

TOOLS FOR

Wood & Plastic Applications



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Miniatures
Shell Inlays
and Inlay
Pockets

Saws
Fret Slots
Use K-Series
Saws

WRU, WRD Series
Roughing

WU1 Series
Pocketing

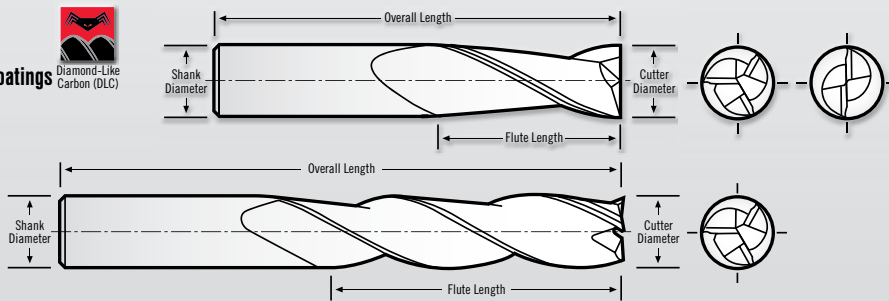
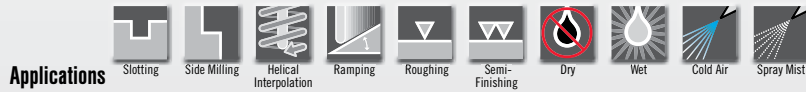
B Series
Ridge and Bridge Saddle
Bodies and Shaping
Neck and Carving

WD1 Series
Purfling and Binding

Wood & Plastic Tools

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W Precision Spiral Routers for CNC Production



WU/WD Tolerances

Cutting Dia. (1/16" to 1/4") = $\pm 0.000/-0.002$ "
 (9/32" to 3/4") = $\pm 0.000/-0.003$ "
 Shank Dia. = $-0.0001/-0.0002$ "
 Flute Length (1/16" to 5/16") = $\pm 0.030/-0.000$ "
 (3/8" to 3/4") = $\pm 0.060/-0.000$ "
 OAL = ± 0.060 "

WTL Tolerances

Cutting Dia. = $-0.000/+0.001$ "
 Shank Dia. = $-0.0001/-0.0002$ "
 Flute Length (1/16" to 5/16") = $\pm 0.030/-0.000$ "
 (3/8" to 3/4") = $\pm 0.060/-0.000$ "
 OAL = ± 0.060 "



WU1-201 2 Flute Stub Length Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
3/16"	3/16"	3/8"	2"	WU1-201-06
1/4"	1/4"	1/2"	2"	WU1-201-08
3/8"	3/8"	5/8"	2"	WU1-201-12
1/2"	1/2"	1-1/4"	3-1/4"	WU1-201-16
5/8"	5/8"	1-1/2"	3-1/2"	WU1-201-20
3/4"	3/4"	1-1/2"	4"	WU1-201-24



WD1-201 2 Flute Stub Length Downshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
3/16"	3/16"	3/8"	2"	WD1-201-06
1/4"	1/4"	1/2"	2"	WD1-201-08
3/8"	3/8"	5/8"	2"	WD1-201-12
1/2"	1/2"	1-1/4"	3-1/4"	WD1-201-16
5/8"	5/8"	1-1/2"	3-1/2"	WD1-201-20
3/4"	3/4"	1-1/2"	4"	WD1-201-24



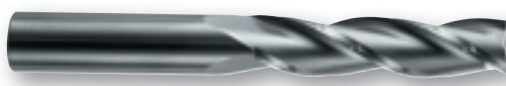
WU1-203 2 Flute Standard Length Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/8"	1/8"	1/2"	1-1/2"	WU1-203-04
3/16"	3/16"	5/8"	2"	WU1-203-06
1/4"	1/4"	3/4"	2-1/2"	WU1-203-08
3/8"	3/8"	1"	2-1/2"	WU1-203-12
1/2"	1/2"	1-1/2"	3-1/2"	WU1-203-16
16mm	16mm	55mm	118mm	WU1-203-16mm
5/8"	5/8"	2"	4-5/8"	WU1-203-20
3/4"	3/4"	2-3/16"	5-1/4"	WU1-203-24



