

# **Accessories And Cutting Tools**



### Option #1: 3.25 HP Wood/Plastic Router

Amps: 15 (120VAC, 60Hz)  
Speed: 10000, 13000, 16000, 19000, 22000 rpm  
Motor Ø: 4.5"

Includes: 1/2", 1/4" and 3/8" collets, wrench set, mounting bracket

**Part #:** (for complete set): **H24P00-5182ST**



### Router Vac Shroud (For 3.25 HP Router)

**Part #:** **H24X30-SHROUD003**

### Option #2: 900 Watt, Variable Speed Spindle

Power: 900 W  
Speed: 8000 to 26000 rpm, variable

Includes: 6 mm 1/8" and 1/4" collets and a 3/16" adapter collet for attachment to machine surface

**Part #:** (for complete set): **H24K50M6990ST**



### Router Vac Shroud (For 900 W Variable Speed Spindle)

**Part #:** **H24X30-SHROUD001**

### Option #3: Engraving Head Set

Power: 900 W  
Speed: 8000 to 26000 rpm, variable

Includes: 1/4", 1/8", and 11/64" collets and drawbars, as well as .005", .010", and .020" engraving cutters

**Part #:** (for complete set): **H24Z50-ENGRAVER**



### Option #4: Air Router 402M

Power: .4 HP  
Speed: 65000 rpm

Includes: five foot supply of air hose with slide throttle, 1/8" collet, collet wrenches, mounting bracket and rear exhaust. Air actuated.

**Part #:** (for complete set): **H24T00-402MST**



### Option #5: Low Speed Milling Spindle

Power: 900W  
Speed: 800-2500RPM

Accepts industry standard ER16 collets.

Includes: mounting bracket, collet wrenches and 10 collets from 1/32" to 3/8". Fits on all DaVinci models except 8"x 8" model.

**Part #:** (for complete set): **H24S50M23110**

## Option #6: High Speed AC Routers

<u>Power (HP)</u>	<u>Speed (RPM)</u>	<u>Collet Sizes</u>
1.0	24000	1/8, 3/16, 1/4
3.0	21000	1/8, 3/16, 1/4, 5/16, 3/8, 1/2
5.0	21000	1/8, 3/16, 1/4, 5/16, 3/8, 1/2
7.5	21000	1/8, 3/16, 1/4, 5/16, 3/8, 1/2



These 4 models of high-speed AC routers all operate off 220VAC (they are available to run off 380-440VAC). The 7HP and 5HP models are only available for 3phase while the 1 and 3HP models will operate with either single or three phase 220VAC. Each router set comes with a mounting bracket, vacuum shroud, collet wrenches and the collets listed with the individual routers. These are heavy-duty routers designed for the most demanding wood, aluminum and plastic routing applications and have no brushes and sealed bearings for reliable **quiet** operation.

### Power 220V

1.0	H24G53-RV552-1	(three phase)*
3.0	H24G53-RV902-30	(three phase)*
5.0	H24G53-RV902-50	(three phase)
7.5	H24G53-RV902-75	(three phase)

*\*single phase available upon request*

## Option #7: Automatic Tool Change System

<u>Power</u>	<u>220V Three Phase</u>
4	H24G53-RV11022-4
7.5	H24G53-RV11022-7

Please note that ATC Systems are only available for **servo routers** and the router must be fitted with a 12" gantry clearance. This adds \$1000 to the price of the gantry. Please note that the tool holders are mounted on the XY table and use up approximately 6" of travel. For this reason, we recommend that an appropriately sized table be selected taking this work travel reduction into account.



## Option #8: Vinyl Knife:

Fits Techno engraving head spindle. Comes with adjustable spring tension controlled floating blade. Two precision bearings for smooth blade rotation. Solid carbide cutter blade can be replaced or resharpened.

**Part #: H26J20-VCUTTER**

## Dust Collector System (With 25', 4"OD Hose)

**Part #: H24P00-VAC1**





<u>Model</u>	<u>Safety Shield Part Number</u>		<u>Machine Stand (Steel frame) Part Number</u>
CA1113	HX3700-E1113	_____	HX3500-015E
CA1921	HX3700-E1921		HX3500-027E
CA2129	HX3700-E2129		HX3500-040E
CA2139	HX3700-E2139		HX3500-054E
CA3133	HX3700-E3133		HX3500-067E
CA4941	HX3700-E4941		HX3500-130E

### Lubrication Kit

Part #: H90Z00-LUBEKIT2



### 10 Amp Relay Box

(Switches 120VAC outlet on/off from program control)

Part #: H26T60-RELAYBOX (12VDC in/120VAC out)

Price: \$110.00 (MAC 200/Stepper)

Part #: H26T60-SRVRELAY (24VDC in/120VAC out)

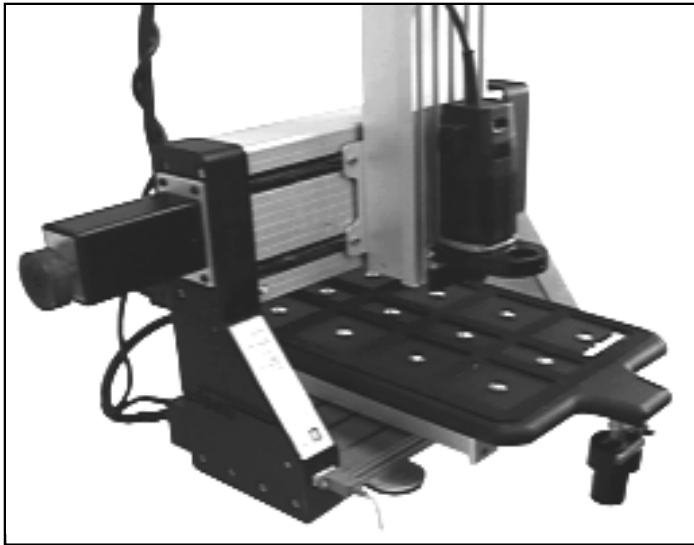
### Cam Clamp

Part #: HL5400M290002



<u>Clamp Bars:</u>	<u>Length</u>	<u>Part #</u>	
	5" (125mm)	HL5400M290020125	_____
	7" (175mm)	HL5400M290020175	
	9" (225mm)	HL5400M290021225	
	12" (300mm)	HX5400-CB192-001	(for Vac Tables)

## Techno Vacuum Table



- ✓ Total surface area: 12"x 18"
- ✓ 12 individually gasketed areas with separate valves for each area
- ✓ Works off standard Shop Vac (not supplied)
- ✓ Spring loaded valves are only activated when material presses on it
- ✓ Vacuum is only supplied to active gasketed chambers
- ✓ Gasketed chambers allow flexible workpiece sizes to be held
- ✓ Vacuum Table mounts to the aluminum base plate (supplied)
- ✓ Includes ball valve to turn vacuum on/off and fitting for Shop-Vac hose

**Part #: HX3510-V242-001**

Can be used on all DaVinci and gantry model machines.

