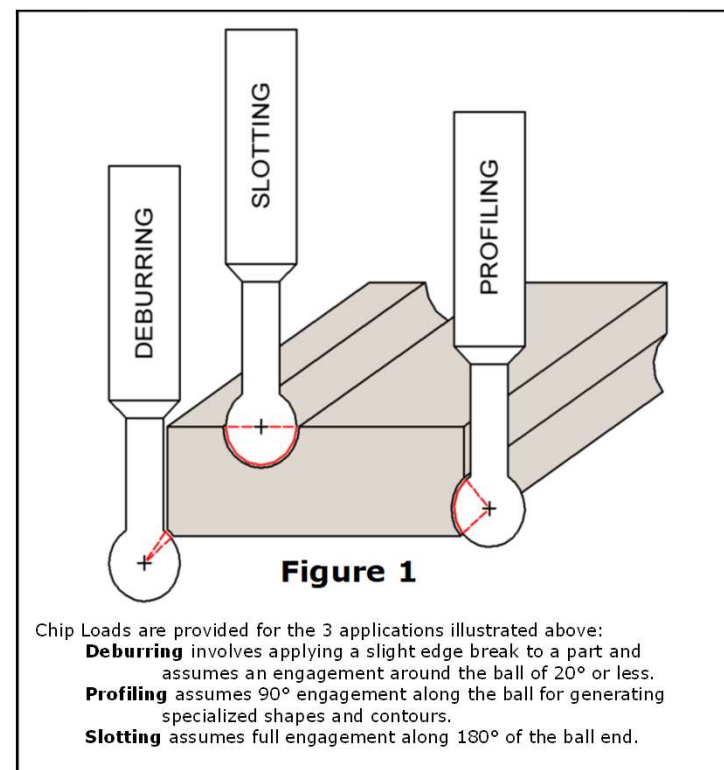
$$\begin{aligned} \text{RPM} &= (\text{SFM} \times 3.82) / \text{Cutter Diameter} \\ &= (200 \times 3.82) / .093 \\ &= 8215 \end{aligned}$$

$$\begin{aligned} \text{Linear Feed (IPM)} &= \text{RPM} \times \text{IPT} \times \text{Number of Flutes} \\ &= 8215 \times .00031 \times 2 \\ &= 5.09 \end{aligned}$$

4. From Speeds & Feeds chart (next page), the number of passes for a deburring operation in 4140 steel is 1 pass.

5. Conclusion

In this example, the tool would run at 8215 RPM, 5.1 IPM and make 1 pass.



| Table 1 | |
|----------------------|-----------|
| Neck Length Multiple | Chip Load |
| 3x | 120% |
| 5x | 100% |
| 8x | 80% |
| 12x | 65% |
| 15x | 55% |