WD1-203 2 Flute Standard Length Downshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/8"	1/8"	1/2"	1-1/2"	WD1-203-04
3/16"	3/16"	5/8"	2"	WD1-203-06
1/4"	1/4"	3/4"	2-1/2"	WD1-203-08
3/8"	3/8"	1"	2-1/2"	WD1-203-12
1/2"	1/2"	1-1/2"	3-1/2"	WD1-203-16
16mm	16mm	55mm	118mm	WD1-203-16mm
5/8"	5/8"	2"	4-5/8"	WD1-203-20
3/4"	3/4"	2-3/16"	5-1/4"	WD1-203-24

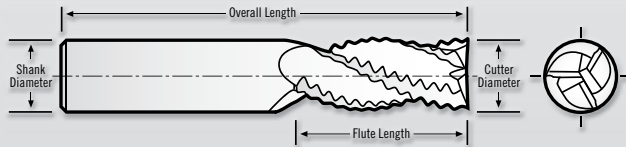
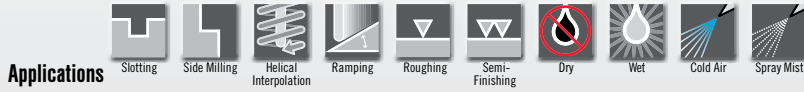


WTL-303 3 Flute Extra Long Length Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/8"	1/8"	1"	3"	WTL-303-04
3/16"	3/16"	1-1/8"	3"	WTL-303-06
1/4"	1/4"	1-1/4"	3-1/8"	WTL-303-08
5/16"	5/16"	1-3/8"	3-1/8"	WTL-303-10
3/8"	3/8"	1-1/2"	3-1/2"	WTL-303-12

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/2"	1/2"	2"	4"	WTL-303-16
5/8"	5/8"	2-1/2"	4-5/8"	WTL-303-20
3/4"	3/4"	3"	5-1/4"	WTL-303-24

Spiral Routers for Rough Cutting **WR**



WRU/WRD Tolerances

Cutting Dia. (1/16" to 1/4") = $+0.000/-0.002$ "
 (9/32" to 3/4") = $+0.000/-0.003$ "
 Shank Dia. = $-0.0001/-0.0002$ "
 Flute Length (1/16" to 5/16") = $+0.030/-0.000$ "
 (3/8" to 3/4") = $+0.060/-0.000$ "
 OAL = ± 0.060 "



WRU-301 3 Flute Stub Length Ruffer Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/2"	1/2"	1-1/2"	3-1/2"	WRU-301-16
5/8"	5/8"	2-3/16"	4-5/8"	WRU-301-20
3/4"	3/4"	2-3/16"	5-1/4"	WRU-301-24



WRD-301 3 Flute Stub Length Downshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/2"	1/2"	1-1/2"	3-1/2"	WRD-301-16
5/8"	5/8"	2-3/16"	4-5/8"	WRD-301-20
3/4"	3/4"	2-3/16"	5-1/4"	WRD-301-24



WRU-303 3 Flute Standard Length Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/2"	1/2"	2-3/16"	4"	WRU-303-16
16mm	16mm	55mm	118mm	WRU-303-16mm
5/8"	5/8"	2-1/2"	4-5/8"	WRU-303-20
3/4"	3/4"	2-1/2"	5-1/4"	WRU-303-24



WRD-303 3 Flute Standard Length Downshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/2"	1/2"	2-3/16"	4"	WRD-303-16
16mm	16mm	55mm	118mm	WRD-303-16mm
5/8"	5/8"	2-1/2"	4-5/8"	WRD-303-20
3/4"	3/4"	2-1/2"	5-1/4"	WRD-303-24

