



Double Angle Shank Cutter Guide

Double angle shank cutters are extremely versatile tools. Harvey tool offers a variety of reaches and included 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 neck diameter ratio. (see Table 1)
3. Calculate the Speed (RPM) and Linear Feed (IPM)
4. Determine correct number of passes (see Table 2)

Example: Tool # 19503 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 **.00077**.

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

$$\begin{aligned} \text{Neck Length Ratio} &= (\text{Neck Length} / \text{Neck Diameter}) \\ &= (1.00 / .125) \\ &= 8 \end{aligned}$$

$$\begin{aligned} \text{Adjusted Chip Load} &= \text{Adjustment Factor} \times \text{Base Chip Load} \\ &= 0.9 \times .00077 \\ &= .000693 \end{aligned}$$

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

$$\begin{aligned} \text{RPM} &= (\text{SFM} \times 3.82) / \text{Cutter Diameter} \\ &= (200 \times 3.82) / .250 \\ &= 3056 \end{aligned}$$

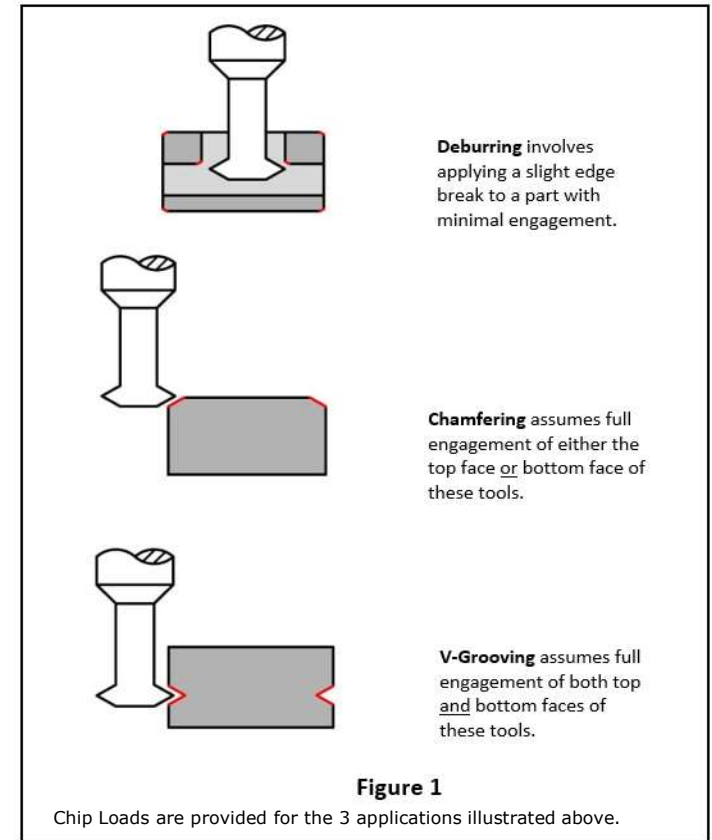
$$\begin{aligned} \text{Linear Feed (IPM)} &= \text{RPM} \times \text{IPT} \times \text{Number of Flutes} \\ &= 3056 \times .000693 \times 4 \\ &= 8.47 \end{aligned}$$

4. From Speeds & Feeds chart (table 2), the number of passes for a **deburring operation in 4140 steel is 1 pass**.

5. Conclusion

In this example, the tool would run at **3056 RPM, 8.47 IPM and make 1 pass**.

Neck Length/Neck Diameter Ratio	0 - 28 Rc			29 - 37 Rc			38 - 45 Rc		
	Deburring	Front/Back Chamfer	V-Groove	Deburring	Front/Back Chamfer	V-Groove	Deburring	Front/Back Chamfer	V-Groove
2x - 8x	1	2	3	1	3	4	1	4	5
9x - 14x	1	3	4	1	4	5	1	6	7
15x - 20x	1	4	5	1	5	6	1	7	8



Neck Length/Neck Diameter Ratio	Adjustment Factor
3x	110%
5x	100%
8x	90%
10x	80%
14x	75%
18x	65%



Speeds & Feeds

Product Table: Double Angle Shank Cutters - Pointed

Series: 162, 191, 192, 195, 268, 275, 297, 391, 451, 473, 660, 661, 716, 717, 726, 7710, 7719, 7723, 7728, 7733, 7910, 7920, 8069, 8070, 8071, 8072, 8073, 8074, 8076, 8218, 8221, 8222, 8224, 8260, 8305, 8335, 8557, 8578, 8719, 9036, 9056, 9099, 9107, 9170, 9181, 9208, 9217, 9255, 9343, 9375, 9468, 9469, 9636, 9637, 9655, 9675, 9699, 9744, 9810, 9834, 9844, 9849, 9858, 9894

Product notes:

Chip Loads are given 3 ways:
Deburring: Generating an Edge Break of .005"-.008"
Front/Back Chamfer: Full chamfer generation using front or back of the cutter head
V-Groove: Assumes engagement on the point, front and back of the cutter head

Depth of Cut is shown as number of Passes with each pass resulting in a descending stepover

Chip Loads within table pertain to machining on one side (from tool centerline) of the cutter head. For machining on two sides, reduce Chip Loads to 60%-80% depending on contact length and finish

Chip Loads represent 4 flute values. For 2 flutes, increase chip loads by 20% (chip load x 1.20) For 6 flutes, reduce chip loads by 20% (chip load x .80)

For number of passes, see table 2 on page 1 Included angles less than 60°, add a pass to front/back chamfer and V-Groove operations

General notes:

All posted speed and feed parameters are suggested starting values that may be increased given optimal setup conditions. Chip loads reflect uncoated cutters and may be increased 10%-20% if coated. For ferrous materials with hardness ≤ 28 Rc, chip loads can be increased 10%-20%.

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 harveytech@harveyperformance.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.

Table with columns: MATERIAL, SFM, Chip Load (IPT) By Cutter Diameter (0.062 to 0.750), and Depth of Cut (Passes). Includes sections for Aluminum Alloys, Magnesium Alloys, Zinc Alloys, and Copper Alloys.

Table with columns: MATERIAL, SFM, Chip Load (IPT) By Cutter Diameter (0.062 to 0.750), and Depth of Cut (Passes). Includes sections for Carbon Steels, Stainless Steels, Tool Steels, Titanium Alloys, and High Temp Alloys.

Table with columns: SFM, Chip Load (IPT) By Cutter Diameter (0.062 to 0.750), and Depth of Cut (Passes). Contains a large grid of data for various materials and operations.