Table Size	Description	Part Number	
All DaVinci models	12"x18" surface with 12 individually gasketed areas	<b>HX3510-V242-001</b>	
59x50 machines*	Includes 6 zone manifold	<b>HX3510-V5050-001</b>	
5'x8' machines*	Includes 6 zone manifold	<b>HX3510-V4896-001</b>	

Pump Size	Description	Part Number	
10 HP	Regenerative Vacuum Blower Assembly (230V-3 Phase) 130 CFM 13.5" Hg Vacuum For 50"x59" machine	<b>H35X13-10HP-003</b>	
10 HP	Regenerative Vacuum Blower Assembly (460V-3 Phase) 130 CFM @ 13.5 Hg Vacuum For 50"x59" machine	<b>H35X14-10HP-003</b>	
15 HP	Regenerative Vacuum Blower Assembly (230V-3Phase) 167 CFM @ 14 Hg Vacuum For 5'x8' machine	<b>H35X13-15HP-003</b>	

All the above vacuum pumps include motor starters and vacuum hose to connect to the vacuum table.

All the above vacuum pumps are available with 440V 3 phase.

**\*Note:** These vacuum tables require 9" clamp bars (Part #: HX5400-CB192-001 @ \$22.00 each)



**Name:** Toolpost Set for Toolchanges  
**Part Number:** H25X00-LPOST1  
**Description:** This toolpost is designed with V-guides on two of its four sides for facing or turning using the five fitted toolchange holders (shown below).



**Name:** Carbide Indexable Tool Holder Set  
**Part Number:** H25X00-LHOLD1

**Description:** A 2mm hex screw holds the cutting inserts on the holder. The five holders shown at right are (from left to right): 90° left-hand holder, 15° left-hand holder, a centered holder used for threading, chamfering and V-grooving, 15° right-hand holder, and the 90° right-hand holder. Set also includes 20 inserts (10 - 1/64", and 10 1/32").



**Part Number:** H25X00-LHOLD1-1  
**Description:** The above set (H25X00-LHOLD1) sold without the cutting inserts.

**Name:** Indexable Carbide Inserts  
**Part Number:** 1/64" tip radius H25N85-00102  
 1/32" tip radius H25N85-00202

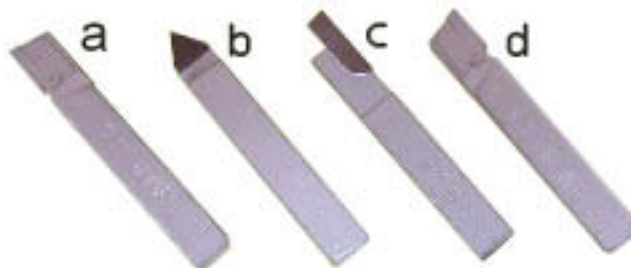
**Description:** Inserts can be rotated three times without sharpening. They are available in various rake angles for different materials and applications. Inserts are sold in packets of 10.



**Name:** Cut-Off Blades  
**Part Number:** H25U86-006720872  
**Description:** Double beveled, 10°, HSS, for use with cut-off toolchange holder from H25X00-LPOST1

**Name:** Tool-Bit Set  
**Part Number:** H25X00-LATHE1  
**Description:** Set includes four different bits.  
 You can also order them individually:

- a. Part #: H25D81-032-001  
Bit: Left side cutter
- b. Part #: H25D83-032-001  
Bit: Threading tool
- c. Part #: H25F82-032-001  
Bit: Parting tool
- d. Part #: H25D80-032-001  
Bit: Right side cutter



## Gantry/DaVinci Tool Set



**20-bit Wood and Plastic Set** (2-pieces of each of the bits in the table below)

**H25X00-WP1**

Catalog Number	CED	CEL	Shank Dia.	OAL	Cut Type	Flute	Material	Suggested use
H25N24-008080432	1/8"	1/2"	1/4"	2"	Down/Flat	Double	Solid Carbide	Wood
H25H24-016140440	1/4"	7/8"	1/4"	2-1/2"	Down/Flat	Double	Solid Carbide	
H25D59-032080429	1/2"	1/2"	1/4"	1-13/16"	V-Groove 45°	N/A	Carbide Tipped	Wood and Plastic
H25D59-048100836	3/4"	5/8"	1/2"	2-1/4"	V-Groove 45°	N/A	Carbide Tipped	
H25N70-016140440*	1/4"	7/8"	1/4"	2-1/2"	Up/Down/Flat	N/A	Solid Carbide	
H25N20-008060424	1/8"	3/8"	1/4"	1-1/2"	Straight/Flat	Double	Solid Carbide	
H25N20-016120440	1/4"	3/4"	1/4"	2-1/2"	Straight/Flat	Double	Solid Carbide	
H25D20-032160444	1/2"	1"	1/4"	2-3/4"	Straight/Flat	Double	Carbide Tipped	
H25S16-008080432	1/8"	1/2"	1/4"	2"	Straight/Flat	O-Flute	High-Speed Steel	Plastic
H25S16-016120434	1/4"	3/4"	1/4"	2-1/8"	Straight/Flat	O-Flute	High-Speed Steel	

**NOTES**

**CED** Cutting Edge Diameter      CED tolerance: ±.005  
**OAL** Overall Length              **CEL** Cutting Edge Length  
 \* Compression spiral for cutting through laminates, MDF, plywood, etc.

*All H25X00-WP1 bits are DaVinci compatible (with the exception of the 1/2" H25D59-048100836)*

## Gantry/DaVinci Tool Set



**18-bit DaVinci Rout & Engrave Set** (2-pieces of each of the bits in the table below)

**H25X00-DAV1**

Catalog Number	CED	CEL	Shank Dia.	OAL	Cut Type	Flute	Material	Suggested Use
H25A00-18112005	.005"	N/A	1/8"	1-1/2"	30° from Vert.	N/A	Solid Carbide	General Engraving
H25A00-18112010	.020"	N/A	1/8"	1-1/2"	30° from Vert.	N/A	Solid Carbide	
H25A00-18112020	.010"	N/A	1/8"	1-1/2"	30° from Vert.	N/A	Solid Carbide	
H25Q22-004030224	1/16"	3/16"	1/8"	1-1/2"	Flat	Double	Solid Carbide	General Use Brass/Aluminum Machinable Plastic
H25Q23-004030224	1/16"	3/16"	1/8"	1-1/2"	Ball	Double	Solid Carbide	
H25Q22-008080224	1/8"	1/2"	1/8"	1-1/2"	Flat	Double	Solid Carbide	
H25Q23-008080224	1/8"	1/2"	1/8"	1-1/2"	Ball	Double	Solid Carbide	
H25Q22-016120440	1/4"	3/4"	1/4"	2-1/2"	Flat	Double	Solid Carbide	
H25Q23-016120440	1/4"	3/4"	1/4"	2-1/2"	Ball	Double	Solid Carbide	