Another Popular Wood Tool

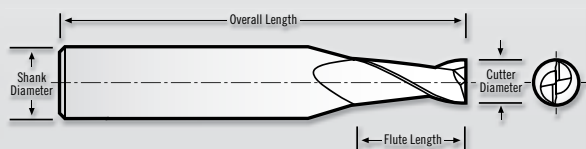
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B-333 3 Flute Tuffy Ball End Standard Length



C8 2 Flute Spiral Routers for Signmaking and Engraving



C8/CD8 Tolerances

Cutting Dia. (1/16" to 1/4") = $+0.000/-0.002$ "

(9/32" to 3/4") = $+0.000/-0.003$ "

Shank Dia. = $-0.0001/-0.0002$ "

Flute Length (1/16" to 5/16") = $+0.030/-0.000$ "

(3/8" to 3/4") = $+0.060/-0.000$ "

OAL = ± 0.060 "



C8-201 2 Flute Stub Length Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/8"	1/4"	1/4"	2"	C8-201-04
3/16"	1/4"	3/8"	2"	C8-201-06
1/4"	1/4"	1/2"	2"	C8-201-08

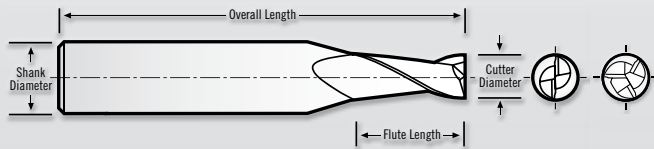


CD8-201 2 Flute Stub Length Downshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/8"	1/4"	1/4"	2"	CD8-201-04
3/16"	1/4"	3/8"	2"	CD8-201-06
1/4"	1/4"	1/2"	2"	CD8-201-08



2 & 3 Flute Spiral Routers for CNC Production **C8**



C8/CD8 Tolerances

Cutting Dia. (1/16" to 1/4") = $\pm .000/- .002$ "

(9/32" to 3/4") = $\pm .000/- .003$ "

Shank Dia. = $- .0001/- .0002$ "

Flute Length (1/16" to 5/16") = $\pm .030/- .000$ "

(3/8" to 3/4") = $\pm .060/- .000$ "

OAL = $\pm .060$ "



C8-203 2 Flute Regular Length Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/8"	1/4"	1/2"	2-1/2"	CD-203-04
3/16"	1/4"	5/8"	2-1/2"	CD-203-06
1/4"	1/4"	3/4"	2-1/2"	CD-203-08



C8-301 3 Flute Stub Length Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/8"	1/4"	1/4"	2"	C8-301-04
3/16"	1/4"	3/8"	2"	C8-301-06
1/4"	1/4"	1/2"	2"	C8-301-08



CD8-203 2 Flute Regular Length Downshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/8"	1/4"	1/2"	2-1/2"	CD8-203-04
3/16"	1/4"	5/8"	2-1/2"	CD8-203-06
1/4"	1/4"	3/4"	2-1/2"	CD8-203-08



C8-303 3 Flute Regular Length Upshear

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number Uncoated
1/8"	1/4"	1/2"	2-1/2"	C8-303-04
3/16"	1/4"	5/8"	2-1/2"	C8-303-06
1/4"	1/4"	3/4"	2-1/2"	C8-303-08

