

Using These Tables. The Speeds & Feeds listed below are conservative recommendations for initial setup. In actual use, depending on the machining environment and workpiece material, significantly higher speeds and feeds may be achievable. Using the below as a starting point, cutting speed/feed can be gradually adjusted upwards until the optimum settings per application are found. Questions? Contact us by telephone at (800) 776-6170.

Series # 4105/4106 body (1xD/1.5xD) with # 4111 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700mm	5/8 in. 15.870mm	3/4 in. 19.050mm	1 in. 25.400mm	1 1/4 in. 31.75mm	1 1/2 in. 38.10mm
Common structural steels	≤ 100 BHN 100-260 BHN	425 360	•	•	•	•	0.010 0.008	0.012 0.010	0.016 0.012	0.020 0.016	0.020 0.016	0.025 0.020
Free-cutting steels	≤ 24 HRC 24-30 HRC	425 360	•	•	•	•	0.012 0.010	0.016 0.012	0.020 0.016	0.025 0.020	0.025 0.020	0.031 0.025
Unalloyed heat-treatable steels	≤ 16 HRC 16-24 HRC 24-30 HRC	425 410 360	•	•	•	•	0.010 0.010 0.008	0.012 0.012 0.010	0.016 0.016 0.012	0.020 0.020 0.016	0.020 0.020 0.016	0.025 0.025 0.020
Alloyed heat-treatable steels	24-30 HRC 30-38 HRC	360 295	•	•	•	•	0.010 0.008	0.012 0.010	0.016 0.012	0.020 0.016	0.020 0.016	0.025 0.020
Unalloyed case hardened steels	≤ 230 BHN	425	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Alloyed case hardened steels	24-30 HRC 30-38 HRC	360 230	•	•	•	•	0.010 0.006	0.012 0.008	0.016 0.010	0.020 0.012	0.020 0.012	0.025 0.016
Nitriding steels	24-30 HRC 30-38 HRC	345 230	•	•	•	•	0.008 0.006	0.010 0.008	0.012 0.010	0.016 0.012	0.016 0.012	0.020 0.016
Tool steels	≤ 24 HRC 24-30 HRC	195 180	•	•	•	•	0.008 0.006	0.010 0.008	0.012 0.010	0.016 0.012	0.016 0.012	0.020 0.016
High speed steels	14-30 HRC	180	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
Spring steels	≤ 330 BHN	165	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Stainless steels, sulphured austenitic martensitic	≤ 24 HRC ≤ 24 HRC ≤ 24 HRC	180 130 115	•	•	•	•	0.005 0.005 0.005	0.006 0.006 0.006	0.008 0.008 0.008	0.010 0.010 0.010	0.010 0.010 0.010	0.012 0.012 0.012
Hardened steels	40-48 HRC 48-60 HRC	80 •	•	•	•	•	0.004 •	0.005 •	0.006 •	0.008 •	0.008 •	0.010 •
Special alloys	≤ 38 HRC	80	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Cast iron	≤ 240 BHN 240-300 BHN	330 295	•	•	•	•	0.010 0.010	0.012 0.012	0.016 0.016	0.020 0.020	0.020 0.020	0.025 0.025
New Cast Materials CGI & ADI	220-300 BHN	260	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
New Cast Materials CGI & ADI	350-410 BHN	260	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Spheroidal graphite iron and malleable cast iron	≤ 240 BHN	395	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Chilled cast iron	240-300 BHN ≤ 350 BHN	330 295	•	•	•	•	0.010 0.010	0.012 0.012	0.016 0.016	0.020 0.020	0.020 0.020	0.025 0.025
Ti and Ti-alloys	≤ 24 HRC 24-38 HRC	130 115	•	•	•	•	0.005 0.004	0.006 0.005	0.008 0.006	0.010 0.008	0.010 0.008	0.012 0.010
Aluminum and Al-alloys	≤ 120 BHN	655	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Al wrought alloys	≤ 150 BHN	590	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Al cast alloys	≤ 10% Si ≤ 24% Si	490 395	•	•	•	•	0.012 0.012	0.016 0.016	0.020 0.020	0.025 0.025	0.025 0.025	0.031 0.031
Magnesium alloys	≤ 150 BHN	590	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Copper, low-alloyed	≤ 120 BHN	230	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Brass, short-chipping	≤ 200 BHN	590	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Brass, long-chipping	≤ 200 BHN	395	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Bronze, short-chipping	≤ 200 BHN	230	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Bronze, long-chipping	200-260 BHN	165	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Bronze, long-chipping	≤ 24 HRC 24-30 HRC	150 115	•	•	•	•	0.010 0.008	0.012 0.010	0.016 0.012	0.020 0.016	0.020 0.016	0.025 0.020