**NOTES**

**CED** Cutting Edge Diameter      CED tolerance: ±.005  
**CEL** Cutting Edge Length        **OAL** Overall Length

*All H25X00-DAV1 bits are DaVinci compatible*

## Gantry/DaVinci Engraving Set



14-bit Engraving Set (2-pieces of each of the bits in the table below)

**H25X00-ENGRAVE**

Catalog Number	CED	Shank Dia.	OAL	Cut Type	Material	Suggested use	
H25A00-18112005	0.005"	1/8"	1-1/2"	30° from Vertical	Solid Carbide	General Engraving	
H25A00-18112010	0.010"	1/8"	1-1/2"	30° from Vertical	Solid Carbide		
H25A00-18112020	0.020"	1/8"	1-1/2"	30° from Vertical	Solid Carbide		
H25A00-18112005B	0.005"	1/8"	1-1/2"	15° from Vertical	Solid Carbide	Engraving Brass/Aluminum	
H25A00-18112010B	0.010"	1/8"	1-1/2"	15° from Vertical	Solid Carbide		
H25A00-18112005F	0.005"	1/8"	1-1/2"	15° from Vertical	Solid Carbide	Engraving Plastic	
H25A00-18112010F	0.010"	1/8"	1-1/2"	15° from Vertical	Solid Carbide		

*All H25X00-ENGRAVE bits are DaVinci compatible*

NOTES CED Cutting Edge Diameter  
OAL Overall Length

**NOTES**

CED Cutting Edge Diameter  
OAL Overall Length

## Individual Solid Carbide Engraving Bits



Cutters are made from micrograin carbide to stay sharper longer and produce cleaner cuts.

Catalog Number	CED	Shank Dia.	OAL	Cut Type	Suggested use	
H25A00-18112005	0.005"	1/8"	1-1/2"	30° from Vertical	General Engraving	
H25A00-18112010	0.010"	1/8"	1-1/2"	30° from Vertical		
H25A00-18112020	0.020"	1/8"	1-1/2"	30° from Vertical		
H25A00-18112005B	0.005"	1/8"	1-1/2"	15° from Vertical	Engraving Brass/Aluminum	
H25A00-18112010B	0.010"	1/8"	1-1/2"	15° from Vertical		
H25A00-18112005F	0.005"	1/8"	1-1/2"	15° from Vertical	Engraving Plastic	
H25A00-18112010F	0.010"	1/8"	1-1/2"	15° from Vertical		

*All of the above bits are DaVinci compatible and work with all 3.25 HP routers (supplied with all gantry machines)*

**For More Bits, Tools and Sets, See Page 152-163**



## TOOL MATERIALS

- Solid Carbide*** Use for all natural woods, wood composites and hard, fibrous or abrasive plastics. Solid carbide is generally the toughest tool (next to diamond tooling) and holds the edge best.
- Carbide Tipped*** Use for plywood and coarse wood composites. Carbide tipped tooling provides some of the edge longevity of carbide with the lower cost of a steel base.
- High-Speed Steel*** Use for aluminum, soft natural woods and ABS or poly plastics. High-speed steel is the most readily available tooling and is preferred for most metal work because of its cost and hardness. HSS is seldom used in wood applications because carbide tooling stays sharper longer. HSS is generally preferred for metal cutting and some plastic cutting operations.

## TOOL GEOMETRY

- Straight Flute*** Use for wood and plastic hand-feed operations. The straight flute design, in single or multiple cutting edges, produces a clean finish. The harder the material, the more cutting edges are recommended.
- Spiral Flute*** Use for aluminum, wood and plastic machine-feed operations. The spiral flute is especially good at cleaning chips. When cutting aluminum and plastic, remelting of the chips is primarily the source of poor cut quality.
- Chipbreaker*** Use for wood roughing or hogging machine-feed operations. The chipbreaker edges increase the overall cutting edge length allowing for faster feed rates.

## FLUTE GEOMETRY

- Single Flute*** Use for faster feed rates in softer materials. The single-flute cutter typically has lots of room for chips, but the single cutting edge limits either the feed rate or the hardness of the material to be cut. These types of cutters are especially recommended for plastics.
- Double Flute*** Use for better finish in harder materials. Double-flute bits provide a smoother cutting action because the chip load is smaller than a single-flute cutter for a given feed. This allows harder materials to be handled.
- Upcut Spiral*** Use for grooving or slotting, for upward chip evacuation and best finish on bottom side of piece part. These bits allow for rapid cuts since the tool clears the chips away from the material. This type of tool is not recommended for softer materials such as MDF because of the ragged finish that can result on the top surface.
- Downcut Spiral*** Use for downward chip flow, better holddown in fixture and best finish on topside of piece part. Note that the cutting speeds usually have to be reduced because the chips are pushed back into the material.
- Up/Down Spiral*** Use for double-laminated material and best finish on top and bottom side of piece part. Because of the spirals, all the chips are forced back into the material. This results in a very clean cut on the top and bottom edges, but the cutting speeds have to be reduced. Note that the center of the spirals should be approximately in the center of the material for best results. This usually means that a substantial scavenger board would have to be used.

## 6-Bit Straight Sets

Complete 6-bit set, 1/4" shank, in a hardwood case  
 Complete 6-bit set, 1/2" shank, in a hardwood case

**H25X00-STRAIGHT1**  
**H25X00-STRAIGHT2**



6-Bit Straight Set, 1/4" Shank, Flat Bottom

Catalog Number	CED	CEL	OAL
H25N20-016120432*	1/4"	3/4"	2"
H25D20-024120432	3/8"	3/4"	2"
H25D20-032120436	1/2"	3/4"	2-1/4"
H25D20-040120436	5/8"	3/4"	2-1/4"
H25D20-048120436	3/4"	3/4"	2-1/4"
H25D20-064120432	1"	3/4"	2"

6-Bit Straight Set, 1/2" Shank, Flat Bottom

Catalog Number	CED	CEL	OAL
H25N20-016120838*	1/4"	3/4"	2-3/8"
H25D20-024160842	3/8"	1"	2-5/8"
H25D20-032160842	1/2"	1"	2-5/8"
H25D20-040160840	5/8"	1"	2-1/2"
H25D20-048160840	3/4"	1"	2-1/2"
H25D20-064200848	1"	1-1/4"	3"

**NOTES**

**CED** Cutting Edge Diameter  
**CEL** Cutting Edge Length  
**OAL** Overall Length  
 \* Indicates Solid Carbide Bits  
 CED tolerance: ±.005