HB 2+2 Herringbone Routers

Characteristics



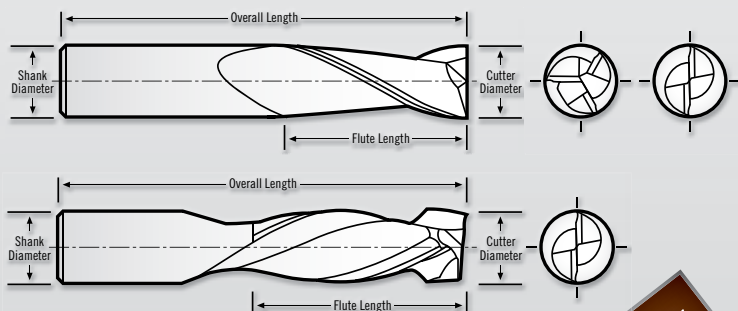
Applications



Materials

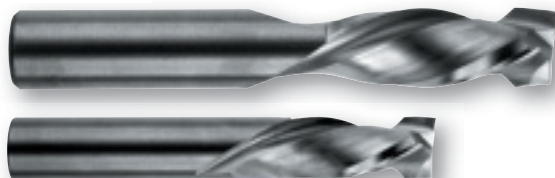


Coatings



HB Tolerances

Cutting Dia. (1/16" to 1/4") = $+0.000/-0.002$
 (9/32" to 3/4") = $+0.000/-0.003$
 Shank Dia. = $-0.0001/-0.0002$
 Flute Length (1/16" to 5/16") = $+0.030/-0.000$
 (3/8" to 3/4") = $+0.060/-0.000$
 OAL = ± 0.060 "



HB-401 2+2 Flute Herringbone Routers

Cutting Diameter	Shank Diameter	Flute Length	Upshear Length	Overall Length	Tool Number Uncoated
1/4"	1/4"	3/4"	3/16"	2-1/2"	HB-401-08
3/8"	3/8"	1"	1/4"	2-1/2"	HB-401-12
1/2"	1/2"	1-1/8"	1/4"	3"	HB-401-16
5/8"	5/8"	1-5/16"	5/16"	4"	HB-401-20
3/4"	3/4"	1-5/16"	3/8"	4"	HB-401-24



HB-402 2+2 Flute Herringbone Routers

Cutting Diameter	Shank Diameter	Flute Length	Upshear Length	Overall Length	Tool Number Uncoated
1/4"	1/4"	3/4"	1/2"	2-1/2"	HB-402-08
3/8"	3/8"	1"	5/8"	2-1/2"	HB-402-12
1/2"	1/2"	1-1/8"	9/16"	3"	HB-402-16
5/8"	5/8"	1-5/16"	3/4"	4"	HB-402-20
3/4"	3/4"	1-5/16"	3/4"	4"	HB-402-24

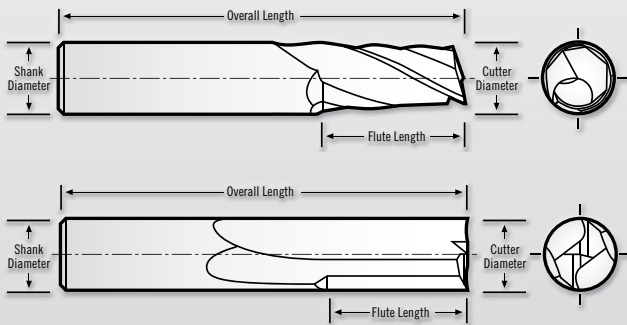
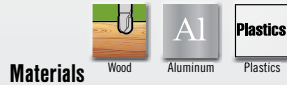
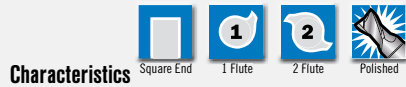


HB-404 2+2 Flute Extra Length Herringbone Routers

Cutting Diameter	Shank Diameter	Flute Length	Upshear Length	Overall Length	Tool Number Uncoated
1/2"	1/2"	1-5/16"	3/4"	3-1/2"	HB-404-16

Short Upshear Length for Thin Materials

Tuffy Grade Carbide Router Bits **PM/MPM/GTS**



PM/PMD Series Tolerances

Cutting Dia. = $+0.000/-0.002$ "
 Shank Dia. = $-0.0001/-0.0002$ "
 Flute Length = $+0.060/-0.000$ "
 OAL = ± 0.060 "

