

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/mm ²] [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 - 21.290
P	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
	P5.1	Cast steel		35	35	35	0.070	0.070

HPR150 | HPR250

Cutting material: CU134 | Lead: ML2G

MMG*		Workpiece material	Strength/hardness [N/mm ²] [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
P	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
	P2.1	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
	P3.1	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/mm ²] [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
P	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
	P2.1	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
	P3.1	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/mm ²] [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 30.00 - 65.00
P	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
	P5.1	Cast steel		35	35	35	0.070	0.070

HPR110 | HPR210

Cutting material: CU134 | Lead: ME1G

MMG*		Workpiece material	Strength/hardness [N/mm ²] [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
P	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
	P2.1	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
	P3.1	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/mm ²] [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
P	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
	P2.1	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
	P3.1	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 | M02G

MMG*			Workpiece material	Strength/hardness [N/mm ²] [HRC]	Cutting speed v _c (m/min)			
					Internal cooling	External cooling	MQL	
P	P4	P4.1	Stainless steels, ferritic and martensitic		35	35	35	
	P6	P6.1	Stainless cast steel, ferritic and martensitic		35	35	35	
M	M1	M1.1	Stainless steels, austenitic	< 700	35	35	35	
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000	35	35	35	
	M2	M2.1	Stainless/heat-resistant cast steel, austenitic	< 700	35	35	35	
	M3	M3.1	Stainless cast steel, ferritic/austenitic (duplex)	< 1000	35	35	35	

HPR110 | HPR210 | HPR150 | HPR250

Cutting material: HP421 | Lead: MF1G | M02G

MMG*			Workpiece material	Strength/hardness [N/mm ²] [HRC]	Cutting speed v _c (m/min)			
					Internal cooling	External cooling	MQL	
P	P4	P4.1	Stainless steels, ferritic and martensitic		35	35	35	
	P6	P6.1	Stainless cast steel, ferritic and martensitic		35	35	35	
M	M1	M1.1	Stainless steels, austenitic	< 700	35	35	35	
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000	35	35	35	
	M2	M2.1	Stainless/heat-resistant cast steel, austenitic	< 700	35	35	35	
	M3	M3.1	Stainless cast steel, ferritic/austenitic (duplex)	< 1000	35	35	35	

	Feed f_z (mm/z) with tool diameter			
	HPR131 HPR231		HPR180 HPR280	
	z4	z6	z4	z6
	7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
	0.070	0.070	0.070	0.070
	0.070	0.070	0.070	0.070
	0.070	0.070	0.070	0.070
	0.070	0.070	0.070	0.070
	0.070	0.070	0.070	0.070

	Feed f_z (mm/z) with tool diameter			
	HPR110 HPR210		HPR150 HPR250	
	z6	z8	z6	z8
	15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
	0.070	0.070	0.070	0.070
	0.070	0.070	0.070	0.070
	0.070	0.070	0.070	0.070
	0.070	0.070	0.070	0.070
	0.070	0.070	0.070	0.070

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)			
					Internal cooling	External cooling	MQL	
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	140	100	120	
		K2.1	Cast iron with spheroidal graphite, GJS	< 500	140	100	120	
	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: CP134 | Lead: MC1G

MMG*			Workpiece material	Strength/hardness [N/mm ²] [HRC]	Cutting speed v _c (m/min)			
					Internal cooling	External cooling	MQL	
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	140	100	120	
		K2.1	Cast iron with spheroidal graphite, GJS	< 500	140	100	120	
	K2	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/mm ²] [HRC]	Cutting speed v _c (m/min)			
					Internal cooling	External cooling	MQL	
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	120	100	120	

HPR100 | HPR150

Cutting material: HC419 | Lead: MC1G

MMG*			Workpiece material	Strength/hardness [N/mm ²] [HRC]	Cutting speed v _c (m/min)			
					Internal cooling	External cooling	MQL	
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	120	100	120	

	Feed f_z (mm/z) with tool diameter			
	HPR130 HPR230		HPR180 HPR280	
	z4	z6	z4	z6
	7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
	0.150	0.200	0.150	0.200
	0.150	0.200	0.150	0.200

