Cutting data recommendations for HPR replaceable head reamers

Feed and cutting speed

HPR131 | HPR231 | HPR180 | HPR280

Cutting material: HP421 | Lead: ME1G | ML2G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)			Feed f_z (mm/z) with tool diameter	
					Internal cooling	External cooling	MQL	z 4	z 6
								7.000 - 9.590	9.600 - 21.290
P	P3	P3.1	Tool, bearing, spring and high-speed steels**	< 800					
		P3.2	Tool, bearing, spring and high-speed steels**	< 1000	100	100	120	0.100	0.200
		P3.3	Tool, bearing, spring and high-speed steels**	< 1500	100	100	120	0.100	0.200
	P5	P5.1	Cast steel		35	35	35	0.070	0.070

HPR150 | HPR250

Cutting material: CU134 | Lead: ML2G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)			Feed f_z (mm/z) with tool diameter	
					Internal cooling	External cooling	MQL	z 6	z 8
								16.600 - 36.990	37.000 - 65.000
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700	140	100	120	0.200	0.250
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200	140	100	120	0.200	0.250
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloy	< 900	140	100	120	0.200	0.250
		P2.2	Nitrided, case hardened and heat-treated steels, alloy	< 1400	140	100	120	0.200	0.250
	P3	P3.1	Tool, bearing, spring and high-speed steels**	< 800	140	100	120	0.200	0.250
		P3.2	Tool, bearing, spring and high-speed steels**	< 1000					
		P3.3	Tool, bearing, spring and high-speed steels**	< 1500					

HPR180 | HPR280

Cutting material: CU134 | Lead: ML2G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)			Feed f_z (mm/z) with tool diameter	
					Internal cooling	External cooling	MQL	z 4	z 6
								7.000 - 14.590	14.600 - 21.290
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700	140	100	120	0.150	0.200
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200	140	100	120	0.150	0.200
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloy	< 900	140	100	120	0.150	0.200
		P2.2	Nitrided, case hardened and heat-treated steels, alloy	< 1400	140	100	120	0.150	0.200
	P3	P3.1	Tool, bearing, spring and high-speed steels**	< 800	140	100	120	0.150	0.200
		P3.2	Tool, bearing, spring and high-speed steels**	< 1000					
		P3.3	Tool, bearing, spring and high-speed steels**	< 1500					

* MAPAL machining groups
** If the alloy parts Cr, Mo, Ni, V, W in total > 8% then select the next highest MAPAL machining group.

HPR110 | HPR210 | HPR150 | HPR250

Cutting material: HP421 | Lead: ME1G | ML2G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)			Feed f_z (mm/z) with tool diameter	
					Internal cooling	External cooling	MQL	z 6	z 8
								15.600 - 29.990	30.00 - 65.00
P	P3	P3.1	Tool, bearing, spring and high-speed steels**	< 800	120	100	120	0.200	0.200
		P3.2	Tool, bearing, spring and high-speed steels**	< 1000	100	100	120	0.200	0.200
		P3.3	Tool, bearing, spring and high-speed steels**	< 1500	100	100	120	0.200	0.200
	P5	P5.1	Cast steel		35	35	35	0.070	0.070

HPR110 | HPR210

Cutting material: CU134 | Lead: ME1G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)			Feed f_z (mm/z) with tool diameter	
					Internal cooling	External cooling	MQL	z 6	z 8
								15.600 - 29.990	30.000 - 65.000
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700	140	100	120	0.200	0.250
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200	140	100	120	0.200	0.250
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloy	< 900	140	100	120	0.200	0.250
		P2.2	Nitrided, case hardened and heat-treated steels, alloy	< 1400	140	100	120	0.200	0.250
	P3	P3.1	Tool, bearing, spring and high-speed steels**	< 800	140	100	120	0.200	0.250
		P3.2	Tool, bearing, spring and high-speed steels**	< 1000					
		P3.3	Tool, bearing, spring and high-speed steels**	< 1500					