*1/4" shanks are DaVinci compatible  
 1/2" shanks work with all 3.25 HP routers  
 (supplied with all gantry machines)*

## 7-Bit Spiral Sets, Flat Bottom, Solid Carbide Bits

Complete 7-bit downcut spiral set, in a hardwood case  
 Complete 7-bit upcut spiral set, in a hardwood case

**H25X00-DOWN1**  
**H25X00-UP1**



7-Bit Downcut Spiral Set, Flat Bottom, Solid Carbide Bits

Catalog Number	CED	CEL	Shank Dia.	OAL
H25N24-008080432	1/8"	1/2"	1/4"	2"
H25N24-010080432	5/32"	1/2"	1/4"	2"
H25N24-012120440	3/16"	3/4"	1/4"	2-1/2"
H25N24-016160440	1/4"	1"	1/4"	2-1/2"
H25N24-020160848	5/16"	1"	1/2"	3"
H25N24-024200856	3/8"	1-1/4"	1/2"	3-1/2"
H25N24-032320864	1/2"	2"	1/2"	4"

7-Bit Upcut Spiral Set, Flat Bottom, Solid Carbide Bits

Catalog Number	CED	CEL	Shank Dia.	OAL
H25N22-008080432	1/8"	1/2"	1/4"	2"
H25N22-010080432	5/32"	1/2"	1/4"	2"
H25N22-012120440	3/16"	3/4"	1/4"	2-1/2"
H25N22-016160440	1/4"	1"	1/4"	2-1/2"
H25N22-020160848	5/16"	1"	1/2"	3"
H25N22-024200856	3/8"	1-1/4"	1/2"	3-1/2"
H25N22-032320864	1/2"	2"	1/2"	4"

**NOTES**

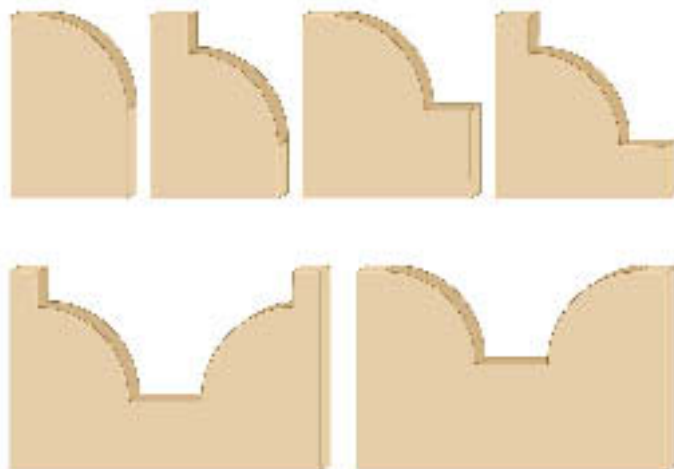
**CED** Cutting Edge Diameter  
**CEL** Cutting Edge Length  
**OAL** Overall Length  
 CED tolerance: ±.005

*Both of the above 7-bit tooling sets work with all 3.25 HP routers  
 (supplied with all gantry machines)*

## Ovolo Bits

These bits can cut a beautiful groove or vein as well as rounded or beaded edges.

Each Ovolo Bit offers six different profiles:



Ovolo bits have been popular with European woodworkers for years, and for good reason! Sure they'll cut that simple roundover or bead, but that's just the beginning. Cut the dramatic vein shown in the illustration at left. Use them to adorn the edges of furniture, to decorate large panels, even plunge cut to produce eye-catching rosettes.

### 6-Bit 1/2" Shank Ovolo Set



Complete 6-bit 1/2" Shank Ovolo set, in a hardwood case **H25X00-OVOLO1**

6-Bit 1/2" Shank Ovolo Set

**NOTES**

**CED** Cutting Edge Diameter  
**CEL** Cutting Edge Length  
**OAL** Overall Length  
 CED tolerance: ±.005

Catalog Number	CED	CEL	OAL	Cutter Radius
H25D69-064080833	1"	1/2"	2-1/16"	1/4"
H25D69-080090835	1-1/4"	9/16"	2-3/16"	3/8"
H25D69-096120838	1-1/2"	3/4"	2-3/8"	1/2"
H25D69-128160840	2"	1"	2-1/2"	3/4"
H25D69-144180842	2-1/4"	1-1/8"	2-5/8"	7/8"
H25D69-160210844	2-1/2"	1-5/16"	2-3/4"	1"

All of the above cutters work with 3.25 HP routers (supplied with all gantry machines)



# Carbide-Tipped 2-Flute Straight, Flat

These carbide-tipped cutters were developed for general-purpose woodworking.

**Primary usage:**

Natural wood and wood composites

**Secondary usage:**

Other composite materials



Catalog Number	CED	CEL	Shank Dia.	OAL	
H25N20-008060424*	1/8"	3/8"	1/4"	1-1/2"	
H25N20-010060424*	5/32"	3/8"	1/4"	1-1/2"	
H25N20-012080424*	3/16"	1/2"	1/4"	1-1/2"	
H25N20-015160440*	15/64"	1"	1/4"	2-1/2"	
H25N20-016120440*	1/4"	3/4"	1/4"	2-1/2"	
H25N20-016120432*	1/4"	3/4"	1/4"	2"	
H25N20-016160438*	1/4"	1"	1/4"	2-3/8"	
H25D20-020160445	5/16"	1"	1/4"	2-13/16"	
H25D20-020200438	5/16"	1-1/4"	1/4"	2-3/8"	
H25D20-024120432	3/8"	3/4"	1/4"	2"	
H25D20-024160440	3/8"	1"	1/4"	2-1/2"	
H25D20-024200440	3/8"	1-1/4"	1/4"	2-1/2"	
H25D20-031160436	31/64"	1"	1/4"	2-1/4"	
H25D20-032120436	1/2"	3/4"	1/4"	2-1/4"	
H25D20-032160444	1/2"	1"	1/4"	2-3/4"	
H25D20-036090436	9/16"	9/16"	1/4"	2-1/4"	
H25D20-040120436	5/8"	3/4"	1/4"	2-1/4"	
H25D20-040160444	5/8"	1"	1/4"	2-3/4"	
H25D20-046160436	23/32"	1"	1/4"	2-1/4"	
H25D20-048120436	3/4"	3/4"	1/4"	2-1/4"	
H25D20-064120432	1"	3/4"	1/4"	2"	
H25N20-015120838*	15/64"	3/4"	1/2"	2-3/8"	
H25N20-016120838*	1/4"	3/4"	1/2"	2-3/8"	
H25D20-024160842	3/8"	1"	1/2"	2-5/8"	
H25D20-024200846	3/8"	1-1/4"	1/2"	2-7/8"	
H25D20-028200852	7/16"	1-1/4"	1/2"	3-1/4"	
H25D20-031160840	31/64"	1"	1/2"	2-1/2"	
H25D20-032160842	1/2"	1"	1/2"	2-5/8"	
H25D20-032160852	1/2"	1"	1/2"	3-1/4"	
H25D20-032240850	1/2"	1-1/2"	1/2"	3-1/8"	
H25D20-040160840	5/8"	1"	1/2"	2-1/2"	
H25D20-046160840	23/32"	1"	1/2"	2-1/2"	
H25D20-048160840	3/4"	1"	1/2"	2-1/2"	
H25D20-048240852	3/4"	1-1/2"	1/2"	3-1/4"	
H25D20-064200848	1"	1-1/4"	1/2"	3"	

