Machinability by Materials (Aluminium)

Alloy Group	Alloy Designation	CHEMICAL COMPOSITION LIMITS (WT%)												Typical tremper	Rm (Mpa)	Machinability Chip formation	Machinability	Typical Applications	v_c m/min min. - max.	f_z mm/Z max.
		Cu	Si	Fe	Mn	Mg	Zn	Cr	Ti	Pb	Bi	Al	Others							
Al	1050	0.05	0.25	0.4	0.5	0.05	0.05	-	-	-	-	99.50min	-	H14	105	D	A	Chemical equipment Sheet metal work Coiled tube	600 - 3000	0,2
	1100	0.05~0.20	Si+Fe1.0max		0.05	-	0.1	-	-	-	-	99.00min	-	H14	90	D	A			
Al-Cu	2011	50.~60.	0.4	0.7	-	-	0.3	-	-	0.2	0.6	remaining	-	T3	310	A	A	Screw machine products. Tuck frame. Aircraft structure. Jet engine impellers. Aircraft engine cylinder heads.	400 - 2500	0,25
	2014	3.9~5.0	0.5~1.2	0.7	0.4~1.2	0.2~0.8	0.25	0.1	0.15	-	-	remaining	-	T6	430	B	A			
	2017	3.5~4.5	0.2~0.8	0.7	0.4~1.0	0.4~0.8	0.25	0.1	0.15	-	-	remaining	-	T4	390	B	A			
	2024	3.8~4.9	0.5	0.5	0.3~0.9	1.2~1.8	0.25	0.1	0.15	-	-	remaining	-	T4	465	B	A			
	2218	3.5~4.5	0.9	1	0.2	1.2~1.8	0.25	0.1	-	-	-	remaining	Ni1.7~2.3	T72	331	B	B			
	2224	3.8~4.4	0.12	0.15	0.30~0.9	1.2~1.8	0.25	0.1	0.15	-	-	remaining	-			A	A			
Al-Mn	3003	0.05~0.20	0.6	0.7	1.0~1.5	-	0.1	-	-	-	-	remaining	-	H14	140	D	B	Cooking utensils. Chemical equipment.	200 - 2500	0,2
Al-Si	4032	0.5~1.3	11.0~13.5	1	-	0.8~1.3	0.25	0.1	-	-	-	remaining	Ni0.5~1.3	T6	379	B	D	Pistons.	200 - 1000	0,18
Al-Mg	5052	0.1	0.25	0.4	0.1	2.2~2.8	0.1	0.15~0.35	-	-	-	remaining	- H34	H14	260	C	A	Architectural. Cable Sheeting. Welded pressure vessels. Hydraulic tubes. Transportation equipment.	400 - 3000	0,25
	5056	0.1	0.3	0.4	0.05~0.20	4.5~5.6	0.1	0.05~0.20	-	-	-	remaining	- H32	H12	300	C	A			
	5083	0.1	0.4	0.4	0.4~1.0	4.0~4.9	0.25	0.05~0.25	0.15	-	-	remaining	-	H112	335	C	A			
	5086	0.1	0.4	0.5	0.20~0.7	3.5~4.5	0.25	0.05~0.25	0.15	-	-	remaining	- H116	H32	300	C	A			
Al-Mg-Si	6061	0.15~0.40	0.4~0.8	0.7	0.15	0.8~1.2	0.25	0.04~0.35	0.15	-	-	remaining	-	T6	300	C	B	Heavy duty structure. Furniture. Architectural. Heavy duty welded structure. Pipeline. Heat Sink.	400 - 2500	0,2
	6063	0.1	0.2~0.6	0.35	0.1	0.45~0.9	0.1	0.1	0.1	-	-	remaining	-	T5	200	C	B			
	6070	0.15~0.40	1.0~1.7	0.5	0.40~1.0	0.50~1.2	0.25	0.1	0.15	-	-	remaining	-	T6	379	C	C			
	6151	0.35	0.6~1.2	1	0.2	0.45~0.8	0.25	0.15~0.35	0.15	-	-	remaining	-	T6		C	C			
	6262	0.15~0.40	0.4~0.8	0.7	0.15	0.8~1.2	0.25	0.04~0.14	0.15	0.4	0.7	remaining	-	T9	400	B	B			
	6351	0.1	0.7~1.3	0.5	0.4~0.8	0.40~0.8	0.2	-	0.2	-	-	remaining	-	T6	310	D	C			
	6463	0.2	0.20~0.6	0.15	0.05	0.45~0.9	0.05	-	-	-	-	remaining	-	T6	241	C	B			
Al-Zn	7001	1.6~2.6	0.35	0.4	0.2	2.6~3.4	6.8~8.0	0.18~0.35	0.2	-	-	remaining	-	O		B	A	High strength structure. Aircraft structure. Bat.	400 - 3000	0,25
	7003	0.2	0.3	0.35	0.3	0.50~1.0	5.0~6.5	0.2	0.2	-	-	remaining	Zr0.05~0.25	T5	400	B	A			
	7050	2.0~2.6	0.12	0.15	0.1	1.9~2.6	5.7~6.7	0.04	0.06	-	-	remaining	Zr0.08~0.15	T73	530	B	A			
	7075	1.2~2.0	0.4	0.5	0.3	2.1~2.9	5.1~6.1	0.18~0.28	0.2	-	-	remaining	-	T6	570	B	A			
	7178	1.6~2.4	0.4	0.5	0.3	2.4~3.1	6.3~7.3	0.18~0.35	0.2	-	-	remaining	-	T6	600	B	A			
	7475	1.2~1.9	0.1	0.12	0.06	1.9~2.6	5.2~6.2	0.18~0.25	0.06	-	-	remaining	-	T61	565	B	A			

Machinability

- **A** EXCELLENT
- **B** GOOD-TO-EXCELLENT
- **C** GOOD
- **D** NOT GOOD

$V_C = \pi \times D \times n / 1000$ m/min = mm x RPM

D: Tool diameter, N: RPM, V_C: Cutting speed, $\pi = 3.1416$

Choose a cutting speed in the range of values, compatible with the cutter max rotation capacity (engraved on the body) and your spindle stability.