

## Recommended Cutting Conditions

Workpiece Material	Properties	Cutting Speed <b>vc</b> (SFM)	Inner Chip Breaker	<b>φ.562" – φ.656"</b> <b>φ14.0 – φ16.5 mm</b>			
				Feed <b>fr</b> (IPR)			
				L/D=2, 3	L/D=4	L/D=5	
<b>P</b>	Mild Steels	≤180HB	655 (590–770)	UM	.0020 (.0016–.0024)	.0020 (.0016–.0024)	.0020 (.0016–.0024)
				UH	–	–	–
	Carbon Steels, Alloy Steels	180–280HB	460 (375–590)	UM	.0031 (.0024–.0055)	.0031 (.0024–.0035)	.0031 (.0024–.0035)
				UH	–	–	–
	Carbon Steels, Alloy Steels	280–350HB	330 (245–460)	UM	.0031 (.0024–.0055)	.0031 (.0024–.0035)	.0031 (.0024–.0035)
				UH	–	–	–
	Alloy Tool Steels	≤350HB	440 (330–560)	UM	.0031 (.0024–.0055)	.0031 (.0024–.0035)	.0031 (.0024–.0035)
				UH	–	–	–
<b>M</b>	Austenitic Stainless Steels	≤200HB	425 (260–590)	US	–	–	–
				UM	.0024 (.0016–.0031)	.0020 (.0016–.0024)	.0020 (.0016–.0024)
	Austenitic Stainless Steels	>200HB	425 (260–590)	US	–	–	–
				UM	.0024 (.0016–.0031)	.0020 (.0016–.0024)	.0020 (.0016–.0024)
	Ferritic and Martensitic Stainless Steels	≤200HB	395 (260–540)	US	–	–	–
				UM	.0024 (.0016–.0031)	.0020 (.0016–.0024)	.0020 (.0016–.0024)
	Ferritic and Martensitic Stainless Steels	>200HB	395 (260–540)	US	–	–	–
				UM	.0024 (.0016–.0031)	.0020 (.0016–.0024)	.0020 (.0016–.0024)
<b>K</b>	Gray Cast Irons	Tensile Strength ≤350MPa	525 (425–640)	UM	.0039 (.0024–.0055)	.0031 (.0024–.0039)	.0031 (.0024–.0039)
	Ductile Cast Irons	Tensile Strength ≤450MPa	330 (260–440)	UM	.0039 (.0024–.0055)	.0031 (.0024–.0039)	.0031 (.0024–.0039)
	Ductile Cast Irons	Tensile Strength ≤800MPa	330 (230–410)	UM	.0031 (.0024–.0047)	.0028 (.0024–.0031)	.0028 (.0024–.0031)
<b>N</b>	Aluminum Alloys	Si < 5%	655 (330–1150)	UN	–	–	–
	Aluminum Alloys	5% ≤ Si ≤ 10%	490 (330–655)	UN	–	–	–
	Aluminum Alloys	Si > 10%	490 (330–655)	UN	–	–	–
<b>H</b>	Hardened Steels	38–45HRC	165 (100–260)	UH	–	–	–

Note 1) Reduce the cutting speed by around 30% when using VP15TF for outer insert.

Note 2) Recommend maximum drilling depth  $L/D \leq 3$  for using outer coolant system.

Note 3) Spindle through & high pressure coolant system is recommended to make stable holes for stainless steels.



# Recommended Cutting Conditions

(inch)