**NOTES**

- \* Indicates Solid Carbide bit
- CED Cutting Edge Diameter
- CEL Cutting Edge Length
- OAL Overall Length



## Solid Carbide, Single Flute, Straight, Flat

These carbide tools were developed to combine the fast free cutting of O flute geometry with the tool life available from solid carbide, particularly in small diameters. Certain tools in the line were designed specifically to route softer, ductile plastics, others are of a more general-purpose nature.

**Primary usage:**

- Wood composites – tools ending in "0".
- Plastics in the ABS, polycarbonate, polystyrene and ductile PVC families – tools marked with \*.

**Secondary usage:**

Other composite materials.



Catalog Number	CED	CEL	Shank Dia.	OAL	Price
H25N10-008080432	1/8"	1/2"	1/4"	2"	\$22.85
H25N10-010090432	5/32"	9/16"	1/4"	2"	\$22.85
H25N10-012100432	3/16"	5/8"	1/4"	2"	\$22.85
H25H10-012100432*	3/16"	5/8"	1/4"	2"	\$20.75
H25N10-014100440	7/32"	5/8"	1/4"	2-1/2"	\$22.85
H25N10-016120440	1/4"	3/4"	1/4"	2-1/2"	\$22.85
H25H10-016120440*	1/4"	3/4"	1/4"	2-1/2"	\$21.70
H25N10-018120640	9/32"	3/4"	3/8"	2-1/2"	\$39.15
H25N10-020130640	5/16"	13/16"	3/8"	2-1/2"	\$39.15
H25N10-024140640	3/8"	7/8"	3/8"	2-1/2"	\$39.15
H25H10-024140640*	3/8"	7/8"	3/8"	2-1/2"	\$37.80
H25N10-028140848	7/16"	1"	1/2"	3"	\$59.80
H25N10-032160848	1/2"	1"	1/2"	3"	\$59.80
H25H10-032160848*	1/2"	1"	1/2"	3"	\$54.25

**NOTES**

- \* Plastic Bits
- CED** Cutting Edge Diameter
- CEL** Cutting Edge Length
- OAL** Overall Length
- CED tolerance: +.000/- .004

## Solid Carbide, 2-Flute Straight, Flat

These carbide tools were developed as a general-purpose tool to route difficult to cut materials, particularly in small diameters. Certain tools in the line were designed specifically to route harder, more rigid plastics.

**Primary usage:**

- Wood composites\thin laminated materials (tools ending in "0").
- Plastics in the acrylic, nylon, melamine and rigid PVC families – tools marked with \*.

**Secondary usage:**

Other composite materials



Catalog Number	CED	CEL	Shank Dia.	OAL	
H25N20-008080432	1/8"	1/2"	1/4"	2"	
H25N20-010090432	5/32"	9/16"	1/4"	2"	
H25N20-012100432	3/16"	5/8"	1/4"	2"	
H25H20-012100432*	3/16"	5/8"	1/4"	2"	
H25N20-014100440	7/32"	5/8"	1/4"	2-1/2"	
H25N20-016120440	1/4"	3/4"	1/4"	2-1/2"	
H25H20-016160440*	1/4"	1"	1/4"	2-1/2"	
H25N20-016120452	1/4"	3/4"	1/4"	3-1/4"	
H25H20-016160452*	1/4"	1"	1/4"	3-1/4"	
H25N20-018120640	9/32"	3/4"	3/8"	2-1/2"	
H25N20-020130640	5/16"	13/16"	3/8"	2-1/2"	
H25N20-024140640	3/8"	7/8"	3/8"	2-1/2"	
H25H20-024140640*	3/8"	7/8"	3/8"	2-1/2"	
H25N20-028160848	7/16"	1"	1/2"	3"	
H25N20-032160848	1/2"	1"	1/2"	3"	
H25H20-032160848*	1/2"	1"	1/2"	3"	

**NOTES**

- \* Plastic Bits
- CED** Cutting Edge Diameter
- CEL** Cutting Edge Length
- OAL** Overall Length
- CED tolerance: +.000/- .004



## Solid Carbide, Flat, Up/Down Compression Spiral

Upcut/downcut design for fast feed rates and optimum edge finish on both sides of laminated materials, plywood, MDF, etc.

**Primary usage:**

Double-sided laminated materials

**Secondary usage:**

Hard wood and wood composite



**NOTES**

- M Mortise upcut for slotting
- HS Hard surface double laminate geometry
- DE Double Edge up and down
- HW Hardwood geometry
- CED Cutting Edge Diameter
- CEL Cutting Edge Length
- OAL Overall Length
- CED tolerance: +.000/- .004

Catalog Number	Notes	CED	CEL	Shank Dia.	OAL
H25N70-016140440		1/4"	7/8"	1/4"	2-1/2"
H25N70-024180648		3/8"	1-1/8"	3/8"	3"
H25N71-024141448	M	3/8"	7/8"	7/8"	3"
H25N72-024180648	HS	3/8"	1-1/8"	3/8"	3"
H25N70-032160848		1/2"	1"	1/2"	3"
H25N71-032140848	M	1/2"	7/8"	1/2"	3"
H25N72-032160848	HS	1/2"	1"	1/2"	3"
H25N73-032160848	DE	1/2"	1"	1/2"	3"
H25N70-032260856		1/2"	1-5/8"	1/2"	3-1/2"
H25N71-032260856	M	1/2"	1-5/8"	1/2"	3-1/2"
H25N74-032240856	HW	1/2"	1-1/2"	1/2"	3-1/2"

## Solid Carbide, Flat, 2-Flute Downcut Spiral Wood Rout



These double-edge tools are designed for routing wood and wood composites where downward chip removal, tool rigidity, long life, and high quality finish is desired.

