

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 #822616 to machine for a Chamfering 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 Chamfering is .00051.
2. Calculate the neck length to neck diameter ratio for the tool. Calculate adjusted chipload based on values in Table 1.

$$\begin{aligned} \text{Neck Length Ratio} &= (\text{Neck Length} / \text{Neck Diameter}) \\ &= (1.00 / .125) \\ &= 8 \\ \text{Adjusted Chip Load} &= \text{Adjustment Factor} \times \text{Base Chip Load} \\ &= 0.9 \times .00051 \\ &= .000459 \end{aligned}$$

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

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

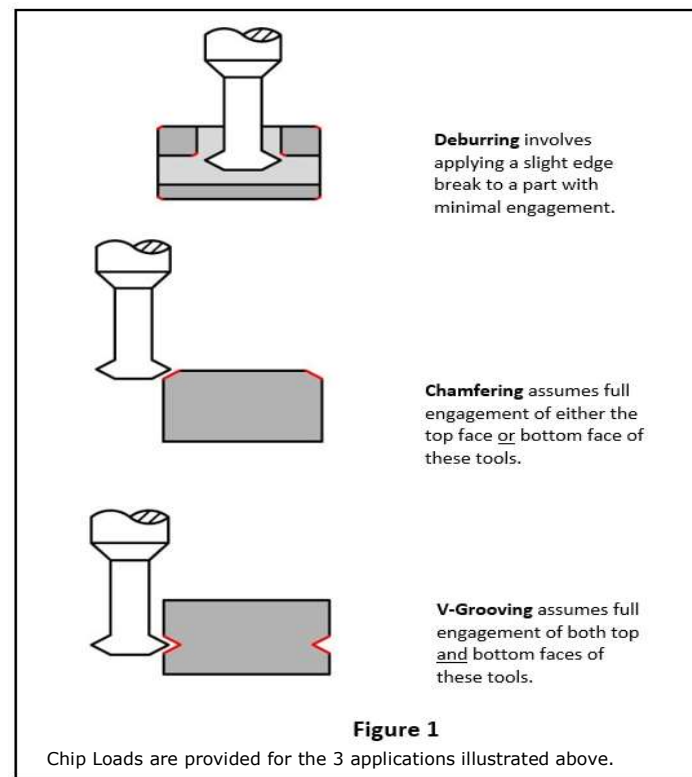
$$\begin{aligned} \text{Linear Feed (IPM)} &= \text{RPM} \times \text{IPT} \times \text{Number of Flutes} \\ &= 3056 \times .000459 \times 6 \\ &= 8.41 \end{aligned}$$

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

5. Conclusion

In this example, the tool would run at 3056 RPM, 8.41 IPM and make 2 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%



Product Table: Double Angle Shank Cutters - Pointed
Series: 7548xx, 7549xx, 7558xx, 7559xx, 7919xx, 7929xx, 8078xx, 8079xx, 8080xx, 8226xx, 8324xx, 8388xx, 8474xx

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 4 flutes, increase chip loads by 20% (chip load x 1.20)
 For 8 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.

MATERIAL	SFM	Hardness: ≤ 28 Rc (≤ 271 HBn)										Depth of Cut Passes			
		Chip Load (IPT) By Cutter Diameter													
		0.062	0.078	0.093	0.125	0.187	0.250	0.312	0.375	0.437	0.500		0.625	0.750	
ALUMINUM ALLOYS		Deburring	.00039	.00049	.00059	.00079	.00118	.00158	.00219	.00263	.00306	.00350	.00438	.00526	see table 2
Casting (2xx, 5xx, 7xx, 8xx)	750	Front/Back Chamfer	.00033	.00041	.00049	.00066	.00099	.00132	.00182	.00219	.00255	.00292	.00365	.00438	see table 2
Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx, 7xxx, 8xxx)	1000	V-Groove	.00025	.00031	.00037	.00050	.00074	.00099	.00137	.00164	.00191	.00219	.00274	.00329	see table 2
Casting - 3%-5% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	750	Deburring	.00035	.00044	.00053	.00071	.00107	.00143	.00197	.00237	.00276	.00315	.00394	.00473	see table 2
Casting - 5%-8% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	700														
Casting - 8%-12% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	650	Front/Back Chamfer	.00029	.00037	.00044	.00059	.00089	.00119	.00164	.00197	.00230	.00263	.00329	.00394	see table 2
Casting - 12%-16% Si (3xx, A3xx, C3xx, 4xx, A4xx, B4xx)	475														
Wrought - 5%-8% Si (4xxx)	1000	V-Groove	.00022	.00028	.00033	.00045	.00067	.00089	.00123	.00148	.00172	.00197	.00246	.00296	see table 2
Wrought - 8%-12% Si (4xxx)	800														
MAGNESIUM ALLOYS		Deburring	.00039	.00049	.00059	.00079	.00118	.00158	.00219	.00263	.00306	.00350	.00438	.00526	see table 2
	1500	Front/Back Chamfer	.00033	.00041	.00049	.00066	.00099	.00132	.00182	.00219	.00255	.00292	.00365	.00438	see table 2
	800	V-Groove	.00025	.00031	.00037	.00050	.00074	.00099	.00137	.00164	.00191	.00219	.00274	.00329	see table 2
ZINC ALLOYS															
COPPER ALLOYS															
High Coppers - 90%+ (C1xxx)	225	Deburring	.00031	.00040	.00047	.00063	.00095	.00127	.00175	.00210	.00245	.00280	.00350	.00420	see table 2
Brass (Copper Zinc alloys, C2xxx, C3xxx, C4xxx, C6400-C69800)	500														
Phosphor Bronzes (Copper Tin alloys, C5xxx)	225														
Aluminum Bronzes (Copper Aluminum alloys, C60600-C64200)	500	Front/Back Chamfer	.00026	.00033	.00039	.00053	.00079	.00106	.00146	.00175	.00204	.00234	.00292	.00350	see table 2
Silicon Bronzes (Copper Silicon alloys, C64700-C66100)	500														
Copper Nickels, Nickel Silvers (Copper Nickel alloys, C7xxx)	225														
Cast Copper Alloys (C83300-C86200, C86400-C87900, C92200-C95800, C97300-C97800, C99400-C99700)	550	V-Groove	.00020	.00025	.00029	.00040	.00059	.00079	.00109	.00131	.00153	.00175	.00219	.00263	see table 2