HPR131 | HPR231

Cutting material: CU134 | Lead: ME1G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)			Feed f_z (mm/z) with tool diameter	
					Internal cooling	External cooling	MQL	z 4	z 6
								7.000 - 9.590	9.600 - 18.590
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700	140	100	120	0.150	0.200
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200	140	100	120	0.150	0.200
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloy	< 900	140	100	120	0.150	0.200
		P2.2	Nitrided, case hardened and heat-treated steels, alloy	< 1400	140	100	120	0.150	0.200
	P3	P3.1	Tool, bearing, spring and high-speed steels**	< 800	140	100	120	0.150	0.200
		P3.2	Tool, bearing, spring and high-speed steels**	< 1000					
		P3.3	Tool, bearing, spring and high-speed steels**	< 1500					

The specified cutting values are guide values.
The optimum data for the respective machining task should be determined during the test or machining.

Cutting data recommendations for HPR replaceable head reamers

Feed and cutting speed

HPR131 | HPR231 | HPR180 | HPR280

Cutting material: HP421 | Lead: MF1G | MO2G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
					Internal cooling	External cooling	MQL		HPR131 | HPR231		HPR180 | HPR280	
									z4	z6	z4	z6
									7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
P	P4	P4.1	Stainless steels, ferritic and martensitic		35	35	35		0.070	0.070	0.070	0.070
	P6	P6.1	Stainless cast steel, ferritic and martensitic		35	35	35		0.070	0.070	0.070	0.070
M	M1	M1.1	Stainless steels, austenitic	< 700	35	35	35		0.070	0.070	0.070	0.070
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000	35	35	35		0.070	0.070	0.070	0.070
	M2	M2.1	Stainless/heat-resistant cast steel, austenitic	< 700	35	35	35		0.070	0.070	0.070	0.070
	M3	M3.1	Stainless cast steel, ferritic/austenitic (duplex)	< 1000	35	35	35		0.070	0.070	0.070	0.070

HPR110 | HPR210 | HPR150 | HPR250

Cutting material: HP421 | Lead: MF1G | MO2G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
					Internal cooling	External cooling	MQL		HPR110 | HPR210		HPR150 | HPR250	
									z6	z8	z6	z8
									15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
P	P4	P4.1	Stainless steels, ferritic and martensitic		35	35	35		0.070	0.070	0.070	0.070
	P6	P6.1	Stainless cast steel, ferritic and martensitic		35	35	35		0.070	0.070	0.070	0.070
M	M1	M1.1	Stainless steels, austenitic	< 700	35	35	35		0.070	0.070	0.070	0.070
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000	35	35	35		0.070	0.070	0.070	0.070
	M2	M2.1	Stainless/heat-resistant cast steel, austenitic	< 700	35	35	35		0.070	0.070	0.070	0.070
	M3	M3.1	Stainless cast steel, ferritic/austenitic (duplex)	< 1000	35	35	35		0.070	0.070	0.070	0.070

* MAPAL machining groups

The specified cutting values are guide values.
The optimum data for the respective machining task should be determined during the test or machining.

Cutting data recommendations for HPR replaceable head reamers

Feed and cutting speed

HPR130 | HPR230 | HPR180 | HPR280

Cutting material: HP423 | Lead: MC1G

MMG*		Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
								HPR130 | HPR230		HPR180 | HPR280	
				Internal cooling	External cooling	MQL		z4	z6	z4	z6
								7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	140	100	120	0.150	0.200	0.150	0.200
	K2	K2.1	Cast iron with spheroidal graphite, GJS	< 500	140	100	120	0.150	0.200	0.150	0.200
		K2.2	Cast iron with spheroidal graphite, GJS	≤ 800							
		K2.3	Cast iron with spheroidal graphite, GJS	> 800							

