

4 FLUTE • CARBIDE COUNTERSINK



SERIES: C4

- For highly abrasive and hard to machine materials.
- Applications in **cast iron, alloy steel, or glass reinforced plastics.**
- Carbide eliminates the high cost of tool changes in production situations.
- Rigid set up is a must - not suited for hand held applications.
- Tools 3/8" and larger have solid carbide heads on hardened steel shanks.
- See page 147 for Nose Diameter

SIZE	SHK	OAL	TOOL	ANGLE/EDP#					
				60°	82°	90°	100°	110°	120°
1/8	1/8	1-1/2	C4-1/8	18956	18823	18957	18958	18959	18960
3/16	3/16	1-1/2	C4-3/16	N/A	18824	N/A	N/A	N/A	N/A
1/4	1/4	2	C4-1/4	18961	18825	18962	18963	18964	18965
5/16	1/4	2-1/2	C4-5/16	N/A	18826	N/A	N/A	N/A	N/A
3/8	1/4	2-1/2	C4-3/8	18966	18827	18967	18968	18969	18970
1/2	3/8	2-1/2	C4-1/2	18971	18828	18972	18973	18974	18975
5/8	3/8	2-5/8	C4-5/8	18976	18829	18977	18978	18979	18980
3/4	1/2	2-3/4	C4-3/4	18981	18830	18982	18983	18984	18985
1	1/2	3	C4-1	18986	18831	18987	18988	N/A	18990

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. C4-1/4-90).

SPEED & FEED INFORMATION

Carbide Drills

SERIES: HDR, IDR, JDR, LDR, HDRNC

MATERIAL	ISO	CARBIDE SFM	HSSCO SFM	FEED RATE PER TOOTH (IPR)			
				1/16"	1/8"	1/4"	1/2"
Stainless Steels-Soft	M	80-300	20-40	0.0005	0.0005	0.0020	0.0040
Stainless Steels-Hard (PH)	M	40-100	15-25	0.0005	0.0005	0.0010	0.0015
Nickel Base Alloys	S	75-200	15-25	0.0005	0.0006	0.0010	0.0015
Inconel/Monel/Hastelloy	S	75-200	15-25	0.0005	0.0005	0.0010	0.0015
Titanium-Soft	S	80-350	20-25	0.0005	0.0020	0.0040	0.0050
Titanium-Hard	S	40-100	20-25	0.0005	0.0008	0.0020	0.0040
Low Carbon Steels	P	150-300	75-130	0.0005	0.0010	0.0020	0.0040
Die Steels	P	60-130	30-45	0.0005	0.0005	0.0020	0.0040
Hardened Steels > HRc 50	H	25-75	-	0.0005	0.0010	0.0020	0.0030
Cast Iron	K	100-300	60-110	0.0010	0.0020	0.0030	0.0050
Malleable Iron	K	65-200	40-80	0.0010	0.0020	0.0030	0.0050
Aluminium Alloys	N	100-400	150-250	0.0010	0.0020	0.0030	0.0050
Brass & Bronze	N	150-300	100-150	0.0005	0.0010	0.0020	0.0040
Copper	N	150-300	75-150	0.0010	0.0030	0.0050	0.0060
Magnesium	N	300-600	200-350	0.0015	0.0030	0.0050	0.0080
Plastics	N	150-450	70-150	0.0015	0.0030	0.0040	0.0060

Countersinks

MATERIAL	ISO	HSS SFM	COUNTERSINK TYPE	
			M42 8% COBALT WITH TiN SFM	CARBIDE SFM
Stainless Steels - Free Machining	M	30-80	40-100	80-125
Stainless Steels - Others	M	15-50	20-65	50-75
Inconels/Monels	S	30-50	40-65	50-75
Titaniums (6Al4V)	S	50-60	60-75	60-90
Steels Annealed	P	40-50	50-65	50-80
Steels HRc 18-24	P	30-40	40-50	40-60
Steels HRc 25-37	P	25-35	30-45	35-55
Mild Steels	P	70-100	85-125	80-170
Cast Iron	K	75-125	95-150	125-225
Malleable Iron	K	80-90	100-115	90-150
Aluminums Alloys	N	150-250	180-300	300-500
Brass (Bronze)	N	75-125	95-150	150-250
Magnesium	N	125-250	150-300	250-400
Plastics	N	100-250	125-300	250-400

► Multiple flute countersinks are designed for increased feed rates. A controlled feed rate will result in better surface finish.

► All Melin countersinks are manufactured on CNC grinders to ensure consistent and accurate flute spacing. Carbide countersinks should be used in rigid tool holders to maximize tool life.

All technical data provided are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc. Call our TECHNICAL SERVICE TEAM with questions.

SPEED & FEED INFORMATION

Calculations

End mill speed & feed formulas are the various individual equations that determine the proper overall machining setup or more specifically the speed of the cutting tool and the rate which it is fed into the work piece. Each individual formula is distinct in what it determines but coordinates with the others to ensure successful cutting tool application. You can visit the **TECHNICAL** section on www.melintool.com for more information.