**Primary usage:**

Wood and wood composites

**Secondary usage:**

Plastics

**NOTES**

- \* For soft woods
- CED Cutting Edge Diameter
- CEL Cutting Edge Length
- OAL Overall Length
- CED tolerance: +.000/- .004

Catalog Number	CED	CEL	Shank Dia.	OAL
H25N24-008080432	1/8"	1/2"	1/4"	2"
H25N24-010080432	5/32"	1/2"	1/4"	2"
H25N24-010080440	5/32"	1/2"	1/4"	2-1/2"
H25N24-012120440	3/16"	3/4"	1/4"	2-1/2"
H25N24-014120432	7/32"	3/4"	1/4"	2"
H25N24-014160440	7/32"	1"	1/4"	2-1/2"
H25N24-016120440	1/4"	3/4"	1/4"	2-1/2"
H25H24-016140440*	1/4"	7/8"	1/4"	2-1/2"
H25N24-016160440	1/4"	1"	1/4"	2-1/2"
H25N24-016180448	1/4"	1-1/8"	1/4"	3"
H25N24-018160540	9/32"	1"	5/16"	2-1/2"
H25N24-020180548	5/16"	1-1/8"	5/16"	3"
H25N24-020160848	5/16"	1"	1/2"	3"
H25N24-024180648	3/8"	1-1/8"	3/8"	3"
H25H24-024180648*	3/8"	1-1/8"	3/8"	3"
H25N24-024200648	3/8"	1-1/4"	3/8"	3"
H25N24-024200848	3/8"	1-1/4"	1/2"	3"
H25N24-028160848	7/16"	1"	1/2"	3"
H25N24-032180848	1/2"	1-1/8"	1/2"	3"
H25H24-032180848*	1/2"	1-1/8"	1/2"	3"
H25N24-032200856	1/2"	1-1/4"	1/2"	3-1/2"
H25N24-032240856	1/2"	1-1/2"	1/2"	3-1/2"
H25N24-032320864	1/2"	2"	1/2"	4"
H25H24-032260856*	1/2"	1-5/8"	1/2"	3-1/2"
H25N24-032340864	1/2"	2-1/8"	1/2"	4"
H25N24-034180848	17/32"	1-1/8"	1/2"	3"



## Solid Carbide, 2-Flute Upcut Spiral, Wood Rout



These double-edge tools are designed for routing wood and wood composites where upward chip removal, tool rigidity, long life, and high quality finish is desired.

**Primary usage:**

Wood and wood composites

**Secondary usage:**

Plastics

**NOTES**

\* For soft woods

**CED** Cutting Edge Diameter

**CEL** Cutting Edge Length

**OAL** Overall Length

CED tolerance: +.000/- .004

Catalog Number	CED	CEL	Shank Dia.	OAL	
H25N22-008080432	1/8"	1/2"	1/4"	2"	
H25N22-010080432	5/32"	1/2"	1/4"	2"	
H25N22-010080440	5/32"	1/2"	1/4"	2-1/2"	
H25N22-012120440	3/16"	3/4"	1/4"	2-1/2"	
H25N22-014120432	7/32"	3/4"	1/4"	2"	
H25N22-014160440	7/32"	1"	1/4"	2-1/2"	
H25N22-016120440	1/4"	3/4"	1/4"	2-1/2"	
H25H22-016140440	1/4"	7/8"	1/4"	2-1/2"	
H25N22-016160440	1/4"	1"	1/4"	2-1/2"	
H25N22-016180448	1/4"	1-1/8"	1/4"	3"	
H25N22-018160540	9/32"	1"	5/16"	2-1/2"	
H25N22-020180548	5/16"	1-1/8"	5/16"	3"	
H25N22-020160848	5/16"	1"	1/2"	3"	
H25N22-024180648	3/8"	1-1/8"	3/8"	3"	
H25H22-024180648*	3/8"	1-1/8"	3/8"	3"	
H25N22-024200648	3/8"	1-1/4"	3/8"	3"	
H25N22-024200848	3/8"	1-1/4"	1/2"	3"	
H25N22-028160848	7/16"	1"	1/2"	3"	
H25N22-032180848	1/2"	1-1/8"	1/2"	3"	
H25H22-032180848*	1/2"	1-1/8"	1/2"	3"	
H25N22-032200856	1/2"	1-1/4"	1/2"	3-1/2"	
H25N22-032240856	1/2"	1-1/2"	1/2"	3-1/2"	
H25H22-032260856*	1/2"	1-5/8"	1/2"	3-1/2"	
H25N22-032320864	1/2"	2"	1/2"	4"	
H25N22-034180848	17/32"	1-1/8"	1/2"	3"	

## High-Speed Steel, Plastic Bit, O Flute Straight



These O flute tools were developed for cutting softer, more flexible plastics. Single-edge for faster feed rates. Double-edge for smoother finish.

**Primary usage:**

ABS, polycarbonate, polystyrene and some PVC plastics

**Secondary usage:**

Other plastics

	Catalog Number	CED	CEL	Shank Dia.	OAL	
Single Edge	H25S16-008080432	1/8"	1/2"	1/4"	2"	
	H25S16-012100432	3/16"	5/8"	1/4"	2"	
	H25S16-016120434	1/4"	3/4"	1/4"	2-1/8"	
	H25S16-016160438	1/4"	1"	1/4"	2-3/8"	
	H25S16-016120452^	1/4"	3/4"	1/4"	3-1/4"	
	H25S16-024160648	3/8"	1"	3/8"	2-1/2"	
	H25S16-024160656^	3/8"	1"	3/8"	3-1/2"	
	H25S16-032200844	1/2"	1-1/4"	1/2"	2-3/4"	
Double Edge	H25S26-012100432	3/16"	5/8"	1/4"	2"	
	H25S26-016120434	1/4"	3/4"	1/4"	2-1/8"	
	H25S26-016160438	1/4"	1"	1/4"	2-3/8"	
	H25S26-016120452^	1/4"	3/4"	1/4"	3-1/4"	
	H25S26-016120460	1/4"	3/4"	1/4"	3-3/4"	
	H25S26-016320452	1/4"	2"	1/4"	3-1/4"	
	H25S26-024160640	3/8"	1"	3/8"	2-1/2"	
	H25S26-024160656^	3/8"	1"	3/8"	3-1/2"	
H25S26-032200844	1/2"	1-1/4"	1/2"	2-3/4"		

**Notes**

**CED** Cutting Edge Diameter

**CEL** Cutting Edge Length

**OAL** Overall Length

^ These tools are designed and toleranced for air routers with guide bushing; CED: =.000/- .008

CED tolerance: ±.005 except as noted

## High-Speed Steel, Single-Edge, O Flute Straight



These tools combine an open flute design with single edge geometry to provide optimum chip removal at fast feed rates.