HPR100 | HPR200 | HPR150 | HPR250

Cutting material: CP134 | Lead: MC1G

MMG*		Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
								HPR100 | HPR200		HPR150 | HPR250	
				Internal cooling	External cooling	MQL		z6	z8	z6	z8
								15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	140	100	120	0.200	0.300	0.200	0.300
	K2	K2.1	Cast iron with spheroidal graphite, GJS	< 500	140	100	120	0.200	0.300	0.200	0.300
		K2.2	Cast iron with spheroidal graphite, GJS	≤ 800							
		K2.3	Cast iron with spheroidal graphite, GJS	> 800							

HPR130 | HPR180

Cutting material: HC419 | Lead: MC1G

MMG*		Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
								HPR130		HPR180	
				Internal cooling	External cooling	MQL		z 4	z 6	z 4	z 6
								7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	120	100	120	0.150	0.200	0.150	0.200

HPR100 | HPR150

Cutting material: HC419 | Lead: MC1G

MMG*		Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
								HPR100		HPR150	
				Internal cooling	External cooling	MQL		z6	z8	z6	z8
								15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	120	100	120	0.150	0.200	0.150	0.200

* MAPAL machining groups

The specified cutting values are guide values.
The optimum data for the respective machining task should be determined during the test or machining.

Cutting data recommendations for HPR replaceable head reamers

Feed and cutting speed

HPR130 | HPR230 | HPR180 | HPR280

Cutting material: HP421 | Lead: MC1G

MMG*		Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
								HPR130 | HPR230		HPR180 | HPR280	
				Internal cooling	External cooling	MQL		z4	z6	z4	z6
								7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
	K2.1	Cast iron with spheroidal graphite, GJS	< 500	120	100	120		0.150	0.200	0.150	0.200
	K2	K2.2	Cast iron with spheroidal graphite, GJS	≤ 800							
		K2.3	Cast iron with spheroidal graphite, GJS	> 800							

HPR100 | HPR200 | HPR150 | HPR250

Cutting material: HP421 | Lead: MC1G

MMG*		Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
								HPR100 | HPR200		HPR150 | HPR250	
				Internal cooling	External cooling	MQL		z6	z8	z6	z8
								15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
	K2.1	Cast iron with spheroidal graphite, GJS	< 500	120	100	120		0.150	0.200	0.150	0.200
	K2	K2.2	Cast iron with spheroidal graphite, GJS	≤ 800							
		K2.3	Cast iron with spheroidal graphite, GJS	> 800							

HPR130 | HPR230 | HPR180 | HPR280

Cutting material: HP423 | Lead: MC1G

MMG*		Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
								HPR130 | HPR230		HPR180 | HPR280	
				Internal cooling	External cooling	MQL		z4	z6	z4	z6
								7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
	K2.1	Cast iron with spheroidal graphite, GJS	< 500								
	K2	K2.2	Cast iron with spheroidal graphite, GJS	≤ 800	120	100	120	0.150	0.200	0.150	0.200
K		K2.3	Cast iron with spheroidal graphite, GJS	> 800	120	100	120	0.150	0.200	0.150	0.200
	K3	K3.1	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500	90	70	90	0.150	0.200	0.150	0.200
		K3.2	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500	90	70	90	0.150	0.200	0.150	0.200

HPR100 | HPR200 | HPR150 | HPR250

Cutting material: HP423 | Lead: MC1G

MMG*		Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
								HPR100 | HPR200		HPR150 | HPR250	
				Internal cooling	External cooling	MQL		z6	z8	z6	z8
								15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
	K2.1	Cast iron with spheroidal graphite, GJS	< 500								
	K2	K2.2	Cast iron with spheroidal graphite, GJS	≤ 800	120	100	120	0.150	0.200	0.150	0.200
K		K2.3	Cast iron with spheroidal graphite, GJS	> 800	120	100	120	0.150	0.200	0.150	0.200
	K3	K3.1	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500	90	70	90	0.150	0.200	0.150	0.200
		K3.2	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500	90	70	90	0.150	0.200	0.150	0.200

* MAPAL machining groups

The specified cutting values are guide values.
The optimum data for the respective machining task should be determined during the test or machining.

