Recommended Starting Speeds [SFM]

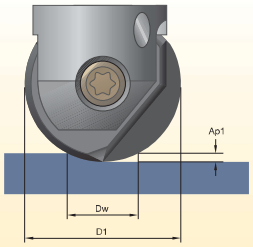
Material Group		K115M			KC505M			KC515M			KC530M		
P	1	–	–	–	–	–	–	1080	**960**	840	900	**780**	660
	2	–	–	–	–	–	–	1020	**900**	780	780	**660**	540
	3	–	–	–	–	–	–	900	**780**	660	660	**600**	540
	4	–	–	–	1180	**860**	710	780	**660**	540	600	**540**	480
	5	–	–	–	1180	**860**	710	660	**540**	420	540	**480**	420
	6	–	–	–	1140	**780**	620	540	**420**	360	420	**360**	300
M	1	–	–	–	–	–	–	1080	**900**	780	900	**720**	600
	2	–	–	–	–	–	–	900	**720**	540	600	**480**	420
	3	–	–	–	–	–	–	720	**600**	480	480	**420**	360
K	1	720	**600**	480	–	–	–	1440	**1080**	720	–	–	–
	2	600	**480**	360	–	–	–	1080	**840**	600	–	–	–
	3	360	**300**	240	–	–	–	480	**360**	240	–	–	–
N	1–2	1440	**1080**	720	–	–	–	–	–	–	–	–	–
	3	960	**720**	600	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–
	4	300	**230**	160	–	–	–	–	–	–	260	**200**	170
H	1	–	–	–	860	**670**	550	550	**400**	310	260	**200**	170

NOTE: FIRST choice starting speeds are in **bold** type.
As the average chip thickness increases, the speed should be decreased.

Calculating Working Diameter and Resulting Surface Speed

Case 1:

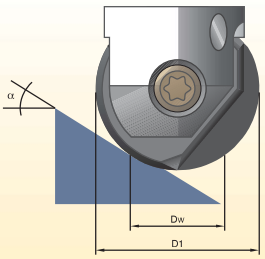
It is important to consider the effective diameter (Dw) when using light depths of cut in order to properly calculate RPM values. Use the following formula when machining flat surfaces or inclinations of 10° or less to find the Dw value. Then, use this for RPM calculations, as opposed to using the overall insert diameter (D1).



$$Dw = \sqrt{D1^2-(D1-2Ap1)^2}$$

Case 2:

When machining inclinations between 11° and 55°, further modification of vc is required. Apply factor "k" from the given formula to calculate the correct vc (vceff). This corrected value is then used to calculate the proper RPM for the tool.



$$k = \frac{1}{\sin\left[\alpha + \arccos\left(1-(2\,(Ap1/D1))\right)\right]}$$

$$vceff = vc \times k$$

Recommended Starting Feeds [IPT] • Ball Nose Insert Size .250"

Light Machining	General Purpose	Heavy Machining

At .125 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..LD
.E..GP	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..GP

At .050 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.006	**.008**	.015	.004	**.006**	.011	.004	**.005**	.010	.004	**.005**	.009	.004	**.005**	.009	.E..LD
.E..GP	.006	**.008**	.015	.004	**.006**	.011	.004	**.005**	.010	.004	**.005**	.009	.004	**.005**	.009	.E..GP

At .025 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..LD
.E..GP	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..GP

At .013 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..LD
.E..GP	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..GP

NOTE: Use “Light Machining” values as starting feed rate.

Recommended Starting Feeds [IPT] • Ball Nose Insert Size .312"

Light Machining	General Purpose	Heavy Machining

At .156 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..LD
.E..GP	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..GP

At .047 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..LD
.E..GP	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..GP

At .031 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..LD
.E..GP	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..GP

At .016 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..LD
.E..GP	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..GP

NOTE: Use “Light Machining” values as starting feed rate.

Recommended Starting Feeds [IPT] • Ball Nose Insert Size .375"

Light Machining	General Purpose	Heavy Machining

At .188 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..LD
.E..GP	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..GP

At .056 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..LD
.E..GP	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..GP

At .038 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..LD
.E..GP	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..GP

At .019 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..LD
.E..GP	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..GP

NOTE: Use “Light Machining” values as starting feed rate.

Recommended Starting Feeds [IPT] • Ball Nose Insert Size .500"

Light Machining	General Purpose	Heavy Machining

At .250 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..LD
.E..GP	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..GP
.E..GN	.007	**.010**	.018	.005	**.008**	.013	.004	**.007**	.011	.004	**.006**	.011	.004	**.006**	.011	.E..GN
.E..HC	.007	**.014**	.024	.005	**.010**	.018	.004	**.009**	.015	.004	**.008**	.014	.004	**.008**	.014	.E..HC

At .075 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..LD
.E..GP	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..GP
.E..GN	.009	**.014**	.025	.007	**.011**	.019	.006	**.009**	.016	.006	**.009**	.015	.006	**.008**	.015	.E..GN
.E..HC	.009	**.019**	.034	.007	**.014**	.025	.006	**.012**	.021	.006	**.011**	.020	.006	**.011**	.020	.E..HC

At .050 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..LD
.E..GP	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..GP
.E..GN	.011	**.017**	.030	.008	**.013**	.022	.007	**.011**	.019	.007	**.010**	.018	.007	**.010**	.018	.E..GN
.E..HC	.011	**.023**	.041	.008	**.017**	.030	.007	**.015**	.026	.007	**.014**	.024	.007	**.013**	.023	.E..HC

At .025 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..LD
.E..GP	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..GP
.E..GN	.016	**.024**	.042	.012	**.017**	.031	.010	**.015**	.026	.009	**.014**	.025	.009	**.014**	.024	.E..GN
.E..HC	.016	**.032**	.057	.012	**.023**	.041	.010	**.020**	.035	.009	**.019**	.033	.009	**.018**	.032	.E..HC

NOTE: Use “Light Machining” values as starting feed rate.