Series # 4105/4106 body (1xD/1.5xD) with # 4112 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700mm	5/8 in. 15.870mm	3/4 in. 19.050mm	1 in. 25.400mm	1 1/4 in. 31.75mm	1 1/2 in. 38.10mm
Common structural steels	≤ 100 BHN 100-260 BHN	425 360	•	•	•	•	0.010 0.008	0.012 0.010	0.016 0.012	0.020 0.016	0.020 0.016	0.025 0.020
Free-cutting steels	≤ 24 HRC 24-30 HRC	425 360	•	•	•	•	0.012 0.010	0.016 0.012	0.020 0.016	0.025 0.020	0.025 0.020	0.031 0.025
Unalloyed heat-treatable steels	≤ 16 HRC 16-24 HRC 24-30 HRC	425 410 360	•	•	•	•	0.010 0.010 0.008	0.012 0.012 0.010	0.016 0.016 0.012	0.020 0.020 0.016	0.020 0.020 0.016	0.025 0.025 0.020
Alloyed heat-treatable steels	24-30 HRC 30-38 HRC	360 295	•	•	•	•	0.010 0.008	0.012 0.010	0.016 0.012	0.020 0.016	0.020 0.016	0.025 0.020
Unalloyed case hardened steels	≤ 230 BHN	425	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Alloyed case hardened steels	24-30 HRC 30-38 HRC	360 230	•	•	•	•	0.010 0.006	0.012 0.008	0.016 0.010	0.020 0.012	0.020 0.012	0.025 0.016
Nitriding steels	24-30 HRC 30-38 HRC	345 230	•	•	•	•	0.008 0.006	0.010 0.008	0.012 0.010	0.016 0.012	0.016 0.012	0.020 0.016
Tool steels	≤ 24 HRC 24-30 HRC	195 180	•	•	•	•	0.008 0.006	0.010 0.008	0.012 0.010	0.016 0.012	0.016 0.012	0.020 0.016
High speed steels	14-30 HRC	180	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
Spring steels	≤ 330 BHN	165	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Stainless steels, sulphured austenitic martensitic	≤ 24 HRC ≤ 24 HRC ≤ 24 HRC	180 130 115	•	•	•	•	0.005 0.005 0.005	0.006 0.006 0.006	0.008 0.008 0.008	0.010 0.010 0.010	0.010 0.010 0.010	0.012 0.012 0.012
Hardened steels	40-48 HRC 48-60 HRC	80 •	•	•	•	•	0.004 •	0.005 •	0.006 •	0.008 •	0.008 •	0.010 •
Special alloys	≤ 38 HRC	80	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Ti and Ti-alloys	≤ 24 HRC 24-38 HRC	130 115	•	•	•	•	0.005 0.004	0.006 0.005	0.008 0.006	0.010 0.008	0.010 0.008	0.012 0.010

$$\text{RPM} = \frac{\text{SFM}}{\text{DIAM. in.}} \times 3.82$$

$$\text{IPM} = \text{IPR} \times \text{RPM}$$

$$\frac{\text{HOLE DEPTH in.}}{\text{IPM}} \times 60 = \text{Cut Time}$$

$$\text{mm} = \text{in.} \times 25.40$$

$$\text{m/min.} = \text{SFM} \div 3.28$$

$$\text{mm/rev.} = \text{IPR} \times 25.40$$

$$\text{Bar} = \text{PSI} \div 14.50$$

$$\text{Liter} = \text{Gal.} \div 3.79$$

Series # 4105/4106 body (1xD/1.5xD) with # 4113 insert

Material group	Hardness	SFM	Feed Rate - IPR										
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700mm	5/8 in. 15.870mm	3/4 in. 19.050mm	1 in. 25.400mm	1 1/4 in. 31.75mm	1 1/2 in. 38.10mm	
Cast iron	≤240 Bhn 240-300 Bhn	330 295	•	•	•	•	•	0.010 0.010	0.012 0.012	0.016 0.016	0.020 0.020	0.020 0.020	0.025 0.025
New Cast Materials CGI & ADI	220-300 Bhn	260	•	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
New Cast Materials CGI & ADI	350-410 Bhn	260	•	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Spheroidal graphite iron and malleable cast iron	≤240 Bhn 240-300 Bhn	395 330	•	•	•	•	•	0.012 0.010	0.016 0.012	0.020 0.016	0.025 0.020	0.025 0.020	0.031 0.025