MPM Tolerances

Cutting Dia. = $+0.000/-0.075$ mm
 Shank Dia. = $-0.002/-0.005$ mm
 Flute Length = $+0.500/+1.500$ mm
 OAL = ± 1.000 mm

GTS Series Tolerances

Cutting Dia. = $+0.000/-0.002$ "
 Shank Dia. = $-0.0001/-0.0002$ "
 Flute Length = $+0.060/-0.000$ "
 OAL = ± 0.060 "



PM Up Shear 1 Flute Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/8"	1/2"	2"	PM-104-04
1/8"	1/4"	1/2"	2"	PM-108-04
3/16"	3/16"	5/8"	2"	PM-106-06
3/16"	1/4"	5/8"	2"	PM-108-06
3/16"	1/4"	1-1/4"	3"	PM-108-06L
1/4"	1/4"	3/4"	2"	PM-108-08
1/4"	1/4"	1-1/2"	3"	PM-108-08L
3/8"	3/8"	1-1/4"	3"	PM-112-12
1/2"	1/2"	1-1/2"	4"	PM-116-16



PMD Down Shear 1 Flute Tuffy Grade

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/4"	1/2"	2"	PMD-108-04
3/16"	1/4"	5/8"	2"	PMD-108-06
1/4"	1/4"	3/4"	2"	PMD-108-08



GTS 2 Flute Tuffy Grade Straight Flute

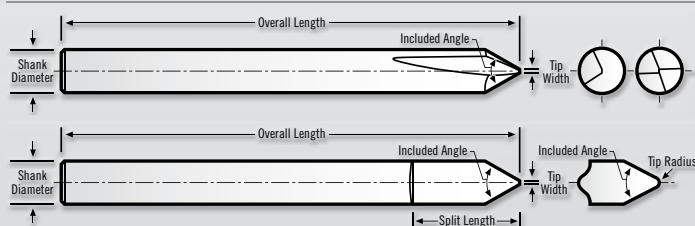
Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
1/8"	1/4"	1/2"	2"	GTS-201-04
1/4"	1/4"	3/4"	2-1/2"	GTS-201-08
3/8"	3/8"	7/8"	2-1/2"	GTS-201-12
1/2"	1/2"	1"	3"	GTS-201-16



MPM Up Shear 1 Flute Tuffy Grade **METRIC**

Cutting Diameter	Shank Diameter	Flute Length	Overall Length	Tool Number
4mm	3mm	12mm	50mm	MPM-104-04
6mm	4mm	12mm	50mm	MPM-106-04
6mm	6mm	14mm	50mm	MPM-106-05
6mm	6mm	14mm	57mm	MPM-106-06
8mm	8mm	22mm	63mm	MPM-108-08
10mm	10mm	25mm	72mm	MPM-110-10
12mm	12mm	25mm	83mm	MPM-112-12

ET Engraving Tools



ET1 Double Lip Engraving Tool for Tougher Materials

Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Tool Number
.010"	1/4"	30°	—	2"	ET1-01030
.015"	1/4"	30°	—	2"	ET1-01530
.020"	1/4"	30°	—	2"	ET1-02030
.030"	1/4"	30°	—	2"	ET1-03030
.040"	1/4"	30°	—	2"	ET1-04030
.050"	1/4"	30°	—	2"	ET1-05030
.060"	1/4"	30°	—	2"	ET1-06030
.010"	1/4"	45°	—	2"	ET1-01045
.015"	1/4"	45°	—	2"	ET1-01545
.020"	1/4"	45°	—	2"	ET1-02045
.030"	1/4"	45°	—	2"	ET1-03045
.040"	1/4"	45°	—	2"	ET1-04045
.050"	1/4"	45°	—	2"	ET1-05045
.060"	1/4"	45°	—	2"	ET1-06045

NOTE: Specially designed to maximize the tip strength of the tool by removing the minimum amount of material from the end.