Recommended Starting Feeds [IPT] • Ball Nose Insert Size .625"

Light Machining	General Purpose	Heavy Machining

At .313 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..LD
.E..GP	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..GP
.E..HC	.007	**.014**	.024	.005	**.010**	.018	.004	**.009**	.015	.004	**.008**	.014	.004	**.008**	.014	.E..HC

At .094 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..LD
.E..GP	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..GP
.E..HC	.009	**.019**	.034	.007	**.014**	.025	.006	**.012**	.021	.006	**.011**	.020	.006	**.011**	.020	.E..HC

At .063 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..LD
.E..GP	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..GP
.E..HC	.011	**.023**	.041	.008	**.017**	.030	.007	**.015**	.026	.007	**.014**	.024	.007	**.013**	.023	.E..HC

At .031 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..LD
.E..GP	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..GP
.E..HC	.016	**.032**	.057	.012	**.023**	.041	.010	**.020**	.035	.009	**.019**	.033	.009	**.018**	.032	.E..HC

NOTE: Use “Light Machining” values as starting feed rate.

Recommended Starting Feeds [IPT] • Ball Nose Insert Size .750"

Light Machining	General Purpose	Heavy Machining

At .375 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..LD
.E..GP	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..GP
.E..GN	.007	**.010**	.018	.005	**.008**	.013	.004	**.007**	.011	.004	**.006**	.011	.004	**.006**	.011	.E..GN
.E..HC	.007	**.014**	.024	.005	**.010**	.018	.004	**.009**	.015	.004	**.008**	.014	.004	**.008**	.014	.E..HC

At .113 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..LD
.E..GP	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..GP
.E..GN	.009	**.014**	.025	.007	**.011**	.019	.006	**.009**	.016	.006	**.009**	.015	.006	**.008**	.015	.E..GN
.E..HC	.009	**.019**	.034	.007	**.014**	.025	.006	**.012**	.021	.006	**.011**	.020	.006	**.011**	.020	.E..HC

At .075 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..LD
.E..GP	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..GP
.E..GN	.011	**.017**	.030	.008	**.013**	.022	.007	**.011**	.019	.007	**.010**	.018	.007	**.010**	.018	.E..GN
.E..HC	.011	**.023**	.041	.008	**.017**	.030	.007	**.015**	.026	.007	**.014**	.024	.007	**.013**	.023	.E..HC

At .038 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..LD
.E..GP	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..GP
.E..GN	.016	**.024**	.042	.012	**.017**	.031	.010	**.015**	.026	.009	**.014**	.025	.009	**.014**	.024	.E..GN
.E..HC	.016	**.032**	.057	.012	**.023**	.041	.010	**.020**	.035	.009	**.019**	.033	.009	**.018**	.032	.E..HC

NOTE: Use “Light Machining” values as starting feed rate.

Recommended Starting Feeds [IPT] • Ball Nose Insert Size 1.00"

Light Machining	General Purpose	Heavy Machining

At .500 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..LD
.E..GP	.005	**.007**	.012	.004	**.005**	.009	.003	**.004**	.008	.003	**.004**	.007	.003	**.004**	.007	.E..GP
.E..GN	.007	**.010**	.018	.005	**.008**	.013	.004	**.007**	.011	.004	**.006**	.011	.004	**.006**	.011	.E..GN
.E..HC	.007	**.014**	.024	.005	**.010**	.018	.004	**.009**	.015	.004	**.008**	.014	.004	**.008**	.014	.E..HC

At .150 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..LD
.E..GP	.007	**.009**	.017	.005	**.007**	.012	.004	**.006**	.011	.004	**.006**	.010	.004	**.006**	.010	.E..GP
.E..GN	.009	**.014**	.025	.007	**.011**	.019	.006	**.009**	.016	.006	**.009**	.015	.006	**.008**	.015	.E..GN
.E..HC	.009	**.019**	.034	.007	**.014**	.025	.006	**.012**	.021	.006	**.011**	.020	.006	**.011**	.020	.E..HC

At .100 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..LD
.E..GP	.008	**.011**	.020	.006	**.008**	.015	.005	**.007**	.013	.005	**.007**	.012	.005	**.007**	.012	.E..GP
.E..GN	.011	**.017**	.030	.008	**.013**	.022	.007	**.011**	.019	.007	**.010**	.018	.007	**.010**	.018	.E..GN
.E..HC	.011	**.023**	.041	.008	**.017**	.030	.007	**.015**	.026	.007	**.014**	.024	.007	**.013**	.023	.E..HC

At .050 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
.E..LD	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..LD
.E..GP	.011	**.016**	.028	.008	**.012**	.020	.007	**.010**	.018	.007	**.009**	.016	.006	**.009**	.016	.E..GP
.E..GN	.016	**.024**	.042	.012	**.017**	.031	.010	**.015**	.026	.009	**.014**	.025	.009	**.014**	.024	.E..GN
.E..HC	.016	**.032**	.057	.012	**.023**	.041	.010	**.020**	.035	.009	**.019**	.033	.009	**.018**	.032	.E..HC

NOTE: Use “Light Machining” values as starting feed rate.