Cutting data recommendations for HPR replaceable head reamers

Feed and cutting speed

HPR130 | HPR230 | HPR180 | HPR280

Cutting material: PU620 | Lead: MA0A

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
					Internal cooling	External cooling	MQL		HPR130 | HPR230		HPR180 | HPR280	
									z4	z6	z4	z6
									7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
N	N1	N1.1	Aluminium, non-alloy and alloy < 3 % Si		130	100	120		0.150	0.250	0.150	0.250
		N1.2	Aluminium, alloy ≤ 7 % Si		130	100	120		0.150	0.250	0.150	0.250
		N1.3	Aluminium, alloyed > 7 - 12 % Si		130	100	120		0.150	0.250	0.150	0.250
		N1.4	Aluminium, alloy > 12 % Si		130	100	120		0.150	0.250	0.150	0.250
	N2	N2.1	Copper, unalloyed and low-alloyed	< 300	130	100	120		0.150	0.250	0.150	0.250
		N2.2	Copper, alloy	> 300	130	100	120		0.150	0.250	0.150	0.250
		N2.3	Brass, bronze, gunmetal	< 1200	130	100	120		0.150	0.250	0.150	0.250

HPR100 | HPR200 | HPR150 | HPR250

Cutting material: PU620 | Lead: MA0A

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)				Feed f_z (mm/z) with tool diameter			
					Internal cooling	External cooling	MQL		HPR100 | HPR200		HPR150 | HPR250	
									z6	z8	z6	z8
									15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
N	N1	N1.1	Aluminium, non-alloy and alloy < 3 % Si		130	100	120		0.150	0.250	0.150	0.250
		N1.2	Aluminium, alloy ≤ 7 % Si		130	100	120		0.150	0.250	0.150	0.250
		N1.3	Aluminium, alloy > 7-12 % Si		130	100	120		0.150	0.250	0.150	0.250
		N1.4	Aluminium, alloy > 12 % Si		130	100	120		0.150	0.250	0.150	0.250
	N2	N2.1	Copper, unalloyed and low-alloyed	< 300	130	100	120		0.150	0.250	0.150	0.250
		N2.2	Copper, alloy	> 300	130	100	120		0.150	0.250	0.150	0.250
		N2.3	Brass, bronze, gunmetal	< 1200	130	100	120		0.150	0.250	0.150	0.250

* MAPAL machining groups

The specified cutting values are guide values.
The optimum data for the respective machining task should be determined during the test or machining.

Cutting data recommendations for HPR replaceable head reamers

Feed and cutting speed

HPR180 | HPR280

Cutting material: HP625 | Lead: MO2G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)			Feed f_z (mm/z) with tool diameter	
					Internal cooling	External cooling	MQL	z 4 7.000-14.590	z 6 14.600-21.290
S	S1	S1.1	Titanium, titanium alloys	< 400	35	20	25	0.060	0.080
	S2	S2.1	Titanium, titanium alloys	< 1200	35	20	25	0.060	0.080
		S2.2	Titanium, titanium alloys	> 1200	35	20	25	0.060	0.080
	S3	S3.1	Nickel, unalloyed and alloyed	< 900	30	15	25	0.060	0.080
		S3.2	Nickel, unalloyed and alloyed	> 900	30	15	25	0.060	0.080
	S4	S4.1	High-temperature super alloy Ni, Co and Fe-based		25	15	20	0.060	0.080
	S5	S5.1	Tungsten and molybdenum alloys		25	15	20	0.060	0.080

HPR131 | HPR231

Cutting material: HP625 | Lead: MF1G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)			Feed f_z (mm/z) with tool diameter	
					Internal cooling	External cooling	MQL	z 4 7.000-9.590	z 6 9.600-18.590
S	S1	S1.1	Titanium, titanium alloys	< 400	35	20	25	0.060	0.100
	S2	S2.1	Titanium, titanium alloys	< 1200	35	20	25	0.060	0.100
		S2.2	Titanium, titanium alloys	> 1200	35	20	25	0.060	0.100
	S3	S3.1	Nickel, unalloyed and alloyed	< 900	30	15	25	0.060	0.100
		S3.2	Nickel, unalloyed and alloyed	> 900	30	15	25	0.060	0.100
	S4	S4.1	High-temperature super alloy Ni, Co and Fe-based		25	15	20	0.060	0.100
	S5	S5.1	Tungsten and molybdenum alloys		25	15	20	0.060	0.100

