

$$\text{RPM} = \frac{\text{Revolutions Per Minute}}{\text{(Spindle Speed)}}$$

$$\text{CS} = \frac{\text{Cutting Speed}}{\text{Surface Feet Per Minute}}$$

Quick Reference Guide

NHCTC
Machine Tool Technology

$$\text{RPM} = \frac{4 \times \text{CS}}{\text{Diameter}}$$

$$\text{CS} = \frac{\text{Diameter} \times \text{RPM}}{4}$$

Cutting Speeds using H S S toolbits

Cast Iron, Tool Steel, Stainless Steel	50 SFPM
Mild Steel	100 SFPM
Brass, Copper Alloys	150 SFPM
Aluminum	200 SFPM

Exceptions for RPM

- +1/4 Speed for Finish Cuts
- 1/2 Speed For Drilling, Reaming
- 3x Speed for Carbide
- 1/4 Speed For Threading, Grooving, Knurling

Feeds: (All Feeds Are Doubled When Using Carbide)

Drill Size	IPR (in/rev.)
Up to 1/8"	.001-.002
1/8 - 1/4"	.002-.004
1/4 - 1/2"	.004-.007
**1/2 - 1"	.007-.015
**OVER 1"	.015-.025

	IPR
Rough Cut	.015 IPR
Medium Cut	.007
Fine Cut	.003

	IPM (in/min)
Rough Cut	4 IPM
Medium Cut	2
Fine Cut	1

IPM=RPM(P)
P= pitch 1/N ; N=threads per inch

IPM=(# of teeth)(rpm)(chip load)
IPM=(IPR)(RPM)

$$\text{IPR} = \frac{\text{IPM}}{\text{RPM}}$$

**subtract .001"ipr per 1/16th dia. over 1/2"

Chip Load

Cutter Dia.	Aluminum	Brass	Bronze	Cast Iron	Low Carb Steel	High Carb Steel	Med. Alloy Steel	Stainless Steel
1/8	.002	.001	.0005	.0005	.0005	.0005	.0005	.0005
1/4	.002	.002	.001	.001	.001	.001	.0005	.001
3/8	.003	.003	.002	.002	.002	.002	.001	.002
1/2	.005	.003	.003	.0025	.003	.002	.001	.002
3/4	.006	.004	.003	.003	.004	.003	.002	.003
1	.007	.005	.004	.0035	.005	.003	.003	.004
1-1/2	.008	.005	.005	.004	.006	.004	.003	.004
2	.009	.006	.005	.005	.007	.004	.003	.005

Twist Drill Sizing Systems

Fractional (in inches)	1/16 th to 3 1/4"	Metric	In millimeters
Number	#1 (.228) to #97 (.0059)	Mini series	.04mm to .09mm
Letter	A (.234) to Z (.413)	Straight	.05mm to 20mm

Clearance Holes

Up to 1/2"	-1/64 th "
1/2 to 1"	-1/32"
Over 1"	-1/16 th "
Hand Reaming	-.003 to .005"

Number Size Mach. Screws =	Outside Dia. = (No. Size)(.013) + .060
Tap Drill Size =	Outside Dia. - Pitch
NC Thread Single Depth =	(0.6495) Pitch
Thread Pitch Diameter =	Nominal O.D. - {(0.6495)Pitch}
Thread Pitch =	1 over threads per inch (tpi)
Compound Feed in	1.5P(indirect dial) or .75P(Direct dial)
Temp Effects on metal	$\Delta L = \Delta \text{Temp}(\text{Length})$ Coefficient of Exp.
Levers and Leverages	frce rec. = Dist. App.(Force App)/Dist rec
CNC 118 deg drill pt depth =	(.3)drill diameter = depth of point
Taper per Inch =	D - d (12) / taper length
Tailstock offset =	Taper per inch (O.A.L.) / 2