ET3 Ball Tip Engraving Tool

Tip Radius	Shank Diameter	Included Angle	Split Length	Overall Length	Tool Number
.005"	1/4"	30°	.650"	2"	ET3-00530
.010"	1/4"	30°	.650"	2"	ET3-01030
.020"	1/4"	30°	.650"	2"	ET3-02030
.030"	1/4"	30°	.650"	2"	ET3-03030
.005"	1/4"	60°	.650"	2"	ET3-00560
.010"	1/4"	60°	.650"	2"	ET3-01060
.020"	1/4"	60°	.650"	2"	ET3-02060
.030"	1/4"	60°	.650"	2"	ET3-03060

NOTE: Ball shaped radius on the tip, excellent results for high speed engraving and 3D engraving applications



ET2 Plunge Tip Engraving Tool for Drill & Engrave

Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Tool Number
.010"	1/4"	60°	—	2"	ET2-01060
.020"	1/4"	60°	—	2"	ET2-02060
.010"	1/4"	90°	—	2"	ET2-01090
.020"	1/4"	90°	—	2"	ET2-02090

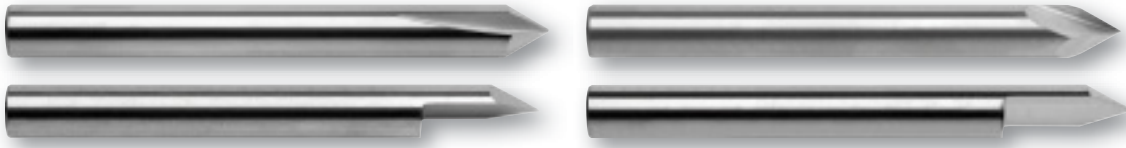
NOTE: Two flute tool serves as a multipurpose tool, which can be used for engraving, chamfering, spot-drilling and countersinking.



ET4 Standard Engraving Tool for Most Applications

Tip Width	Shank Diameter	Included Angle	Split Length	Overall Length	Tool Number
.010"	1/4"	60°	.650"	2"	ET4-01060
.020"	1/4"	60°	.650"	2"	ET4-02060
.030"	1/4"	60°	.650"	2"	ET4-03060
.050"	1/4"	60°	.650"	2"	ET4-05060
.060"	1/4"	60°	.650"	2"	ET4-06060
.010"	1/4"	90°	.650"	2"	ET4-01090
.020"	1/4"	90°	.650"	2"	ET4-02090
.030"	1/4"	90°	.650"	2"	ET4-03090
.050"	1/4"	90°	.650"	2"	ET4-05090
.060"	1/4"	90°	.650"	2"	ET4-06090

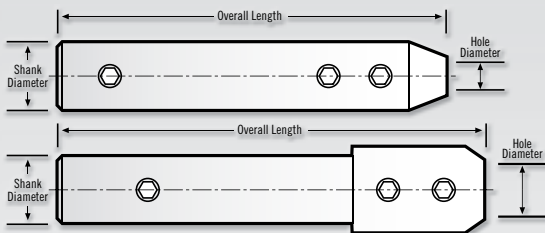
NOTE: Utilized in a wide variety of machines, including top loading engraving machines, CNC milling machines and industrial engraving marking systems.



ET SPEEDS & FEEDS

Material	5000 RPM	7500 RPM	10,000 RPM
	in/min	in/min	in/min
NON-FERROUS METALS			
Aluminum/Aluminum Alloys	10 ipm	15 ipm	20 ipm
Brass/Bronze	10 ipm	15 ipm	20 ipm
Copper/Copper Alloys	10 ipm	15 ipm	20 ipm
Magnesium	10 ipm	15 ipm	20 ipm
COMPOSITES			
G10 Fiberglass	15 ipm	22.5 ipm	30 ipm
Graphite	15 ipm	22.5 ipm	30 ipm
Carbon Fiber	15 ipm	22.5 ipm	30 ipm
Plastics	15 ipm	22.5 ipm	30 ipm
FERROUS METALS			
Cast Iron	5 ipm	7.5 ipm	10 ipm
Steel, Low Carbon	5 ipm	7.5 ipm	10 ipm
Steel, Medium Carbon	7.5 ipm	11.25 ipm	15 ipm
Steel, Hardened	2.5 ipm	3.75 ipm	5 ipm
Stainless Steel, Soft	5 ipm	7.5 ipm	10 ipm
Stainless Steel, Hard	2.5 ipm	3.75 ipm	5 ipm
Inconel	4 ipm	6 ipm	8 ipm
Titanium, Soft	5 ipm	7.5 ipm	10 ipm
Titanium, Hard	2.5 ipm	3.75 ipm	5 ipm