Series # 4105/4106 body (1xD/1.5xD) with #4114 insert

Material group	Hardness	SFM	Feed Rate - IPR										
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700mm	5/8 in. 15.870mm	3/4 in. 19.050mm	1 in. 25.400mm	1 1/4 in. 31.75mm	1 1/2 in. 38.10mm	
Aluminium and Al-alloys	≤120 Bhn	655	•	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Al wrought alloys	≤150 Bhn	590	•	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Al cast alloys ≤ 10% Si	≤200 Bhn	490	•	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Al cast alloys ≤ 24% Si	≤200 Bhn	395	•	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Magnesium alloys	≤150 Bhn	590	•	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Copper, low-alloyed	≤120 Bhn	230	•	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Brass, short-chipping	≤200 Bhn	590	•	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Brass, long-chipping	200-260 Bhn	395	•	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Bronze, long-chipping	≤24 Bhn 24-30 Bhn	230 165	•	•	•	•	•	0.010 0.010	0.012 0.012	0.016 0.016	0.020 0.020	0.020 0.020	0.025 0.025

Series # 4105/4106 body (1xD/1.5xD) with # 4115 insert

Material group	Hardness	SFM	Feed Rate - IPR										
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700mm	5/8 in. 15.870mm	3/4 in. 19.050mm	1 in. 25.400mm	1 1/4 in. 31.75mm	1 1/2 in. 38.10mm	
Stainless steels, sulphured	≤24 Rc	180	•	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
austenitic	≤24 Rc	130	•	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
martensitic	≤24 Rc	115	•	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
Hardened steels	40-48 48-60	80 80	•	•	•	•	•	0.004 •	0.005 •	0.006 •	0.008 •	0.008 •	0.010 •
Special alloys	≤38	•	•	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Chilled cast iron	≤350 Bhn	295	•	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Ti and Ti-alloys	≤24 Rc	130	•	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
	>24-38 Rc	115	•	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010

Using These Tables. The Speeds & Feeds listed below are conservative recommendations for initial setup. In actual use, depending on the machining environment and workpiece material, significantly higher speeds and feeds may be achievable. Using the below as a starting point, cutting speed/feed can be gradually adjusted upwards until the optimum settings per application are found. Questions? Contact us by telephone at (800) 776-6170.

Series # 4107 body (3xD) with # 4112 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700mm	5/8 in. 15.870mm	3/4 in. 19.050mm	1 in. 25.400mm	1 1/4 in. 31.75mm	1 1/2 in. 38.10mm
Common structural steels	≤ 100 BHN	425	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	100-260 BHN	360	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Free-cutting steels	≤ 24 HRC	425	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
	24-30 HRC	360	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Unalloyed heat-treatable steels	≤ 16 HRC	425	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	16-24 HRC	410	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	24-30 HRC	360	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Alloyed heat-treatable steels	24-30 HRC	360	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	30-38 HRC	295	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Unalloyed case hardened steels	≤ 230 BHN	425	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Alloyed case hardened steels	24-30 HRC	360	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	30-38 HRC	230	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016
Nitriding steels	24-30 HRC	345	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
	30-38 HRC	230	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016
Tool steels	≤ 24 HRC	195	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
	24-30 HRC	180	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016
High speed steels	14-30 HRC	180	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
Spring steels	≤ 330 BHN	165	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Stainless steels	≤ 24 HRC	180	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
	≤ 24 HRC	130	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
	≤ 24 HRC	115	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
Hardened steels	40-48 HRC	80	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
	48-60 HRC	•	•	•	•	•	•	•	•	•	•	•
Special alloys	≤ 38 HRC	80	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Ti and Ti-alloys	≤ 24 HRC	130	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
	24-38 HRC	115	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010