* MAPAL machining groups

HPR110 | HPR210

Cutting material: HP625 | Lead: MF1G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)			Feed f_z (mm/z) with tool diameter	
					Internal cooling	External cooling	MQL	z 6 15.600-29.990	z 8 30.000-65.000
S	S1	S1.1	Titanium, titanium alloys	< 400	35	20	25	0.100	0.100
	S2	S2.1	Titanium, titanium alloys	< 1200	35	20	25	0.100	0.100
		S2.2	Titanium, titanium alloys	> 1200	35	20	25	0.100	0.100
	S3	S3.1	Nickel, unalloyed and alloyed	< 900	30	15	25	0.100	0.100
		S3.2	Nickel, unalloyed and alloyed	> 900	30	15	25	0.100	0.100
	S4	S4.1	High-temperature super alloy Ni, Co and Fe-based		25	15	20	0.100	0.100
	S5	S5.1	Tungsten and molybdenum alloys		25	15	20	0.100	0.100

HPR150 | HPR250

Cutting material: HP625 | Lead: MO2G

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]	Cutting speed v_c (m/min)			Feed f_z (mm/z) with tool diameter	
					Internal cooling	External cooling	MQL	z 6 16.600-36.990	z 8 37.000-65.000
S	S1	S1.1	Titanium, titanium alloys	< 400	35	20	25	0.080	0.080
	S2	S2.1	Titanium, titanium alloys	< 1200	35	20	25	0.080	0.080
		S2.2	Titanium, titanium alloys	> 1200	35	20	25	0.080	0.080
	S3	S3.1	Nickel, unalloyed and alloyed	< 900	30	15	25	0.080	0.080
		S3.2	Nickel, unalloyed and alloyed	> 900	30	15	25	0.080	0.080
	S4	S4.1	High-temperature super alloy Ni, Co and Fe-based		25	15	20	0.080	0.080
	S5	S5.1	Tungsten and molybdenum alloys		25	15	20	0.080	0.080

The specified cutting values are guide values.
The optimum data for the respective machining task should be determined during the test or machining.