MATERIAL	SFM	Hardness: 29-37 Rc (279-344 HBn)										Depth of Cut Passes			
		Chip Load (IPT) By Cutter Diameter													
		0.062	0.078	0.093	0.125	0.187	0.250	0.312	0.375	0.437	0.500		0.625	0.750	
CARBON STEELS		Deburring	.00017	.00021	.00025	.00034	.00050	.00067	.00094	.00113	.00132	.00151	.00189	.00227	see table 2
Free-Machining/Low Carbon steels, 10xx - 1029 & all 10Lxx, 11xx - 1139 & all 11Lxx, 12xx - 1215 & all 12Lxx	600	Front/Back Chamfer	.00014	.00017	.00021	.00028	.00042	.00056	.00079	.00095	.00110	.00126	.00158	.00189	see table 2
		V-Groove	.00010	.00013	.00016	.00021	.00031	.00042	.00059	.00071	.00083	.00095	.00118	.00142	see table 2
1030 - 1095, 1140 - 1151, 13xx, 15xx, 20xx, 30xx, 40xx & 4xLxx, 50xx & 5xLxx, 50xx & 50Lxx, 51xx & 51Lxx, 52xx & 52Lxx, 60xx, 80xx, 90xx	200	Deburring	.00015	.00019	.00023	.00031	.00046	.00061	.00086	.00104	.00121	.00138	.00173	.00207	see table 2
		Front/Back Chamfer	.00013	.00016	.00019	.00026	.00038	.00051	.00072	.00086	.00101	.00115	.00144	.00173	see table 2
		V-Groove	.00010	.00012	.00014	.00019	.00029	.00038	.00054	.00065	.00076	.00086	.00108	.00130	see table 2
STAINLESS STEELS		Deburring	.00017	.00021	.00025	.00034	.00050	.00067	.00094	.00113	.00132	.00151	.00189	.00227	see table 2
203 E2, 303 (all types), 416, 416Se, 416 Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe	450	Front/Back Chamfer	.00014	.00017	.00021	.00028	.00042	.00056	.00079	.00095	.00110	.00126	.00158	.00189	see table 2
		V-Groove	.00010	.00013	.00016	.00021	.00031	.00042	.00059	.00071	.00083	.00095	.00118	.00142	see table 2
201, 202, 203, 205, 301, 302, 304, 304L, 308, 309, 310, 314, 316, 316L, 317, 321, 329, 330, 347, 348, 385, 403, 405, 409, 410, 413, 420, 429, 430, 434, 436, 442, 446, 501, 502	200	Deburring	.00015	.00019	.00023	.00031	.00046	.00061	.00086	.00104	.00121	.00138	.00173	.00207	see table 2
		Front/Back Chamfer	.00013	.00016	.00019	.00026	.00038	.00051	.00072	.00086	.00101	.00115	.00144	.00173	see table 2
		V-Groove	.00010	.00012	.00014	.00019	.00029	.00038	.00054	.00065	.00076	.00086	.00108	.00130	see table 2
414, 431, 440A, 440B, 440C, 13-8, 15-5, 15-7, 17-4, 17-7	150	Deburring	.00010	.00012	.00014	.00019	.00029	.00038	.00054	.00065	.00076	.00086	.00108	.00130	see table 2
		Front/Back Chamfer	.00008	.00010	.00012	.00016	.00024	.00032	.00045	.00054	.00063	.00072	.00090	.00108	see table 2
		V-Groove	.00006	.00007	.00009	.00012	.00018	.00024	.00034	.00041	.00047	.00054	.00068	.00081	see table 2
TOOL STEELS		Deburring	.00015	.00019	.00023	.00031	.00046	.00061	.00086	.00104	.00121	.00138	.00173	.00207	see table 2
A, L, O, P, W series	200	Front/Back Chamfer	.00013	.00016	.00019	.00026	.00038	.00051	.00072	.00086	.00101	.00115	.00144	.00173	see table 2
		V-Groove	.00010	.00012	.00014	.00019	.00029	.00038	.00054	.00065	.00076	.00086	.00108	.00130	see table 2
D, H, M, T, S series	150	Deburring	.00010	.00012	.00014	.00019	.00029	.00038	.00054	.00065	.00076	.00086	.00108	.00130	see table 2
		Front/Back Chamfer	.00008	.00010	.00012	.00016	.00024	.00032	.00045	.00054	.00063	.00072	.00090	.00108	see table 2
		V-Groove	.00006	.00007	.00009	.00012	.00018	.00024	.00034	.00041	.00047	.00054	.00068	.00081	see table 2
TITANIUM ALLOYS		Deburring	.00010	.00012	.00014	.00019	.00029	.00038	.00054	.00065	.00076	.00086	.00108	.00130	see table 2
	150	Front/Back Chamfer	.00008	.00010	.00012	.00016	.00024	.00032	.00045	.00054	.00063	.00072	.00090	.00108	see table 2
		V-Groove	.00006	.00007	.00009	.00012	.00018	.00024	.00034	.00041	.00047	.00054	.00068	.00081	see table 2
HIGH TEMP ALLOYS		Deburring	.00010	.00012	.00014	.00019	.00029	.00038	.00054	.00065	.00076	.00086	.00108	.00130	see table 2
Inconel, Hastelloy, Waspalloy, Monel, Nimonic, Haynes, Discoloy, Incoloy	70	Front/Back Chamfer	.00008	.00010	.00012	.00016	.00024	.00032	.00045	.00054	.00063	.00072	.00090	.00108	see table 2
		V-Groove	.00006	.00007	.00009	.00012	.00018	.00024	.00034	.00041	.00047	.00054	.00068	.00081	see table 2