**Primary usage:**

Natural woods of soft to medium density and hardness

**Secondary usage:**

Flexible, nonabrasive plastics

Catalog Number	CED	CEL	Shank Dia.	OAL	
H25U16-004030432	1/16"	3/16"	1/4"	2"	
H25U16-006060432	3/32"	3/8"	1/4"	2"	
H25U16-008060432	1/8"	3/8"	1/4"	2"	
H25U16-008080432	1/8"	1/2"	1/4"	2"	
H25U16-010080432	5/32"	1/2"	1/4"	2"	
H25U16-012100432	3/16"	5/8"	1/4"	2"	
H25U16-012120432	3/16"	3/4"	1/4"	2"	
H25U16-014100434	7/32"	5/8"	1/4"	2-1/8"	
H25U16-016100434	1/4"	5/8"	1/4"	2-1/8"	
H25U16-016120434	1/4"	3/4"	1/4"	2-1/8"	
H25U16-016160438	1/4"	1"	1/4"	2-3/8"	
H25U16-016200442	1/4"	1-1/4"	1/4"	2-5/8"	
H25U16-020160538	5/16"	1"	5/16"	2-3/8"	
H25U16-020160648	5/16"	1"	3/8"	3"	
H25U16-024160840	3/8"	1"	1/2"	2-1/2"	
H25U16-032200844	1/2"	1-1/4"	1/2"	2-3/4"	
H25U16-024160640	3/8"	1"	3/8"	2-1/2"	

**NOTES**

**CED** Cutting Edge Diameter

**CEL** Cutting Edge Length

**OAL** Overall Length

CED tolerance: ±.005



## Carbide-Tipped CNC + MDF, 2-Flute

These carbide-tipped tools were developed for CNC routing of MDF materials. These tools are designed with special carbide, stiffer tool bodies and superior edge geometry to withstand the rigor of CNC routing. Increased life comes from the combination of carbide grade, tool design and edge quality.

**Primary usage:**

Medium-density fiberboard

**Secondary usage:**

Hardwoods

Catalog Number	CED	CEL	Shank Dia.	OAL	
H25D20-016140438	1/4"	7/8"	1/4"	2-3/8"	
H25D20-024160640	3/8"	1"	3/8"	2-1/2"	
H25D20-024160840	3/8"	1"	1/2"	2-1/2"	
H25D20-032160840	1/2"	1"	1/2"	2-1/2"	
H25D20-032200844	1/2"	1-1/4"	1/2"	2-3/4"	
H25D20-032320844	1/2"	2"	1/2"	2-3/4"	
H25D20-040321064	5/8"	2"	5/8"	4"	
H25D20-048261256	3/4"	1-5/8"	3/4"	3-1/2"	
H25D20-048341264	3/4"	2-1/8"	3/4"	4"	
H25D20-048421272	3/4"	2-5/8"	3/4"	4-1/2"	
H25D20-048481280	3/4"	3"	3/4"	5"	
H25D20-064341264	1"	2-1/8"	3/4"	4"	
H25D20-064481280	1"	3"	3/4"	5"	

**NOTES**

**CED** Cutting Edge Diameter

**CEL** Cutting Edge Length

**OAL** Overall Length

CED tolerance: ±.002





# Carbide-Tipped Double Edge V-Groove

## 90° V-Grooving Bits



Catalog Number	CED	CEL	Shank Dia.	OAL	Angle	
H25D61-016050428	1/4"	5/16"	1/4"	1-3/4"	90°	
H25D61-024080426	3/8"	1/2"	1/4"	1-5/8"	90°	
H25D61-032080429	1/2"	1/2"	1/4"	1-13/16"	90°	
H25D61-040080839	5/8"	1/2"	1/2"	2-7/16"	90°	
H25D61-048100836	3/4"	5/8"	1/2"	2-1/4"	90°	

These bits are used for lettering, veining, grooving, chamfering, carving and are ideal for any pattern applications.

**Primary usage:**

Natural wood and wood composites

**Secondary usage:**

Plastic, other composite materials

## Laser-Point 60° V-Grooving Bit

Catalog Number	CED	CEL	Shank Dia.	OAL	Angle	
H25D60-040070439	5/8"	7/16"	1/4"	2-7/16"	60°	

**NOTES**

- CED** Cutting Edge Diameter
- CEL** Cutting Edge Length
- OAL** Overall Length
- CED tolerance: ±.005

# Carbide-Tipped Double Edge, Round Nose "V" Groove

## 60° Lettering Bits



Catalog Number	CED	CEL	Shank Dia.	OAL	Angle	
H25D62-064120430	1"	3/4"	1/4"	1-7/8"	60°	
H25D62-072120835	1-1/8"	3/4"	1/2"	2-3/16"	60°	

These bits have 1/8" radius into a 1/4" flat bottom. They are used for lettering, veining, grooving, chamfering, carving and are ideal for any pattern applications.

**Primary usage:**

Natural wood and wood composites

**Secondary usage:**

Plastic, other composite materials

**NOTES**

- CED** Cutting Edge Diameter
- CEL** Cutting Edge Length
- OAL** Overall Length
- CED tolerance: ±.002

# Carbide-Tipped Double Edge, Flat Bottom "V" Groove

## 60° Lettering Bits



Catalog Number	CED	CEL	Shank Dia.	OAL	Angle	
H25D63-072200846	1-1/8"	1-1/4"	1/2"	2-7/8"	20°	

These bits have 1/8" radius into a 1/4" flat bottom. They are used for lettering, veining, grooving, chamfering, carving and are ideal for any pattern applications.

**Primary usage:**

Natural wood and wood composites

**Secondary usage:**

Plastic, other composite materials

**NOTES**

- CED** Cutting Edge Diameter
- CEL** Cutting Edge Length
- OAL** Overall Length
- CED tolerance: ±.002



## Carbide-Tipped Double-Edge, Round & Route



These two-flute cutters were designed to put a radius on the edge and dress the stock. They will provide a smooth finish on natural woods and wood composites.

**Primary usage:**

Natural wood, plywood and wood composites

**Secondary usage:**

Nonabrasive plastics

Catalog Number	CED	Small CED	CEL	Shank Dia.	OAL	CE Radius	
H25D67-06416190841	1"	1/2"	1-3/16"	1/2"	2-9/16"	3/16"	
H25D67-06416270849	1"	1/2"	1-11/16"	1/2"	3-1/16"	3/16"	
H25D67-07218190841	1-1/8"	1/2"	1-3/16"	1/2"	2-9/16"	1/4"	
H25D67-072270849	1-1/8"	1/2"	1-11/16"	1/2"	3-1/16"	1/4"	
H25D67-088190841	1-3/8"	1/2"	1-3/16"	1/2"	2-9/16"	3/8"	
H25D67-088270849	1-3/8"	1/2"	1-11/16"	1/2"	3-1/16"	3/8"	

**NOTES**

- CED Cutting Edge Diameter
- CEL Cutting Edge Length
- OAL Overall Length

## Carbide-Tipped Double Edge Round Nose



Produce beautiful decorative effects. Give panels, doors, drawers or almost any surface a special touch with a delicate cove or an eye-catching vein.

