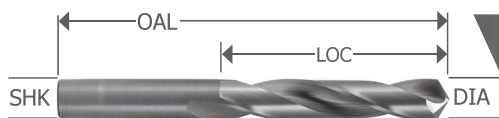


GENERAL PURPOSE CARBIDE DRILLS



2 FLUTE • JOBBER LENGTH CARBIDE DRILL



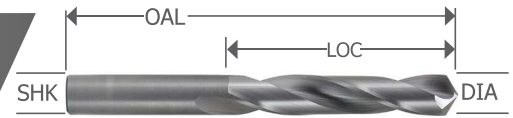
SERIES: HDR

DIAMETER		LOC	OAL	TOOL	BRIGHT EDP	ALTIN EDP
1mm	0.0394	16mm	38mm	HDR-1MM	11197	51197
# 60	0.0400	3/4	1-1/2	HDR-60	14415	54415
# 58	0.0420	3/4	1-1/2	HDR-58	17114	57114
# 57	0.0430	3/4	1-1/2	HDR-57	17113	57113
# 56	0.0465	3/4	1-1/2	HDR-56	17112	57112
3/64	0.0469	3/4	1-1/2	HDR-3/64	17001	57001
# 55	0.0520	3/4	1-1/2	HDR-55	17111	57111
# 54	0.0550	3/4	1-1/2	HDR-54	17110	57110
1.5mm	0.0591	19mm	38mm	HDR-1.5MM	17393	57393
# 53	0.0595	3/4	1-1/2	HDR-53	17109	57109
1/16	0.0625	3/4	1-1/2	HDR-1/16	17002	57002
# 52	0.0635	3/4	1-1/2	HDR-52	17108	57108
# 51	0.0670	3/4	1-1/2	HDR-51	17107	57107
# 50	0.0700	7/8	1-3/4	HDR-50	17106	57106
# 49	0.0730	7/8	1-3/4	HDR-49	17105	57105
# 48	0.0760	7/8	1-3/4	HDR-48	17104	57104
5/64	0.0781	7/8	1-3/4	HDR-5/64	17003	57003
# 47	0.0785	7/8	1-3/4	HDR-47	17103	57103
2mm	0.0787	22mm	44mm	HDR-2MM	17394	57394
# 46	0.0810	7/8	1-3/4	HDR-46	17102	57102
# 45	0.0820	7/8	1-3/4	HDR-45	17101	57101
# 44	0.0860	1	2	HDR-44	17100	57100
# 43	0.0890	1	2	HDR-43	17099	57099
# 42	0.0935	1	2	HDR-42	17098	57098
3/32	0.0938	1	2	HDR-3/32	17004	57004
# 41	0.0960	1	2	HDR-41	17097	57097
# 40	0.0980	1	2	HDR-40	17096	57096
2.5mm	0.0984	25mm	51mm	HDR-2.5MM	17395	57395
# 39	0.0995	1-1/4	2-1/4	HDR-39	17095	57095
# 38	0.1015	1-1/4	2-1/4	HDR-38	17094	57094
# 37	0.1040	1-1/4	2-1/4	HDR-37	17093	57093
# 36	0.1065	1-1/4	2-1/4	HDR-36	17092	57092
7/64	0.1094	1-1/4	2-1/4	HDR-7/64	17005	57005
# 35	0.1100	1-1/4	2-1/4	HDR-35	17091	57091
# 34	0.1110	1-1/4	2-1/4	HDR-34	17090	57090
# 33	0.1130	1-1/4	2-1/4	HDR-33	17089	57089
# 32	0.1160	1-1/4	2-1/4	HDR-32	17088	57088
3mm	0.1181	32mm	58mm	HDR-3MM	17396	57396
# 31	0.1200	1-1/4	2-1/4	HDR-31	17087	57087
1/8	0.1250	1-1/4	2-1/4	HDR-1/8	17006	57006
# 30	0.1285	1-1/4	2-1/4	HDR-30	17086	57086
# 29	0.1360	1-3/8	2-1/4	HDR-29	17085	57085
3.5mm	0.1378	35mm	64mm	HDR-3.5MM	17397	57397
# 28	0.1405	1-3/8	2-1/2	HDR-28	17084	57084
9/64	0.1406	1-3/8	2-1/2	HDR-9/64	17007	57007
# 27	0.1440	1-3/8	2-1/2	HDR-27	17083	57083
# 26	0.1470	1-3/8	2-1/2	HDR-26	17082	57082
# 25	0.1495	1-3/8	2-1/2	HDR-25	17081	57081
# 24	0.1520	1-3/8	2-1/2	HDR-24	17080	57080
# 23	0.1540	1-3/8	2-1/2	HDR-23	17079	57079
5/32	0.1562	1-3/8	2-1/2	HDR-5/32	17008	57008
# 22	0.1570	1-3/8	2-1/2	HDR-22	17078	57078
4mm	0.1575	35mm	64mm	HDR-4MM	17398	57398
# 21	0.1590	1-3/8	2-1/2	HDR-21	17077	57077