	Feed f_z (mm/z) with tool diameter			
	HPR100 HPR200		HPR150 HPR250	
	z6	z8	z6	z8
	15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
	0.200	0.300	0.200	0.300
	0.200	0.300	0.200	0.300

	Feed f_z (mm/z) with tool diameter			
	HPR130		HPR180	
	z 4	z 6	z 4	z 6
	7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
	0.150	0.200	0.150	0.200

	Feed f_z (mm/z) with tool diameter			
	HPR100		HPR150	
	z6	z8	z6	z8
	15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
	0.150	0.200	0.150	0.200

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/mm ²] [HRC]	Cutting speed v _c (m/min)			
				Internal cooling	External cooling	MQL	
	K2	K2.1 Cast iron with spheroidal graphite, GJS	< 500	120	100	120	
		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/mm ²] [HRC]	Cutting speed v _c (m/min)			
				Internal cooling	External cooling	MQL	
	K2	K2.1 Cast iron with spheroidal graphite, GJS	< 500	120	100	120	
		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/mm ²] [HRC]	Cutting speed v _c (m/min)			
				Internal cooling	External cooling	MQL	
	K2	K2.1 Cast iron with spheroidal graphite, GJS	< 500				
		K2.2 Cast iron with spheroidal graphite, GJS	≤ 800	120	100	120	
		K2.3 Cast iron with spheroidal graphite, GJS	> 800	120	100	120	
	K3	K3.1 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500	90	70	90	
		K3.2 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500	90	70	90	

HPR100 | HPR200 | HPR150 | HPR250

Cutting material: HP423 | Lead: MC1G

MMG*		Workpiece material	Strength/hardness [N/mm ²] [HRC]	Cutting speed v _c (m/min)			
				Internal cooling	External cooling	MQL	
	K2	K2.1 Cast iron with spheroidal graphite, GJS	< 500				
		K2.2 Cast iron with spheroidal graphite, GJS	≤ 800	120	100	120	
		K2.3 Cast iron with spheroidal graphite, GJS	> 800	120	100	120	
	K3	K3.1 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500	90	70	90	
		K3.2 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500	90	70	90	

	Feed f_z (mm/z) with tool diameter			
	HPR130 HPR230		HPR180 HPR280	
	z4	z6	z4	z6
	7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
	0.150	0.200	0.150	0.200

	Feed f_z (mm/z) with tool diameter			
	HPR100 HPR200		HPR150 HPR250	
	z6	z8	z6	z8
	15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
	0.150	0.200	0.150	0.200

	Feed f_z (mm/z) with tool diameter			
	HPR130 HPR230		HPR180 HPR280	
	z4	z6	z4	z6
	7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
	0.150	0.200	0.150	0.200
	0.150	0.200	0.150	0.200
	0.150	0.200	0.150	0.200
	0.150	0.200	0.150	0.200

	Feed f_z (mm/z) with tool diameter			
	HPR100 HPR200		HPR150 HPR250	
	z6	z8	z6	z8
	15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
	0.150	0.200	0.150	0.200
	0.150	0.200	0.150	0.200
	0.150	0.200	0.150	0.200
	0.150	0.200	0.150	0.200

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/mm ²] [HRC]	Cutting speed v _c (m/min)			
					Internal cooling	External cooling	MQL	
N	N1	N1.1	Aluminium, non-alloy and alloy < 3 % Si		130	100	120	
		N1.2	Aluminium, alloy ≤ 7 % Si		130	100	120	
		N1.3	Aluminium, alloyed > 7 - 12 % Si		130	100	120	
		N1.4	Aluminium, alloy > 12 % Si		130	100	120	
	N2	N2.1	Copper, unalloyed and low-alloyed	< 300	130	100	120	
		N2.2	Copper, alloy	> 300	130	100	120	
		N2.3	Brass, bronze, gunmetal	< 1200	130	100	120	