MATERIAL	SFM	Hardness: 38-45 Rc (353-421 HBn)										Depth of Cut Passes			
		Chip Load (IPT) By Cutter Diameter													
		0.062	0.078	0.093	0.125	0.187	0.250	0.312	0.375	0.437	0.500		0.625	0.750	
		Deburring	-	-	-	-	-	-	-	-	-	-	-	-	-
		Front/Back Chamfer	-	-	-	-	-	-	-	-	-	-	-	-	-
		V-Groove	-	-	-	-	-	-	-	-	-	-	-	-	-
		Deburring	-	-	-	-	-	-	-	-	-	-	-	-	-
		Front/Back Chamfer	-	-	-	-	-	-	-	-	-	-	-	-	-
		V-Groove	-	-	-	-	-	-	-	-	-	-	-	-	-
		Deburring	-	-	-	-	-	-	-	-	-	-	-	-	-
		Front/Back Chamfer	-	-	-	-	-	-	-	-	-	-	-	-	-
		V-Groove	-	-	-	-	-	-	-	-	-	-	-	-	-
		Deburring	.00015	.00019	.00023	.00031	.00046	.00061	.00086	.00104	.00121	.00138	.00173	.00207	see table 2
	100	Front/Back Chamfer	.00013	.00016	.00019	.00026	.00038	.00051	.00072	.00086	.00101	.00115	.00144	.00173	see table 2
		V-Groove	.00010	.00012	.00014	.00019	.00029	.00038	.00054	.00065	.00076	.00086	.00108	.00130	see table 2
		Deburring	.00010	.00012	.00014	.00019	.00029	.00038	.00054	.00065	.00076	.00086	.00108	.00130	see table 2
	90	Front/Back Chamfer	.00008	.00010	.00012	.00016	.00024	.00032	.00045	.00054	.00063	.00072	.00090	.00108	see table 2
		V-Groove	.00006	.00007	.00009	.00012	.00018	.00024	.00034	.00041	.00047	.00054	.00068	.00081	see table 2
		Deburring	.00015	.00019	.00023	.00031	.00046	.00061	.00086	.00104	.00				