sizes continued on next page

GENERAL PURPOSE CARBIDE DRILLS

2 FLUTE • JOBBER LENGTH CARBIDE DRILLS



SERIES: HDR

DIAMETER		LOC	OAL	TOOL	BRIGHT EDP	ALTIN EDP
# 20	0.1610	1-3/8	2-1/2	HDR-20	17076	57076
# 19	0.1660	1-5/8	2-3/4	HDR-19	17075	57075
# 18	0.1695	1-5/8	2-3/4	HDR-18	17074	57074
11/64	0.1719	1-5/8	2-3/4	HDR-11/64	17009	57009
# 17	0.1730	1-5/8	2-3/4	HDR-17	17073	57073
# 16	0.1770	1-5/8	2-3/4	HDR-16	17072	57072
4.5mm	0.1772	41mm	70mm	HDR-4.5MM	17399	57399
# 15	0.1800	1-5/8	2-3/4	HDR-15	17071	57071
# 14	0.1820	1-5/8	2-3/4	HDR-14	17070	57070
# 13	0.1850	1-5/8	2-3/4	HDR-13	17069	57069
3/16	0.1875	1-5/8	2-3/4	HDR-3/16	17010	57010
# 12	0.1890	1-5/8	2-3/4	HDR-12	17068	57068
# 11	0.1910	1-5/8	2-3/4	HDR-11	17067	57067
# 10	0.1935	1-5/8	2-3/4	HDR-10	17066	57066
# 9	0.1960	1-3/4	3	HDR-9	17065	57065
5mm	0.1969	44mm	76mm	HDR-5MM	17400	57400
# 8	0.1990	1-3/4	3	HDR-8	17064	57064
# 7	0.2010	1-3/4	3	HDR-7	17063	57063
13/64	0.2031	1-3/4	3	HDR-13/64	17011	57011
# 6	0.2040	1-3/4	3	HDR-6	17062	57062
# 5	0.2055	1-3/4	3	HDR-5	17061	57061
# 4	0.2090	1-3/4	3	HDR-4	17060	57060
# 3	0.2130	1-3/4	3	HDR-3	17059	57059
5.5mm	0.2165	44mm	76mm	HDR-5.5MM	17401	57401
7/32	0.2188	1-3/4	3	HDR-7/32	17012	57012
# 2	0.2210	1-3/4	3	HDR-2	17058	57058
# 1	0.2280	1-3/4	3	HDR-1	17057	57057
A	0.2340	2	3-1/4	HDR-A	17031	57031
15/64	0.2344	2	3-1/4	HDR-15/64	17013	57013
6mm	0.2362	51mm	83mm	HDR-6MM	17402	57402
B	0.2380	2	3-1/4	HDR-B	17032	57032
C	0.2420	2	3-1/4	HDR-C	17033	57033
D	0.2460	2	3-1/4	HDR-D	17034	57034
E	0.2500	2	3-1/4	HDR-E	17035	57035
1/4	0.2500	2	3-1/4	HDR-1/4	17014	57014
6.5mm	0.2559	51mm	83mm	HDR-6.5MM	17403	57403
F	0.2570	2	3-1/4	HDR-F	17036	57036
G	0.2610	2-1/8	3-1/2	HDR-G	17037	57037
17/64	0.2656	2-1/8	3-1/2	HDR-17/64	17015	57015
H	0.2660	2-1/8	3-1/2	HDR-H	17038	57038
I	0.2720	2-1/8	3-1/2	HDR-I	17039	57039
7mm	0.2756	54mm	90mm	HDR-7MM	17404	57404
J	0.2770	2-1/8	3-1/2	HDR-J	17040	57040
K	0.2810	2-1/8	3-1/2	HDR-K	17041	57041
9/32	0.2812	2-1/8	3-1/2	HDR-9/32	17016	57016
L	0.2900	2-1/8	3-1/2	HDR-L	17042	57042
M	0.2950	2-3/8	3-3/4	HDR-M	17043	57043
7.5mm	0.2953	60mm	95mm	HDR-7.5MM	17405	57405
19/64	0.2969	2-3/8	3-3/4	HDR-19/64	17017	57017
N	0.3020	2-3/8	3-3/4	HDR-N	17044	57044
5/16	0.3125	2-3/8	3-3/4	HDR-5/16	17018	57018
8mm	0.3150	60mm	95mm	HDR-8MM	17406	57406
O	0.3160	2-3/8	3-3/4	HDR-O	17045	57045
P	0.3230	2-3/8	3-3/4	HDR-P	17046	57046
21/64	0.3281	2-1/2	4	HDR-21/64	17019	57019
Q	0.3320	2-1/2	4	HDR-Q	17047	57047

