

切削参数推荐

Recommended Cutting Parameters

ISO	材料	单位切削力	布氏硬度	切削速度Cutting speed Vc(m/min)				
	Material	Cutting force N/mm2	Hardness HB	涂层Coated grade				
				BP6305	BP6315	BP6325	BP6335	
P	非合金钢Carbon steel							
	C=0.1-0.25%	1500	125	220-550	200-480	180-380	150-350	
	C=0.25-0.55%	1600	150	200-500	180-450	150-400	130-300	
	C=0.55-0.80%	1700	170	180-480	160-430	130-350	110-300	
	低合金钢 (合金元素≤5%) Low carbon steel (alloy ≤5%)							
	非淬硬钢Not-hardened steel	1700	180	220-500	200-500	170-400	140-280	
	轴承钢Bearing steel	1800	210	200-400	150-280	140-240	100-220	
	调质Tempered steel	1850	275	150-300	130-260	120-230	800-200	
	调质Tempered steel	2050	350	130-260	120-230	110-200	60-160	
	高合金钢 (合金元素 > 5%) High carbon steel (alloy > 5%)							
	退火Annealed steel	1950	200	200-380	190-380	140-280	100-220	
	淬硬工具钢Hardened tool steel	3000	325	100-200	90-180	70-130	45-100	
	铸钢Casting steel							
	非合金Non-alloy	1550	180	150-300	130-260	110-200	90-180	
	低合金 (合金元素≤5%) Low alloy (alloy ≤5%)	1600	200	130-280	130-260	120-200	100-180	
	高合金 (合金元素 > 5%) High alloy (alloy > 5%)	2050	225	115-230	110-200	90-160	65-130	
	M	铁素体/马氏体/棒材/锻件Ferrite/Martensite/Bar/Forging						
		非淬硬Not-hardened	1800	200				
沉淀硬化Precipitation hardening		2850	330					
淬硬钢Hardened		2350	330					
奥氏体 棒材/锻件 Austenitic bars/forgings								
奥氏体 Austenitic		1800	180					
沉淀硬化Precipitation hardening		2850	300					
超级奥氏体 Super austenitic		2250	200					
奥氏体-铁素体 (双相) 棒材/锻件 Austenitic-ferrite (duplex) bars/forgings								
不可焊接Unweldable≥0.05% C		2000	230					
可焊接Weldable < 0.05% C		2450	260					
铁素体/马氏体 铸件 Ferrite/Martensite Castings								
非淬硬Not-hardened		1700	200					
沉淀硬化Precipitation hardening		2450	330					
淬硬钢Hardened		2150	330					
奥氏体 铸件 Austenitic castings								
奥氏体Austenitic		1700	180					
沉淀硬化Precipitation hardening		2450	330					
超级奥氏体Super austenitic	2150	200						
奥氏体-铁素体 (双相) 铸件Austenitic-Ferrite (duplex)								
不可焊接Unweldable≥0.05% C	1800	230						
可焊接weldable < 0.05% C	2250	260						

切削速度Cutting speed Vc(m/min)							
涂层Coated grade							
BP2205	BP2215	BP2225	BP3215	BP4205	BP4215	BP5205	BP5215
		100-300	200-400				
		100-270	170-390				
		80-200	130-350				
		80-200	140-370				
		40-120	110-220				
		40-90	90-200				
		30-90	80-170				
		60-160	110-250				
		40-80	40-100				
		80-200	180-350				
		50-140	150-260				
		40-100	100-200				
	240-380	150-260	170-280				
	225-350	100-140	100-155				
	160-245	110-150	120-165				
	260-410	120-200	135-220				
	145-220	100-140	100-155				
	160-245	120-160	130-185				
	205-315	100-180	130-210				
	185-280	100-160	110-190				
	205-320	150-230	170-260				
	95-160	80-110	80-130				
	110-175	80-110	90-140				
	170-280	130-200	140-220				
	95-160	80-100	80-130				
	150-210	110-145	120-160				
	120-230	100-160	100-180				
	110-205	90-140	90-160				

