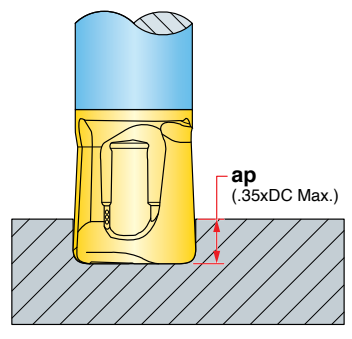
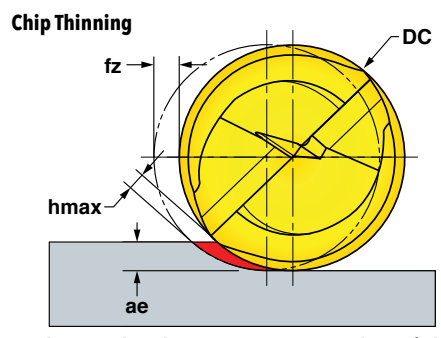


CHIPSURFER™ OPERATING GUIDELINES: 45D • DRILL MILL



When drilling, depth of cut (ap) should not exceed .35 x DC.



When ae is less than 25% DC, recommend use of Chip Thinning Calculator to ensure hmax is within fz range.

| ISO | Materials | | | Mill Vc Cutting Speed SFM | Drill Vc Cutting Speed SFM | DC Cutting Dia. (inch) | fz* Feed/Tooth (inch) | Coolant |
|-------|-----------------------|---------------------|--|---------------------------|----------------------------|------------------------|-----------------------|--------------------------------|
| | Mat'l Group #VDI 3323 | Type | Examples | | | | | |
| P | 1 - 5 | Non-alloy Steel | 1018, A36, 1045, A572, 1070 | 450-700 | 170-450 | 0.312 | .0020-.0040 | No |
| | | | | | | 0.375 | .0020-.0045 | |
| | | | | | | 0.500 | .0020-.0050 | |
| | | | | | | 0.625 | .0020-.0060 | |
| | 6 - 9 | Low-alloy Steel | 4140, 4340, P20, 8620, 300M | 400-650 | 140-350 | 0.312 | .0020-.0040 | |
| | | | | | | 0.375 | .0020-.0045 | |
| | | | | | | 0.500 | .0020-.0050 | |
| | | | | | | 0.625 | .0020-.0060 | |
| | 10 - 11 | High-alloy Steel | H13, A2, D2, M2, T1 | 400-600 | 130-300 | 0.312 | .0020-.0035 | |
| | | | | | | 0.375 | .0020-.0040 | |
| | | | | | | 0.500 | .0020-.0045 | |
| | | | | | | 0.625 | .0020-.0050 | |
| M | 12 - 14 | Stainless Steel | 410, 416, 440, 303, 304, 316, 15-5, 17-4 | 200-450 | 100-230 | 0.312 | .0020-.0030 | May be required at high speeds |
| 0.375 | .0025-.0035 | | | | | | | |
| 0.500 | .0020-.0040 | | | | | | | |
| 0.625 | .0020-.0045 | | | | | | | |
| K | 15 - 18 | Iron | CLS. 20, 30, 45, 60-40-18, 100-70-03 | 500-800 | 265-550 | 0.312 | .0020-.0050 | No |
| | | | | | | 0.375 | .0020-.0055 | |
| | | | | | | 0.500 | .0020-.0060 | |
| | | | | | | 0.625 | .0020-.0065 | |
| S | 31 - 37 | High-Temp, Ti | Inconel, Hastelloy, 6Al-4V, 5Al-5Mo-5V-3Cr | 65-250 | 65-165 | 0.312 | .0010-.0020 | Yes |
| | | | | | | 0.375 | .0015-.0025 | |
| | | | | | | 0.500 | .0020-.0030 | |
| | | | | | | 0.625 | .0020-.0035 | |
| H | 38 - 39 | Hardened Steel > 48 | A2, O1, D2 | 150-300 | 65-165 | 0.312 | .0010-.0020 | Yes |
| | | | | | | 0.375 | .0015-.0025 | |
| | | | | | | 0.500 | .0020-.0030 | |
| | | | | | | 0.625 | .0020-.0035 | |

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.