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SERIES: HDR

DIAMETER		LOC	OAL	TOOL	BRIGHT EDP	ALTIN EDP
8.5mm	0.3346	64mm	102mm	HDR-8.5MM	17407	57407
R	0.3390	2-1/2	4	HDR-R	17048	57048
11/32	0.3438	2-1/2	4	HDR-11/32	17020	57020
S	0.3480	2-1/2	4	HDR-S	17049	57049
9mm	0.3543	64mm	102mm	HDR-9MM	17408	57408
T	0.3580	2-3/4	4-1/4	HDR-T	17050	57050
23/64	0.3594	2-3/4	4-1/4	HDR-23/64	17021	57021
U	0.3680	2-3/4	4-1/4	HDR-U	17051	57051
9.5mm	0.3740	70mm	108mm	HDR-9.5MM	17409	57409
3/8	0.3750	2-3/4	4-1/4	HDR-3/8	17022	57022
V	0.3770	2-3/4	4-1/4	HDR-V	17052	57052
W	0.3860	2-7/8	4-1/2	HDR-W	17053	57053
25/64	0.3906	2-7/8	4-1/2	HDR-25/64	17023	57023
10mm	0.3937	73mm	114mm	HDR-10MM	17410	57410
X	0.3970	2-7/8	4-1/2	HDR-X	17054	57054
Y	0.4040	2-7/8	4-1/2	HDR-Y	17055	57055
13/32	0.4062	2-7/8	4-1/2	HDR-13/32	17024	57024
Z	0.4130	2-7/8	4-1/2	HDR-Z	17056	57056
10.5mm	0.4134	73mm	114mm	HDR-10.5MM	17411	57411
27/64	0.4219	2-7/8	4-1/2	HDR-27/64	17025	57025
11mm	0.4331	73mm	114mm	HDR-11MM	17412	57412
7/16	0.4375	2-7/8	4-1/2	HDR-7/16	17026	57026
11.5mm	0.4528	76mm	121mm	HDR-11.5MM	17413	57413
29/64	0.4531	3	4-3/4	HDR-29/64	17027	57027
15/32	0.4688	3	4-3/4	HDR-15/32	17028	57028
12mm	0.4724	76mm	121mm	HDR-12MM	17414	57414
31/64	0.4844	3	4-3/4	HDR-31/64	17029	57029
1/2	0.5000	3	4-3/4	HDR-1/2	17030	57030
17/32 (SHK 9/16)	0.5313	3-1/4	6	HDR-17/32	17447	57447
9/16	0.5625	3-1/4	6	HDR-9/16	17990	57990
19/32 (SHK 5/8)	0.5938	3-1/2	6	HDR-19/32	17448	57448
5/8	0.6250	3-1/2	6	HDR-5/8	17991	57991
21/32 (SHK 3/4)	0.6563	3-5/8	6	HDR-21/32	17449	57449
11/16 (SHK 3/4)	0.6875	3-5/8	6	HDR-11/16	17450	57450
23/32 (SHK 3/4)	0.7188	3-7/8	6	HDR-23/32	17451	57451
3/4	0.7500	3-7/8	6	HDR-3/4	17992	57992

*Shank diameter is equal to cutting diameter unless specified.

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

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

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