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	Material	Cutting force	Hardness	涂层Coated grade			
		N/MM2	HB	BP6305	BP6315	BP6325	BP6335
K	可锻铸铁 Malleable iron						
	铁素体 (短切屑) Ferrite (short chip)	790	130	225-325	180-280		
	珠光体 (长切屑) Pearlite (long chips)	900	230	200-285	150-240		
	灰口铸铁 Grey cast iron						
	低抗拉强度 Low tensile strength	890	180	220-330	200-280		
	高抗拉强度 High tensile strength	970	220	200-285	180-240		
	球墨铸铁 SG nodular cast iron						
	铁素体 Ferrite	900	160	180-280	120-240		
	珠光体 Pearlite	1350	250	150-260	100-220		
	马氏体 Martensite	2100	380	125-205	100-180		
N	铝合金 Aluminum alloy						
	锻造或锻造+冷作, 非时效处理 Forging or forging+cold work, non aging treatment	400	60				
	锻造或锻造加时效处理 Forging or forging+aging treatment	650	100				
	铝合金 Aluminum alloy						
	铸造, 非时效 Casting, non Aging	600	75				
	铸造或铸造加时效处理 Casting or casting + aging	700	90				
	铝合金 Aluminum alloy						
	铸造, 13-15% 硅 Casting, 13-15% silicon	700	130				
	铸造, 16-22% 硅 Casting, 16-22% silicon	700	130				
	铜和铜合金 Copper and copper alloy						
易切合金, ≥1% 铅 Easy cutting alloy, lead ≥ 1%	550	110					
黄铜, 铅青铜, ≤1% 铅 Brass, lead tung, lead ≤ 1%	550	90					
青铜与无铅铜, 包括电解铜 Bronze and lead-free copper, including electrolytic copper	1350	100					
S	高温合金 铁基 High-temperature alloy steel based						
	退火或固溶处理 Annealing or solution treatment	2400	200	100-200			
	时效处理或固溶处理加时效处理 Aging treatment or solution treatment plus aging treatment	2500	280	80-185			
	镍基 Nickel based						
	退火或固溶处理 Annealing or solution treatment	2650	250				
	时效处理或固溶处理加时效处理 Aging treatment or solution treatment plus aging treatment	2900	350				
	铸造或铸造加时效处理 Casting or casting plus aging treatment	3000	320				
	钴基 Cobalt based						
	退火或固溶处理 Annealing or solution treatment	2700	200				
	固溶处理加时效处理 Solution treatment plus aging treatment	3000	300				
铸造或铸造加时效处理 Casting or casting plus aging treatment	3100	320					
钛合金 Titanium alloy 2) Rm=最终的拉伸强度测量 UTS(MPa)							
商业纯 Commercial pure (99.5% Ti)	1300	400					
α, 近α与α+β合金, 退火 α, close to α and α+β Alloy, Annealed	1400	950					
α+β合金时效处理, β合金, 退火或时效处理 Alloy aging treatment, β Alloy, annealed or aged treatment	1400	1050					

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涂层Coated grade							
BP2205	BP2215	BP2225	BP3215	BP4205	BP4215	BP5205	BP5215
			280-360				
			220-340				
			300-420				
			270-360				
			240-360				
			220-330				
			150-260				
100-1000		100-900				260-2500	230-2200
50-350		40-330				260-2500	230-2200
100-1000		100-900				260-2500	230-2200
100-600		100-500				260-2500	230-2200
40-400		40-350				50-550	50-480
30-300		30-240				35-350	30-350
30-260		30-220				65-600	60-550
20-150		15-120				65-600	60-550
15-100		11-90				35-350	30-300
		45-75		70-150	40-70	50-80	45-75
		35-55		60-120	30-50	40-65	35-60
		25-45		30-90	20-40	30-50	28-45
		15-35		25-75	10-30	20-40	16-38
		12-23		22-60	10-20	15-25	11-22
		25-45		30-90	20-40	30-50	25-40
		15-35		25-75	10-20	20-40	18-35
		12-22		20-60	10-20	15-25	13-22
					145-200	100-150	135-190
					55-85	40-60	50-80
							45-70
					50-80	35-60	45-75
							40-65