Stock removals during reaming

MMG*			Workpiece material	Strength/hardness [N/mm²] [HRC]		Stock removal a_p (mm) during reaming				
						< Ø5mm	Ø5-8mm	Ø8-12mm	Ø12-18mm	> Ø18mm
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700		0.100	0.100	0.150	0.150	0.150
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200		0.100	0.100	0.100	0.150	0.150
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloy	< 900		0.100	0.100	0.150	0.150	0.150
		P2.2	Nitrided, case hardened and heat-treated steels, alloy	< 1400		0.100	0.100	0.100	0.150	0.150
	P3	P3.1	Tool, bearing, spring and high-speed steels**	< 800		0.100	0.100	0.150	0.150	0.150
		P3.2	Tool, bearing, spring and high-speed steels**	< 1000		0.100	0.100	0.150	0.150	0.150
		P3.3	Tool, bearing, spring and high-speed steels**	< 1500		0.100	0.100	0.100	0.150	0.150
	P4	P4.1	Stainless steels, ferritic and martensitic			0.100	0.100	0.100	0.100	0.100
	P5	P5.1	Cast steel			0.100	0.100	0.100	0.150	0.150
	P6	P6.1	Stainless cast steel, ferritic and martensitic			0.100	0.100	0.100	0.100	0.100
M	M1	M1.1	Stainless steels, austenitic	< 700		0.100	0.100	0.100	0.100	0.100
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000		0.100	0.100	0.100	0.100	0.100
	M2	M2.1	Stainless/heat-resistant cast steel, austenitic	< 700		0.100	0.100	0.100	0.100	0.100
	M3	M3.1	Stainless cast steel, ferritic/austenitic (duplex)	< 1000		0.100	0.100	0.100	0.100	0.100
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300		0.150	0.150	0.150	0.150	0.150
	K2	K2.1	Cast iron with spheroidal graphite, GJS	< 500		0.150	0.150	0.150	0.150	0.150
		K2.2	Cast iron with spheroidal graphite, GJS	≤ 800		0.150	0.150	0.150	0.150	0.150
		K2.3	Cast iron with spheroidal graphite, GJS	> 800		0.100	0.150	0.150	0.150	0.150
	K3	K3.1	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500		0.150	0.150	0.150	0.150	0.150
		K3.2	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500		0.100	0.150	0.150	0.150	0.150
N	N1	N1.1	Aluminium, non-alloy and alloy < 3 % Si			0.150	0.150	0.150	0.150	0.150
		N1.2	Aluminium, alloy ≤ 7 % Si			0.150	0.150	0.150	0.150	0.150
		N1.3	Aluminium, alloy > 7-12 % Si			0.150	0.150	0.150	0.150	0.150
		N1.4	Aluminium, alloy > 12 % Si			0.150	0.150	0.150	0.150	0.150
	N2	N2.1	Copper, unalloyed and low-alloyed	< 300		0.150	0.150	0.150	0.150	0.150
		N2.2	Copper, alloy	> 300		0.150	0.150	0.150	0.150	0.150
		N2.3	Brass, bronze, gunmetal	< 1200		0.150	0.150	0.150	0.150	0.150
	N4	N4.1	Plastic, thermoplastics			0.200	0.200	0.200	0.200	0.200
		N4.2	Plastic, thermosets			0.200	0.200	0.200	0.200	0.200
		N4.3	Plastic, foams			0.200	0.200	0.200	0.200	0.200
C	C1	C1.1	Plastic matrix, aramide fibre-reinforced (AFRP)			0.200	0.200	0.200	0.200	0.200
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP			0.200	0.200	0.200	0.200	0.200
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP			0.200	0.200	0.200	0.200	0.200
	C2	C2.1	Carbon matrix, carbon fibre-reinforced (CFC)			0.200	0.200	0.200	0.200	0.200
S	S1	S1.1	Titanium, titanium alloys	< 400		0.100	0.100	0.100	0.100	0.100
	S2	S2.1	Titanium, titanium alloys	< 1200		0.100	0.100	0.100	0.100	0.100
		S2.2	Titanium, titanium alloys	> 1200		0.100	0.100	0.100	0.100	0.100
	S3	S3.1	Nickel, unalloyed and alloyed	< 900		0.100	0.100	0.100	0.100	0.100
		S3.2	Nickel, unalloyed and alloyed	> 900		0.100	0.100	0.100	0.100	0.100
	S4	S4.1	High-temperature super alloy Ni, Co and Fe-based			0.100	0.100	0.100	0.100	0.100
	S5	S5.1	Tungsten and molybdenum alloys			0.100	0.100	0.100	0.100	0.100
H	H1	H1.1	Hardened steel / cast steel	< 44		0.075	0.075	0.075	0.075	0.075
		H1.2	Hardened steel / cast steel	< 55		0.050	0.050	0.075	0.075	0.075
	H2	H2.1	Hardened steel / cast steel	< 60		0.050	0.050	0.075	0.075	0.075
		H2.2	Hardened steel / cast steel	< 65		0.050	0.050	0.075	0.075	0.075
		H2.3	Hardened steel / cast steel	< 68		0.050	0.050	0.075	0.075	0.075
	H3	H3.1	Wear-resistant cast/chill casting, GJN			0.100	0.050	0.075	0.075	0.075

* MAPAL machining groups
** If the alloy parts Cr, Mo, Ni, V, W in total > 8% then select the next highest MAPAL machining group.

The specified cutting values are guide values.
The optimum data for the respective machining task should be determined during the test or machining.