Accuhold End Mill Extension Holder **ACH/MAH**



ACH Tolerances

Hole Dia. = $+0.0015/-0.0000$ "
 Shank Dia. = $-0.0001/-0.0003$ "
 OAL = ± 0.060 "

MAH Tolerances

Hole Dia. = $+0.004/-0.000$ mm
 Shank Dia. = $+0.000/-0.007$ mm
 OAL = ± 1.5 mm



ACH Accuhold - End Mill Extension Holder

Hole Diameter	Shank Diameter	Overall Length	Tool Number
1/8"	3/8"	3-1/4"	ACH-04
3/16"	1/2"	3-1/2"	ACH-06
1/4"	5/8"	4-1/4"	ACH-08
3/8"	3/4"	4-1/2"	ACH-12
* 1/2"	3/4"	4-3/4"	ACH-16
* 1/2"	1"	4-3/4"	ACH-16L

* 1" Diameter x 1.5" Long Head



MAH Accuhold - Metric End Mill Extension Holder **METRIC**

Hole Diameter	Shank Diameter	Overall Length	Tool Number
3mm	10mm	82.5mm	MAH-03
4mm	12mm	110mm	MAH-04
5mm	12mm	110mm	MAH-05
6mm	16mm	125mm	MAH-06
8mm	20mm	135mm	MAH-08
10mm	20mm	135mm	MAH-10
* 12mm	25mm	150mm	MAH-12

Speeds & Feeds

WOOD SERIES SPEEDS & FEEDS

Material	RPM (1/4")	Feed Inches/Minute
Wood		
Hardwoods	18,000	180–250
Softwoods	18,000	180–250
MDF	18,000	150–250
Laminated Materials	18,000	150–250

General Guidelines

- Select the shortest flute length possible for the application. Shorter flute length router tools offer better stability and increased feed rates.
- Select the largest diameter tool for the job. Increasing diameter by 10% provides 25% more strength.
- Adjust RPM and feed rate to reduce vibration. Vibration will cause poor finish and chip tools. Too slow a feed rate can also cause vibration and poor tool life.
- Regular cleaning of tool holders and collets help ensure the tool's performance and life.
- Securing the part as rigidly as possible will improve finishes and tool life.

Material	RPM (1/4")	Feed Inches/Minute
Plastics, Others		
Solid Surface	15,300	70–130
Fiberglass	15,300	80–150
Phenolic	15,300	80–150
Aluminum (Soft)	18,000	90–120
Aluminum (Aircraft Grade)	18,000	180–230
Copper	9,200	45–60
Foam	18,000	150–300
Plastics (Soft)	18,000	180–250
Plastics (Hard)	18,000	150–200

Wood Tools in Other Sections

MINIATURES

(See Miniatures Applications)



89

SAWS

(See Saws Applications)



121

S1 / MS1 301

2, 3 and 4 Flute



36

A1 / MA1 201

(See Aluminum Applications)



18

C1 201/301

2 & 3 Flute on 1/4" Shank
(See Multiple Applications)



38

SB / B 201/203 MSB / MB 201/203

2 Flute Ball End
(See Multiple Applications)



110

PCD 203 Routers

2 Flute PCD Diamond
(See Composites)



71

PM / MPM / PMD Routers

Single Flute



145