INCH

$$\text{RPM} = \frac{\text{Revolutions Per Minute}}{3.82 \times \text{SFM} / \text{Tool Dia}}$$

$$\text{SFM} = \frac{\text{Surface Foot Per Minute}}{.262 \times \text{RPM} \times \text{Tool Dia}}$$

$$\text{CPT or IPT} = \frac{\text{Chip-Load Per Tooth}}{\text{IPM} / \text{RPM} / \text{No. Of Flutes}}$$

$$\text{IPM} = \frac{\text{Inches Per Minute}}{\text{CPT} \times \text{RPM} \times \text{No. Of Flutes}}$$

$$\text{MRRCI} = \frac{\text{Metal Removal Rate Cubic Inches}}{\text{IPM} \times \text{Axial Doc} \times \text{Radial Woc}}$$

$$\text{IPR} = \frac{\text{Inches Per Revolution}}{\text{IPM} / \text{RPM}}$$

METRIC

$$\text{RPM} = \frac{\text{Revolutions Per Minute}}{1000 \times \text{M/MIN} / (3.14 \times \text{D})}$$

$$\text{M/MIN} = \frac{\text{Meters Per Minute}}{(3.14 \times \text{D} \times \text{RPM}) / 1000}$$

$$\text{Fz OR CPT} = \frac{\text{Chip-Load Per Tooth}}{\text{Feedrate (mm) per MIN} / (\text{Z} \times \text{RPM})}$$

$$\text{VF OR FPM} = \frac{\text{Feedrate (mm) Per Minute}}{\text{Feerate (mm) per Tooth} \times \text{Z} \times \text{RPM}}$$

$$\begin{aligned} \text{D} &= \text{Cutter Dia.} \\ \text{Z} &= \text{No. Of Teeth.} \end{aligned}$$

EQUIVALENTS & CONVERSIONS:

ABBREVIATIONS	
RPM	Revolutions Per Minute
SFM	Surface Feet Per Minute
CPT	Chip Load Per Tooth
IPM	Inches Per Minute
V_f	Millimeters Per Minute
ae	Radial Width of Cut
ap	Axial Depth of Cut
Vc	Surface Meters Per Minute
Fz	Metric Chip Load Per Tooth

$$\text{N, n or Min}^{-1} = \text{RPM}$$

$$\text{Vc or M/MIN} = \text{SFM}$$

$$\text{Fz or mm/TOOTH} = \text{CPT}$$

$$\text{V}_f \text{ or mm/MIN} = \text{IPM}$$

$$\text{SFM} / 3.281 = \text{M/MIN}$$

$$\text{M/MIN} \times 3.281 = \text{SFM}$$

$$\text{mm/MIN} / 25.4 = \text{IPM}$$

$$\text{mm/TOOTH} / 25.4 = \text{CPT}$$



IMPERIAL METRIC

$$\text{Inch} \times 25.4 = \text{Millimeter}$$

$$\text{Millimeter} \times .03937 = \text{Inch}$$

Countersinks

Nose Diameter for Pre-Setting CNC Precision Countersinks

SIZE	NC POINT DIAMETER					
	60°	82°	90°	100°	110°	120°
0.188	0.058	0.032	0.032	0.032	0.032	0.032
0.250	0.078	0.046	0.046	0.046	0.046	0.046
0.313	0.080	0.047	0.047	0.047	0.047	0.047
0.375	0.125	0.078	0.078	0.078	0.062	0.062
0.438	0.140	0.096	0.096	0.096	0.070	0.070
0.500	0.156	0.109	0.109	0.109	0.078	0.078
0.625	0.203	0.125	0.125	0.125	0.109	0.109
0.750	0.250	0.156	0.156	0.156	0.125	0.125
0.875	0.281	0.172	0.172	0.172	0.140	0.140
1.000	0.328	0.203	0.203	0.203	0.171	0.171

Carbide Burs

SERIES: Carbide Burs

Bur Diameter	RPM
1/8 Solid Carbide	45,000-50,000
3/16 Solid Carbide	35,000-40,000
3/16 Carbide Head Brazed to 1/8 Steel Shank	30,000-35,000
1/4 Solid Carbide	30,000-35,000
Carbide Head Brazed to 1/8 Steel Shank	25,000-30,000
5/16 Carbide Head Brazed to 1/4 Steel Shank	25,000-30,000
3/8 Carbide Head Brazed to 1/4 Steel Shank	25,000-30,000
7/16 Carbide Head Brazed to 1/4 Steel Shank	20,000-25,000
1/2 Carbide Head Brazed to 1/4 Steel Shank	20,000-25,000
5/8 Carbide Head Brazed to 1/4 Steel Shank	15,000-20,000
3/4 Carbide Head Brazed to 1/4 Steel Shank	15,000-20,000
1 Carbide Head Brazed to 1/4 Steel Shank	12,000-18,000

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