



## 3 FLUTE • HSSCo M42 COUNTERSINK



### SERIES: HSP3

SIZE	SHK	OAL	TOOL	ANGLE/EDP#				
				60°	82°	90°	100°	120°
1/4	1/4	2	HSP3-1/4	19697	19698	19699	19700	19701
3/8	1/4	2	HSP3-3/8	19702	19703	19704	19705	19706
1/2	3/8	2	HSP3-1/2	19707	19708	19709	19710	19711
5/8	3/8	2-1/4	HSP3-5/8	19712	19713	19714	19715	19716
3/4	1/2	2-3/4	HSP3-3/4	19717	19718	19719	19720	19721
1	1/2	2-3/4	HSP3-1	19722	19723	19724	19725	19726

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HSP3-1/4-90).

# COUNTERSINKS

## 3 FLUTE • HSSCo M42 TiN COATED COUNTERSINKS



- Used for countersinking holes for centers or enlarging existing holes.
- Radial relief on the angle contributes to smooth, chatter-free operations.



**SERIES: HSP3-\_\_-T**

SIZE	SHK	OAL	TOOL	ANGLE/EDP#				
				60°	82°	90°	100°	120°
1/4	1/4	2	HSP3-1/4-T	19645	19646	19647	19648	19649
3/8	1/4	2	HSP3-3/8-T	19650	19651	19652	19653	19654
1/2	3/8	2	HSP3-1/2-T	19655	19656	10810	19657	19658
5/8	3/8	2-1/4	HSP3-5/8-T	19659	19660	19661	19662	19663
3/4	1/2	2-3/4	HSP3-3/4-T	19664	19665	19666	19667	19668
1	1/2	2-3/4	HSP3-1-T	19669	19670	19671	19672	19673

To order countersinks: Use the EDP # listed or add the angle to the end of the tool name (i.e. HSP3-1/4-90T).

# 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 <b>TIN</b> 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](http://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

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

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

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

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

D = Cutter Dia.  
Z = No. Of Teeth.

## EQUIVALENTS & CONVERSIONS:

### ABBREVIATIONS

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

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

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

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

$$V_f \text{ or } \text{mm/MIN} = \text{IPM}$$

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

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

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

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



IMPERIAL                      METRIC

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

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