

SPEED-METALS

38356 Willoughby Parkway
Willoughby, Ohio 44094

Phone: 440.951.0712
Fax: 440.951.1080

www.speedmetals.com

Layout Guide for Machining Standard Aluminum Alloys with High Speed Tools

		SFPM = $\frac{3.14 \times \text{DIA.} \times \text{RPM}}{12}$		FEED = Rate of tool movement per revolution of stock							
ALUMINUM ALLOYS		2011-T3 Micro-Chip II 2111-T3 Micro Chip Lead Free 2011-T8 6262-T8/T9 KA62-T8/T9 6262-T651/T6511 KA62-T651/T6511		2014-T651 2017-T451 2024-T351		6061-T651/T6511 7075-T651					
MACHINING OPERATIONS		SURFACE FPM		FEED IN/REV		SURFACE FPM		FEED IN/REV			
		MULTI-SPINDLE	SINGLE SPINDLE			MULTI-SPINDLE	SINGLE SPINDLE				
TURNING Box Tools, Knee and Hollow Mills	DEPTH OF CUT-INCHES										
	1/8	600	600 to 1100 DEPENDING ON SHAPE: ROUND, HEX OR SQUARE	0.012		300	300	0.010	300	300	0.008
	1/4			0.010		to	to	0.008	to	to	0.006
3/8	0.008				550	550	0.006	550	550	0.006	
FORMING Circular, Flat or Dove Tail	WIDTH OF CUT-INCHES	MULTI-SPINDLE	SINGLE SPINDLE								
	1/8 - 1/4	700 to		0.0035		450		0.0030	300		0.002
	1/4 - 1/2	800	700	0.0030		to		0.0025	to		0.002
	1/2 - 3/4	500	to	0.0025		550		0.0015	450		0.001
	3/4 - 1	TO	1100	0.0020				0.0010			0.001
1 - 1-1/2	600		0.0015								
SHAVING	DEPTH OF CUT-INCHES										
	0.005	700 to 1100		0.003		450		0.0025	300		0.0015
	0.01		0.002		to		0.0010	to		0.0010	
0.015	0.001			550		0.0005	450		0.0005		
TWIST DRILLING Standard and Fast Spiral	DIAMETER INCHES	MULTI-SPINDLE	SINGLE SPINDLE			MULTI-SPINDLE	SINGLE SPINDLE				
	1/32	400	LESS THAN 1 INCH 600 1 to 1 1/2 550 Over 1 1/2 inches 450	0.002		350	LESS THAN 1 1/2 INCHES 500 OVER 1 1/2 INCHES 450	0.002	300		0.0015
	1/16			0.004				0.004			0.0030
	1/8			0.009				0.008			0.0050
	1/4			0.014				0.011			0.0070
	3/8			0.016				0.013			0.0090
	1/2			0.016				0.013			0.0100
	3/4			0.016				0.013			0.0100
	1			0.016				0.013			0.0100
	1 1/4			0.016				0.013			0.0100
	1 1/2			0.016				0.013			0.0100
	1 3/4			0.016				0.013			0.0100
2	0.016				0.013			0.0100			
HALF ROUND DRILLING	DIAMETER INCHES										
	3/32 - 3/8	600		.005 - .008		450		.004 - .007	250		.003 - .006
	3/8 - 3/4	600		.008 - .012		to		.008 - .010	to		.007 - .009
3/4 - 1 1/4	550		.012 - .020		550		.012 - .014	350		.010 - .012	
REAMING	DIAMETER INCHES										
	- 1/8	600		0.007 to		500		0.007 to	300		0.007 to
+ 1/8	450		0.010		to		0.010	to		0.010	
				0.010 to		450		0.010 to	250		0.010 to
				0.020				0.020			0.020
TAPER REAMING	ALL SIZES	300 to		0.002		300 to		0.002 to	300 to		0.002 to
		500		0.005		500		0.005	450		0.005
TAPPING	PITCH OF THREADS										
	3 - 8	50 - 75				50 - 75			50 - 75		
	9 - 15	90 - 125				90 - 125			90 - 125		
	16 - 24	125 - 150				125 - 150			125 - 150		
25 & up	150 - 200				150 - 200			150 - 200			

		SFPM = $\frac{3.14 \times \text{DIA.} \times \text{RPM}}{12}$		FEED = Rate of tool movement per revolution of stock					
ALUMINUM ALLOYS		2011-T3 Micro-Chip II 2111-T3 Micro Chip Lead Free 2011-T8		2014-T651 2017-T451 2024-T351		6061-T651/T6511 7075-T651			
		6262-T8/T9 KA62-T8/T9 6262-T651/T6511 KA62-T651/T6511							
MACHINING OPERATIONS		SURFACE FPM		FEED IN/REV		SURFACE FPM		FEED IN/REV	
THREADING	PITCH OF THREADS								
	3 - 8	200				150			
	9 - 15	250				200			
	15 - 20	325				250			
	21 & up	450				300		250	
CUTOFF	WIDTH OF CUT-INCHES								
	1/8	700		0.0035		450		0.0030	
	3/16	to		0.0040		to		0.0035	
	1/4	1100		0.0040		550		0.0040	
TURRET KNURLING 1/4 Inch Width Knurl Double All Feeds for Knurl Back Off	STOCK DIAMETER INCHES	MULTI-SPINDLE	SINGLE SPINDLE						
	1/4	700 to	700 to	0.0125		450		0.0125	
	3/8	1100		0.0145		to		0.0145	
	1/2	500 to	1100	0.0190		550		0.0190	
	3/4		700	0.0195				450	
	1			0.0205				0.0195	
1 1/4			0.0215				0.0205		
				0.0215				0.0215	
CROSS SLIDE KNURLING 1/4 Inch Width Knurl	STOCK DIAMETER INCHES	MULTI-SPINDLE	SINGLE SPINDLE						
	1/4	700 to	700 to	0.0025		450		0.0025	
	3/8	1100		0.0033		to		0.0033	
	1/2	500 to	1100	0.0045		550		0.0045	
	3/4		700	0.0060				450	
	1			0.0075				0.0060	
1 1/4			0.0095				0.0075		
				0.0095				0.0095	
COUNTER-BORING AND TREPANNING	WIDTH OF CUT-INCHES	MULTI-SPINDLE	SINGLE SPINDLE						
	3/8	700 to	700	0.0050		450		0.0040	
	1/2	1100		0.0075		to		0.0050	
	3/4	500	1100	0.0090		550		0.0060	
	1	to		0.0100				450	
1 1/4	700		0.0110				0.0075		
				0.0090				0.007	
THREAD ROLLING Cross Slide Tools 9 Pitch + Coarser 14 - 18 Pitch 18 Pitch + Finer	ALL SIZES			SPINDLE REV			SPINDLE REV		
		500*		20 - 29		500*		20 - 29	
		to		13 - 24		to		13 - 24	
		600		12 - 22		600		12 - 22	
				10 - 18				10 - 18	

*Speed of rolls is determining factor, Refer to thread roll vendor.

Comparative Characteristics

ALLOY/TEMPER	CORR. RESIST		MACHINABILITY	ANODIZE RESPONSE
	GEN.	STRESS		
2011-T3	D	D	A	C
2111-T3	D	D	A	C
6061-T6	B	A	C	A
6262-T8	B	A	B+	A
KA62-T8	B	A	B+	A
2024-T351	D	C	B	C
7075-T6	C	C	B+	B

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