Series # 4107 body (3xD) with # 4113 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Cast iron	≤240 Bhn	330	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	240-300 Bhn	295	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
New Cast Materials CGI & ADI	220-300 Bhn	260	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
New Cast Materials CGI & ADI	350-410 Bhn	260	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Spheroidal graphite iron and malleable cast iron	≤240 Bhn	395	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
	240-300 Bhn	330	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025

Series # 4107 body (3xD) with # 4114 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Aluminium and Al-alloys	≤120 Bhn	655	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Al wrought alloys	≤150 Bhn	590	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Al cast alloys ≤ 10% Si	≤200 Bhn	490	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
	≤ 24% Si	395	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Magnesium alloys	≤150 Bhn	590	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Copper, low-alloyed	≤120 Bhn	230	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Brass, short-chipping	≤200 Bhn	590	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
	long-chipping	≤200 Bhn	395	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Bronze, short-chipping	≤200 Bhn	230	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	>200-260 Bhn	165	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Bronze, long-chipping	≤24 Hrc	150	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	24-30 Hrc	115	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020

Series # 4107 body (3xD) with # 4115 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Stainless steels, sulphured	≤24 hrc	180	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
	austenitic	≤24 hrc	130	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
	martensitic	≤24 hrc	115	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
Hardened steels	>40-48 hrc	80	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
	>48-60 hrc	•	•	•	•	•	•	•	•	•	•	•
Special alloys	≤38 hrc	80	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Chilled cast iron	≤350 Bhn	295	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Ti and Ti-alloys	≤24 hrc	130	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
	>24-38 hrc	115	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010

$$\text{RPM} = \frac{\text{SFM}}{\text{DIAM. in.}} \times 3.82 \quad \text{IPM} = \text{IPR} \times \text{RPM}$$

$$\frac{\text{HOLE DEPTH in.}}{\text{IPM}} \times 60 = \text{Cut Time}$$

$$\text{mm} = \text{in.} \times 25.40$$

$$\text{m/min.} = \text{SFM} \div 3.28$$

$$\text{mm/rev.} = \text{IPR} \div 25.40$$

$$\text{Bar} = \text{PSI} \div 14.50$$

$$\text{Liter} = \text{Gal.} \div 3.79$$

Series # 4108 body (5xD) with # 4112 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700mm	5/8 in. 15.870mm	3/4 in. 19.050mm	1 in. 25.400mm	1 1/4 in. 31.75mm	1 1/2 in. 38.10mm
Common structural steels	≤ 100 BHN	425	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	100-260 BHN	360	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Free-cutting steels	≤ 24 HRC	425	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
	24-30 HRC	360	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Unalloyed heat-treatable steels	≤ 16 HRC	425	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	16-24 HRC	410	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	24-30 HRC	360	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Alloyed heat-treatable steels	24-30 HRC	360	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	30-38 HRC	295	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Unalloyed case hardened steels	≤ 230 BHN	425	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Alloyed case hardened steels	24-30 HRC	360	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	30-38 HRC	230	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016
Nitriding steels	24-30 HRC	345	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
	30-38 HRC	230	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016
Tool steels	≤ 24 HRC	195	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
	24-30 HRC	180	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016
High speed steels	14-30 HRC	180	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
Spring steels	≤ 330 BHN	165	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Stainless steels	24 HRC	180	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
	24 HRC	130	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
	24 HRC	115	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
Hardened steels	40-48 HRC	80	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
	48-60 HRC	•	•	•	•	•	•	•	•	•	•	•
Special alloys	≤ 38 HRC	80	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Ti and Ti-alloys	≤ 24 HRC	130	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
	24-38 HRC	115	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010

Series # 4108 body (5xD) with # 4113 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Cast iron	≤240 Bhn	330	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	240-300 Bhn	295	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
New Cast Materials CGI & ADI	220-300 Bhn	260	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
New Cast Materials CGI & ADI	350-410 Bhn	260	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Spheroidal graphite iron and malleable cast iron	≤240 Bhn	395	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
	240-300 Bhn	330	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025

Series # 4108 body (5xD) with # 4114 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Aluminium and Al-alloys	≤120 Bhn	655	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Al wrought alloys	≤150 Bhn	590	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Al cast alloys ≤ 10% Si	≤200 Bhn	490	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
≤ 24% Si	≤200 Bhn	395	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Magnesium alloys	≤150 Bhn	590	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
Copper, low-alloyed	≤120 Bhn	230	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Brass, short-chipping	≤200 Bhn	590	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
long-chipping	≤200 Bhn	395	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Bronze, short-chipping	≤200 Bhn	230	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
>200-260 Bhn	165	•	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Bronze, long-chipping	≤24 Rc	150	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	24-30 Rc	115	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020

