Material Groups

Recommended Machining Conditions

ISO	Material		Condition	Tensile Strength Rm [Kpsi]	Hardness HB	VC SFM	SUMOCHAM Feed Vs. Drill Diameter IPR									
							D= .157-.193	D=.197-.232	D=.236-.311	D=.315-.390	D=.394-.469	D=.472-.547	D=.551-.625	D=.630-.783	D=.787-1.020	D=1.024-1.295
P	non-alloy steel and cast steel, free cutting steel	<0.25% C	annealed	61	125	260-360-460	.0015 .0023 .0031	.0028 .0035 .0043	.0035 .0043 .0051	.005 .007 .009	.006 .008 .011	.007 .009 .012	.008 .011 .014	.010 .014 .018	.010 .014 .018	.012 .015 .020
		≥0.25% C	annealed	94	190	260-340-430										
		<0.55% C	quenched and tempered	123	250	260-330-390										
		≥0.55% C	annealed	109	220	230-300-360										
			quenched and tempered	145	300	160-230-300										
	low alloy and cast steel (less than 5% of alloying elements)		annealed	87	200	230-310-390	.0015 .0023 .0031	.0028 .0039 .0051	.0035 .0047 .0059	.005 .007 .010	.006 .008 .011	.006 .009 .013	.007 .010 .014	.009 .012 .016	.010 .014 .018	.012 .015 .020
			quenched and tempered	135	275	230-300-360										
				145	300	160-230-300										
				174	350	130-180-230										
	high alloyed steel, cast steel and tool steel		annealed	99	200	160-230-300	.0023 .0027 .0031	.0028 .0035 .0039	.0035 .0041 .0047	.005 .006 .008	.005 .007 .009	.006 .008 .010	.007 .009 .011	.008 .010 .012	.009 .011 .013	.010 .012 .014
			quenched and tempered	160	325	130-200-260										
	stainless steel and cast steel		ferritic / martensitic	99	200	130-180-230	.0019 .0023 .0027	.0024 .0028 .0031	.0031 .0035 .0039	.004 .005 .006	.005 .006 .007	.006 .007 .008	.006 .008 .009	.006 .008 .010	.007 .009 .012	.008 .011 .014
			martensitic	119	240	130-180-230										
M	stainless steel and cast steel		austenitic, duplex	87	180	100-160-230	.0019 .0023 .0027	.0024 .0028 .0031	.0031 .0035 .0039	.004 .005 .006	.005 .006 .007	.006 .007 .008	.006 .008 .009	.006 .008 .010	.007 .009 .012	.008 .011 .014
K	gray cast iron (GG)		ferritic / pearlitic		180	300-410-520	.0015 .0023 .0031	.0039 .0051 .0059	.0047 .0059 .0071	.006 .009 .012	.008 .011 .014	.010 .013 .016	.012 .015 .018	.014 .018 .022	.014 .015 .024	.016 .020 .024
			pearlitic / martensitic		260	260-360-460										
	nodular cast iron (GGG)		ferritic		160	300-440-590										
			pearlitic		250	260-360-460										
	malleable cast iron		ferritic		130	300-410-520										
			pearlitic		230	260-360-460										
N	aluminum-wrought alloys		not hardenable		60	300-510-720	.0019 .0047 .0074	.0039 .0067 .0098	.0059 .0086 .0118	.008 .011 .014	.010 .013 .016	.012 .015 .018	.014 .017 .020	.016 .020 .024	.018 .022 .028	.020 .026 .030
			hardenable		100											
	aluminum-cast alloys	≤12% Si	not hardenable		75											
			hardenable		90											
		>12% Si	high temperature		130	260-390-520										
	copper alloys	>1% Pb	free cutting		110	300-510-720										
			brass		90											
			electrolytic copper		100											
S	high temperature alloys	Fe based	annealed		200	100-150-200	.0011 .0015 .0019	.0015 .0019 .0023	.0019 .0023 .0027	.002 .003 .004	.003 .004 .005	.004 .005 .006	.005 .006 .007	.005 .006 .008	.006 .007 .009	.006 .008 .010
			hardened		280	70-110-160										
		Ni or Co based	annealed		250											
			hardened		350											
			cast		320											
	titanium alloys		pure	58		70-110-160	.001 .0015 .0019	.0015 .0019 .0023	.0020 .0024 .0028	.002 .004 .005	.003 .004 .006	.004 .006 .007	.005 .006 .008	.006 .007 .009	.006 .008 .010	.007 .009 .011
			alpha+beta alloys, hardened	152												
H	hardened steel		hardened		55 HRc	70-110-160			.0020 .0024 .0028	.002 .004 .005	.003 .004 .006	.004 .006 .007	.005 .006 .008	.006 .007 .009	.006 .008 .010	.007 .009 .011
			hardened		60 HRc											

■ Recommended cutting data
- When using external coolant supply only, reduce cutting speed by 10%.
- Use internal coolant supply when machining austenitic stainless steel.
- When using more than 5XD drill ratio, reduce cutting parameters by 10%.

As a starting value, the middle of the recommended machining range should be used.
Then, according to the wear results, conditions can be changed to optimize performance.
The data refers to IC948