

2.810 Max Milling Rate Video

Machine: Cinn. Mil. 7VC

Tool: 5/16 in 2 flute, high speed steel end mill

Aluminum trials: 6061 – T6, $d = 0.2$ in, $\Omega = 4000$ rpm

1. $v = 30$ in/min, no coolant
MRR = 1.9 in³/min (0.5 cm³/sec) Result: small chips
2. no coolant
MRR = 2.8 in³/min (0.8 cm³/sec) Result: small chips
3. no coolant
MRR = 3.8 in³/min (1.0 cm³/sec) Result: melting/welding of chips,
bad surface finish
4. with coolant (water soluble oil)
MRR = 1.9 in³/min (0.5 cm³/sec) Result: small chips
5. with coolant
MRR = 2.8 in³/min (0.8 cm³/sec) Result: small chips
6. with coolant
MRR = 3.8 in³/min (1.0 cm³/sec) Result: melting/welding, not as
severe

Steel trials: Mild Steel (1018)

Tool: 5/16 in, 2 flute, high speed steel end mill

$d = 0.2$ in, $\Omega = 857$ RPM, all with coolant

1. MRR = 0.4 in³/min (0.1 cm³/sec) Result: small chips
2. MRR = 0.6 in³/min (0.16 cm³/sec) Result: broken end mill
3. $d = 0.2$ in, $\Omega = 1714$
MRR = 0.4 in³/min (0.1 cm³/sec) Result: small chips
4. $d = 0.2$ in, $\Omega = 1714$
MRR = 0.6 in³/min (0.16 cm³/sec) Result: small chips rougher surface
but no break
5. $d = 0.2$ in, $\Omega = 1714$
MRR = 0.9 in³/min (0.35 cm³/sec) Result: broken end mill