

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 #823332-C6 to machine for a Deburring application in hardened steel at 50 Rc.

1. Using Figure 1 (upper right), determine the type of application you will be performing. From Speeds & Feeds chart (next page), SFM is 60 and Base Chip Load (IPT) for Deburring is .00060.

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

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Neck Length Ratio = (Neck Length / Neck Diameter)
= (.500 / .323)
= 1.5
Adjusted Chip Load = Adjustment Factor x Base Chip Load
= 1.2 \times .00060
= .00072
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3. Calculate Speed (RPM) and Linear Feed (IPM)

 $\begin{array}{l} {\sf RPM} = ({\sf SFM} \times 3.82) \ / \ {\sf Cutter \ Diameter} \\ = (60 \times 3.82) \ / \ .500 \\ = 458 \\ {\sf Linear \ Feed \ (IPM)} = \ {\sf RPM} \times {\sf IPT} \times {\sf Number \ of \ Flutes} \\ = 458 \times .00072 \times 8 \\ = 2.63 \end{array}$

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

5. Conclusion

In this example, the tool would run at 458 RPM, 2.63 IPM and make 1 pass.

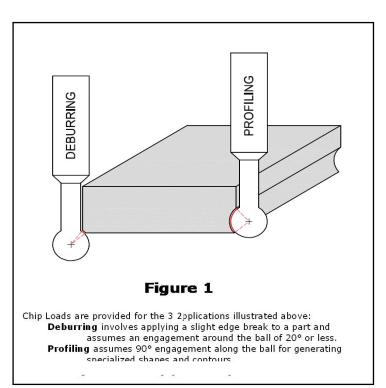


Table 1									
Neck Length	Chip								
Multiple	Load								
3x	120%								
5x	100%								
8x	80%								
12x	65%								
15x	55%								



Speeds & Feeds

Product Table: Undercutting End Mills - 270° for Hardened Steels **Characteristics:** 8 Flutes **Series:** 8199xx-C6, 8233xx-C6

Material	Hardness	SFM	Chip Load (IPT) By Cutter Diameter													Depth of Cut
				.015	.031	.047	.062	.078	.093	.125	.187	.250	.312	.375	.500	Passes
Hardened Steels	40 - 00 110	60	Deburring	.00002	.00004	.00006	.00007	.00009	.00011	.00015	.00023	.00030	.00038	.00045	.00060	1
Titanium Alloys			Profiling	.00002	.00003	.00005	.00006	.00008	.00010	.00013	.00020	.00026	.00033	.00039	.00052	4
Nickel Alloys	56 - 68 Rc	50	Deburring	.00001	.00003	.00005	.00006	.00008	.00009	.00012	.00018	.00024	.00030	.00036	.00048	1
			Profiling	.00001	.00003	.00004	.00005	.00007	.00008	.00010	.00016	.00021	.00026	.00031	.00042	5

Please note:

All posted speed and feed parameters are suggested starting values that may be increased given optimal setup conditions. If less than minimum Axial or Radial DOC values are used, increased feed rates are possible. If greater than maximum Axial or Radial DOC values are used, decreased feed rates may be needed.

If you require additional information, Harvey Tool has a team of technical experts available to assist you through even the most challenging applications. Please contact us at **800-645-5609** or **tech@harveytool.com**.

WARNING: Cutting tools may shatter under improper use. Government regulations require use of safety glasses and other appropriate safety equipment in the vicinity of use.