Series # 4108 body (5xD) with # 4115 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Stainless steels, sulphured	≤24 Rc	180	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
austenitic	≤24 Rc	130	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
martensitic	≤24 Rc	115	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
Hardened steels	40-48 Rc	80	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
	48-60 Rc	•	•	•	•	•	•	•	•	•	•	•
Special alloys	≤38 Rc	80	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Chilled cast iron	≤350 Bhn	295	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Ti and Ti-alloys	≤24 Rc	130	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012
	>24-38 Rc	115	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010

Using These Tables. The Speeds & Feeds listed below are conservative recommendations for initial setup. In actual use, depending on the machining environment and workpiece material, significantly higher speeds and feeds may be achievable. Using the below as a starting point, cutting speed/feed can be gradually adjusted upwards until the optimum settings per application are found. Questions? Contact us by telephone at (800) 776-6170.

Series # 4109 body (7xD) with # 4112 insert

Material group	Hardness	SFM	Feed Rate - IPR										
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700mm	5/8 in. 15.870mm	3/4 in. 19.050mm	1 in. 25.400mm	1 1/4 in. 31.75mm	1 1/2 in. 38.10mm	
Common structural steels	≤ 100 BHN	425	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
	100-260 BHN	360	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
Free-cutting steels	≤ 24 HRC	425	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025	
	24-30 HRC	360	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
Unalloyed heat-treatable steels	≤ 16 HRC	425	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
	16-24 HRC	410	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
	24-30 HRC	360	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
Alloyed heat-treatable steels	24-30 HRC	360	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
	30-38 HRC	295	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
Unalloyed case hardened steels	≤ 230 BHN	425	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025	
Alloyed case hardened steels	24-30 HRC	360	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
	30-38 HRC	230	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
Nitriding steels	24-30 HRC	345	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
	30-38 HRC	230	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012	
Tool steels	≤ 24 HRC	195	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
	24-30 HRC	180	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012	
High speed steels	14-30 HRC	180	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010	
Spring steels	≤ 330 BHN	165	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010	
Stainless steels	sulphured austenitic martensitic	≤ 24 HRC	180	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
		≤ 24 HRC	130	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
		≤ 24 HRC	115	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Hardened steels	40-48 HRC	80	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008	
	48-60 HRC	•	•	•	•	•	•	•	•	•	•	•	
Special alloys	≤ 38 HRC	80	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008	
Ti and Ti-alloys	≤ 24 HRC	130	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010	
	24-38 HRC	115	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008	

Series # 4109 body (7xD) with # 4113 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Cast iron	≤240 Bhn	330	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	240-300 Bhn	295	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
New Cast Materials CGI & ADI	240-300 Bhn	260	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
New Cast Materials CGI & ADI	350-410 Bhn	260	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Spheroidal graphite iron and malleable cast iron	≤240 Bhn	395	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
	240-300 Bhn	330	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025

Series # 4109 body (7xD) with # 4114 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Aluminium and Al-alloys	≤120 Bhn	655	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Al wrought alloys	≤150 Bhn	590	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Al cast alloys ≤ 10% Si	≤200 Bhn	490	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	≤24% Si	395	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Magnesium alloys	≤150 Bhn	590	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Copper, low-alloyed	≤120 Bhn	230	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Brass, short-chipping	≤200 Bhn	590	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	long-chipping	395	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Bronze, short-chipping	≤200 Bhn	230	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
	200-260 Bhn	165	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Bronze, long-chipping	24 Hrc	150	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
	24-30 Hrc	115	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016