Workpiece Material	Properties	Cutting Speed vc (SFM)	Inner Chip Breaker	φ1.187"–φ2.500" φ30.0–φ63 mm				
				Feed fr (IPR)				
				L/D=2, 3	L/D=4	L/D=5	L/D=6	
<b>P</b>	Mild Steels	≤180HB	655 (590–770)	UM	.0031 (.0024–.0039)	.0028 (.0024–.0031)	.0028 (.0024–.0031)	.0024 (.0024–.0028)
				UH				
	Carbon Steels, Alloy Steels	180–280HB	460 (375–590)	UM	.0055 (.0031–.0094)	.0047 (.0031–.0063)	.0047 (.0031–.0063)	.0043 (.0039–.0047)
				UH				
	Carbon Steels, Alloy Steels	280–350HB	330 (245–460)	UM	.0055 (.0031–.0094)	.0047 (.0031–.0063)	.0047 (.0031–.0063)	.0043 (.0039–.0047)
				UH				
	Alloy Tool Steels	≤350HB	440 (330–560)	UM	.0055 (.0031–.0094)	.0047 (.0031–.0063)	.0047 (.0031–.0063)	.0039 (.0031–.0047)
				UH				
<b>M</b>	Austenitic Stainless Steels	≤200HB	425 (260–590)	US	.0039 (.0024–.0055)	.0035 (.0024–.0047)	.0035 (.0024–.0047)	.0028 (.0024–.0039)
				UM	.0035 (.0024–.0047)	.0031 (.0024–.0039)	.0031 (.0024–.0039)	.0028 (.0024–.0031)
	Austenitic Stainless Steels	>200HB	425 (260–590)	US	.0039 (.0024–.0055)	.0035 (.0024–.0047)	.0035 (.0024–.0047)	.0028 (.0024–.0039)
				UM	.0035 (.0024–.0047)	.0031 (.0024–.0039)	.0031 (.0024–.0039)	.0028 (.0024–.0031)
	Ferritic and Martensitic Stainless Steels	≤200HB	395 (260–540)	US	.0039 (.0024–.0055)	.0035 (.0024–.0047)	.0035 (.0024–.0047)	.0028 (.0024–.0039)
				UM	.0035 (.0024–.0047)	.0031 (.0024–.0039)	.0031 (.0024–.0039)	.0028 (.0024–.0031)
	Ferritic and Martensitic Stainless Steels	>200HB	395 (260–540)	US	.0039 (.0024–.0055)	.0035 (.0024–.0047)	.0035 (.0024–.0047)	.0028 (.0024–.0039)
				UM	.0035 (.0024–.0047)	.0031 (.0024–.0039)	.0031 (.0024–.0039)	.0028 (.0024–.0031)
<b>K</b>	Gray Cast Irons	Tensile Strength ≤350MPa	525 (425–640)	UM	.0059 (.0039–.0079)	.0047 (.0039–.0051)	.0047 (.0039–.0051)	.0043 (.0039–.0047)
	Ductile Cast Irons	Tensile Strength ≤450MPa	330 (260–440)	UM	.0059 (.0039–.0079)	.0047 (.0039–.0051)	.0047 (.0039–.0051)	.0043 (.0039–.0047)
	Ductile Cast Irons	Tensile Strength ≤800MPa	330 (230–410)	UM	.0059 (.0039–.0079)	.0047 (.0039–.0051)	.0047 (.0039–.0051)	.0043 (.0039–.0047)
<b>N</b>	Aluminum Alloys	Si<5%	655 (330–1150)	UN	.0048 (.0020–.0080)	.0048 (.0020–.0072)	.0048 (.0020–.0072)	.0032 (.0020–.0048)
	Aluminum Alloys	5%≤Si≤10%	490 (330–655)	UN	.0048 (.0020–.0080)	.0048 (.0020–.0072)	.0048 (.0020–.0072)	.0032 (.0020–.0048)
	Aluminum Alloys	Si>10%	490 (330–655)	UN	.0048 (.0020–.0080)	.0048 (.0020–.0072)	.0048 (.0020–.0072)	.0032 (.0020–.0048)
<b>H</b>	Hardened Steels	38–45HRC	165 (100–260)	UH	.0044 (.0024–.0064)	.0036 (.0024–.0048)	–	–

Note 1) Reduce the cutting speed by around 30% when using VP15TF for outer insert.

Note 2) Recommend maximum drilling depth L/D≤3 for using outer coolant system.

Note 3) Spindle through & high pressure coolant system is recommended to make stable holes for stainless steels.