HPR100 | HPR200 | HPR150 | HPR250

Cutting material: PU620 | Lead: MA0A

MMG*			Workpiece material	Strength/hardness [N/mm ²] [HRC]	Cutting speed v _c (m/min)			
					Internal cooling	External cooling	MQL	
N	N1	N1.1	Aluminium, non-alloy and alloy < 3 % Si		130	100	120	
		N1.2	Aluminium, alloy ≤ 7 % Si		130	100	120	
		N1.3	Aluminium, alloy > 7-12 % Si		130	100	120	
		N1.4	Aluminium, alloy > 12 % Si		130	100	120	
	N2	N2.1	Copper, unalloyed and low-alloyed	< 300	130	100	120	
		N2.2	Copper, alloy	> 300	130	100	120	
		N2.3	Brass, bronze, gunmetal	< 1200	130	100	120	

	Feed f_z (mm/z) with tool diameter			
	HPR130 HPR230		HPR180 HPR280	
	z4	z6	z4	z6
	7.000-9.590	9.600-18.590	7.000-14.590	14.600-21.290
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250

	Feed f_z (mm/z) with tool diameter			
	HPR100 HPR200		HPR150 HPR250	
	z6	z8	z6	z8
	15.600-29.990	30.000-65.000	16.600-36.990	37.000-65.000
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250
	0.150	0.250	0.150	0.250

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: M02G

MMG*			Workpiece material	Strength/hardness [N/mm ²] [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
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/mm ²] [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
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

HPR110 | HPR210

Cutting material: HP625 | Lead: MF1G

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

* MAPAL machining groups

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

	Stock removal a_p (mm) during reaming				
	< Ø5mm	Ø5-8mm	Ø8-12mm	Ø12-18mm	> Ø18mm
	0.100	0.100	0.150	0.150	0.150
	0.100	0.100	0.100	0.150	0.150
	0.100	0.100	0.150	0.150	0.150
	0.100	0.100	0.100	0.150	0.150
	0.100	0.100	0.150	0.150	0.150
	0.100	0.100	0.150	0.150	0.150
	0.100	0.100	0.100	0.150	0.150
	0.100	0.100	0.100	0.100	0.100
	0.100	0.100	0.100	0.150	0.150
	0.100	0.100	0.100	0.100	0.100
	0.100	0.100	0.100	0.100	0.100
	0.100	0.100	0.100	0.100	0.100
	0.100	0.100	0.100	0.100	0.100
	0.100	0.100	0.100	0.100	0.100
	0.150	0.150	0.150	0.150	0.150
	0.150	0.150	0.150	0.150	0.150
	0.150	0.150	0.150	0.150	0.150
	0.100	0.150	0.150	0.150	0.150
	0.150	0.150	0.150	0.150	0.150
	0.100	0.150	0.150	0.150	0.150
	0.150	0.150	0.150	0.150	0.150
	0.150	0.150	0.150	0.150	0.150
	0.150	0.150	0.150	0.150	0.150
	0.150	0.150	0.150	0.150	0.150
	0.150	0.150	0.150	0.150	0.150
	0.150	0.150	0.150	0.150	0.150
	0.150	0.150	0.150	0.150	0.150
	0.200	0.200	0.200	0.200	0.200
	0.200	0.200	0.200	0.200	0.200
	0.200	0.200	0.200	0.200	0.200
	0.200	0.200	0.200	0.200	0.200
	0.200	0.200	0.200	0.200	0.200
	0.200	0.200	0.200	0.200	0.200
	0.200	0.200	0.200	0.200	0.200
	0.100	0.100	0.100	0.100	0.100
	0.100	0.100	0.100	0.100	0.100
	0.100	0.100	0.100	0.100	0.100
	0.100	0.100	0.100	0.100	0.100
	0.100	0.100	0.100	0.100	0.100
	0.100	0.100	0.100	0.100	0.100
	0.100	0.100	0.100	0.100	0.100
	0.075	0.075	0.075	0.075	0.075
	0.050	0.050	0.075	0.075	0.075
	0.050	0.050	0.075	0.075	0.075
	0.050	0.050	0.075	0.075	0.075
	0.050	0.050	0.075	0.075	0.075
	0.100	0.050	0.075	0.075	0.075

The specified cutting values are guide values.

The optimum data for the respective machining task should be determined during the test or machining.