Series # 4109 body (7xD) with # 4115 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Stainless steels, sulphured austenitic martensitic	≤24 Hrc	180	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
	≤24 Hrc	130	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
	≤24 Hrc	115	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Hardened steels	40-48 Hrc	80	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008
	48-60 Hrc	•	•	•	•	•	•	•	•	•	•	•
Special alloys	≤38 Hrc	80	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008
Chilled cast iron	≤350 Bhn	295	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Ti and Ti-alloys	≤24 Hrc	130	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
	24-38 Hrc	115	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008

$$RPM = \frac{SFM}{DIAM. \text{ in.}} \times 3.82 \quad IPM = IPR \times RPM$$

$$\frac{\text{HOLE DEPTH in.}}{IPM} \times 60 = \text{Cut Time}$$

$$mm = \text{in.} \times 25.40$$

$$m/min. = SFM \div 3.28$$

$$mm/rev. = IPR \times 25.40$$

$$\text{Bar} = \text{PSI} \div 14.50$$

$$\text{Liter} = \text{Gal.} \div 3.79$$

Series # 4110 body (10xD) with # 4112 insert

Material group	Hardness	SFM	Feed Rate - IPR										
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700mm	5/8 in. 15.870mm	3/4 in. 19.050mm	1 in. 25.400mm	1 1/4 in. 31.75mm	1 1/2 in. 38.10mm	
Common structural steels	≤ 100 BHN	425	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
	100-260 BHN	360	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
Free-cutting steels	≤ 24 HRC	425	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025	
	24-30 HRC	360	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
Unalloyed heat-treatable steels	≤ 16 HRC	425	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
	16-24 HRC	410	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
	24-30 HRC	360	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
Alloyed heat-treatable steels	24-30 HRC	360	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
	30-38 HRC	295	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
Unalloyed case hardened steels	≤ 230 BHN	425	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025	
Alloyed case hardened steels	24-30 HRC	360	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020	
	30-38 HRC	230	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
Nitriding steels	24-30 HRC	345	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
	30-38 HRC	230	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012	
Tool steels	≤ 24 HRC	195	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016	
	24-30 HRC	180	•	•	•	•	0.005	0.006	0.008	0.010	0.010	0.012	
High speed steels	14-30 HRC	180	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010	
Spring steels	≤ 330 BHN	165	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010	
Stainless steels	sulphured austenitic martensitic	≤ 24 HRC	180	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
		24-30 HRC	130	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
		≤ 24 HRC	115	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Hardened steels	40-48 HRC	80	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008	
	48-60 HRC	•	•	•	•	•	•	•	•	•	•	•	
Special alloys	≤ 38 HRC	80	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008	
Ti and Ti-alloys	≤ 24 HRC	130	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010	
	24-38 HRC	115	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008	

Series # 4110 body (10xD) with # 4113 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Cast iron	≤240 Bhn	330	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	240-300 Bhn	295	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
New Cast Materials CGI & ADI	220-300 Bhn	260	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
New Cast Materials CGI & ADI	350-410 Bhn	260	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Spheroidal graphite iron and malleable cast iron	≤240 Bhn	395	•	•	•	•	0.012	0.016	0.020	0.025	0.025	0.031
	240-300 Bhn	330	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025

Series # 4110 body (10xD) with # 4114 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Aluminium and Al-alloys	≤120 Bhn	655	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Al wrought alloys	≤150 Bhn	590	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Al cast alloys ≤ 10% Si	≤200 Bhn	490	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	≤ 24% Si	395	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Magnesium alloys	≤150 Bhn	590	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Copper, low-alloyed	≤120 Bhn	230	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Brass, short-chipping	≤200 Bhn	590	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
	≤200 Bhn	395	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Bronze, short-chipping	≤200 Bhn	230	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
	200-260 Bhn	165	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
Bronze, long-chipping	≤24 Hrc	150	•	•	•	•	0.008	0.010	0.012	0.016	0.016	0.020
	24-30 Hrc	115	•	•	•	•	0.006	0.008	0.010	0.012	0.012	0.016

Series # 4110 body (10xD) with # 4115 insert

Material group	Hardness	SFM	Feed Rate - IPR									
			1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Stainless steels, sulphured austenitic martensitic	≤24 Hrc	180	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
	≤24 Hrc	130	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
	≤24 Hrc	115	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
Hardened steels	40-48 Hrc	80	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008
	48-60 Hrc	•	•	•	•	•	•	•	•	•	•	•
Special alloys	≤38 Hrc	80	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008
Chilled cast iron	≤350 Bhn	295	•	•	•	•	0.010	0.012	0.016	0.020	0.020	0.025
Ti and Ti-alloys	≤24 Rc	130	•	•	•	•	0.004	0.005	0.006	0.008	0.008	0.010
	24-38 Rc	115	•	•	•	•	0.003	0.004	0.005	0.006	0.006	0.008