**Primary usage:**

Natural woods and wood composites

**Secondary usage:**

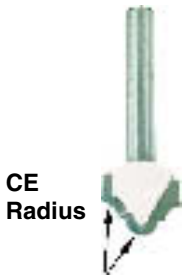
Plastic and other composite materials

Catalog Number	CED	CEL	Shank Dia.	OAL	CE Radius	
H25N68-008060424*	1/8"	3/8"	1/4"	1-1/2"	1/16"	
H25N68-016040424*	1/4"	1/4"	1/4"	1-1/2"	1/8"	
H25D68-024040430	3/8"	1/4"	1/4"	1-7/8"	3/16"	
H25D68-032060431	1/2"	3/8"	1/4"	1-15/16"	1/4"	
H25D68-040060434	5/8"	3/8"	1/4"	2-1/8"	5/16"	
H25D68-048070433	3/4"	7/16"	1/4"	2-1/16"	3/8"	
H25N68-016100836*	1/4"	5/8"	1/2"	2-1/4"	1/8"	
H25D68-032200846	1/2"	1-1/4"	1/2"	2-7/8"	1/4"	
H25D68-048200846	3/4"	1-1/4"	1/2"	2-7/8"	3/8"	
H25D68-064200848	1"	1-1/4"	1/2"	3"	1/2"	

**NOTES**

- CED Cutting Edge Diameter
- CEL Cutting Edge Length
- OAL Overall Length
- \* Solid Carbide Bit

## Carbide-Tipped Double-Edge Plunge Ogee Bits



You'll never run out of uses for these multifaceted bits. Use them with your router table to add a touch of classic style to almost any edge. Or give doors and panels the perfect highlight with a clean, eye-catching vein.

**Note:** when routing the full profile, take more than one passing.

**Primary usage:**

Natural wood and wood composites

**Secondary usage:**

Plastic, other composite materials

**NOTES**

- CED** Cutting Edge Diameter
- CEL** Cutting Edge Length
- OAL** Overall Length
- CED tolerance:  $\pm .005$

Catalog Number	CED	CEL	Shank Dia.	OAL	CE Radius	
H25D64-048080432	3/4"	1/2"	1/4"	2"	5/32"	
H25D64-048080833	3/4"	1/2"	1/2"	2-1/16"	5/32"	



## Carbide-Tipped Double-Edge Radius Grooving Bit

These bits are used for lettering, veining, edge work, and are ideal for any pattern application.

**Primary usage:**

Natural wood and wood composites

**Secondary usage:**

Plastic and other composite materials

**CE Radius**

**NOTES**

- CED** Cutting Edge Diameter
- CEL** Cutting Edge Length
- OAL** Overall Length
- CED tolerance:  $\pm .002$

Catalog Number	CED	CEL	Shank Dia.	OAL	CE Radius	
H25D65-072120838	1-1/8"	3/4"	1/2"	2-3/8"	1/2"	
H25D65-048100836	3/4"	5/8"	1/2"	2-1/4"	3/8"	

## Carbide-Tipped Double-Edge Radius Grooving Bit

These bits can cut a beautiful groove or vein as well as rounded or beaded edges.

**Primary usage:**

Natural wood and wood composites

**Secondary usage:**

Other composite materials



$F = CED - 2 \times CE \text{ Radius}$

**NOTES**

- CED** Cutting Edge Diameter
- CEL** Cutting Edge Length
- OAL** Overall Length
- CED tolerance:  $\pm .002$

Catalog Number	CED	CEL	Shank Dia.	OAL	CE Radius	
H25D69-056080428	7/8"	1/2"	1/4"	1-3/4"	3/16"	
H25D69-064080432	1"	1/2"	1/4"	2"	1/4"	
H25D69-080090432	1-1/4"	9/16"	1/4"	2"	3/8"	
H25D69-096120432	1-1/2"	3/4"	1/4"	2"	1/2"	
H25D69-064080833	1"	1/2"	1/2"	2-1/16"	1/4"	
H25D69-080090835	1-1/4"	9/16"	1/2"	2-3/16"	3/8"	
H25D69-096120838	1-1/2"	3/4"	1/2"	2-3/8"	1/2"	
H25D69-112140838	1-3/4"	7/8"	1/2"	2-3/8"	5/8"	
H25D69-128160840	2"	1"	1/2"	2-1/2"	3/4"	
H25D69-144180842	2-1/4"	1-1/8"	1/2"	2-5/8"	7/8"	
H25D69-160210844	2-1/2"	1-5/16"	1/2"	2-3/4"	1"	



These solid carbide ball end mills are recommended for cutting nonferrous alloys. Use where long life and high-quality finish is desired.

**Primary usage:**

Aluminum, brass

**Secondary usage:**

Machinable plastics and waxes

**NOTES**

- CED** Cutting Edge Diameter
- CEL** Cutting Edge Length
- OAL** Overall Length
- CED tolerance: ±.005

Catalog Number	CED	CEL	Shank Dia.	OAL	End Type	# of Flutes	
H25Q23-004030224	1/16"	3/16"	1/8"	1-1/2"	1-1/2"	2	
H25Q43-004030224	1/16"	3/16"	1/8"	1-1/2"	1-1/2"	4	
H25Q23-008080224	1/8"	1/2"	1/8"	1-1/2"	1-1/2"	2	
H25Q43-008080224	1/8"	1/2"	1/8"	1-1/2"	1-1/2"	4	
H25Q23-016120440	1/4"	3/4"	1/4"	2-1/2"	2-1/2"	2	
H25Q43-016120440	1/4"	3/4"	1/4"	2-1/2"	2-1/2"	4	
H25Q23-024140640	3/8"	7/8"	3/8"	2-1/2"	2-1/2"	2	
H25Q43-024140640	3/8"	7/8"	3/8"	2-1/2"	2-1/2"	4	
H25Q23-032160848	1/2"	1"	1/2"	3"	3"	2	
H25Q43-032160848	1/2"	1"	1/2"	3"	3"	4	

# Solid Carbide Flat End Mills



These solid carbide flat bottom end mills are recommended for cutting nonferrous alloys. Use where long life and high-quality finish is desired.

**Primary usage:**

Aluminum, brass

**Secondary usage:**

Machinable plastics and waxes

**NOTES**

- CED** Cutting Edge Diameter
- CEL** Cutting Edge Length
- OAL** Overall Length
- CED tolerance: ±.005

Catalog Number	CED	CEL	Shank Dia.	OAL	End Type	# of Flutes	
H25Q22-004030224	1/16"	3/16"	1/8"	1-1/2"	Flat	2	
H25Q42-004030224	1/16"	3/16"	1/8"	1-1/2"	Flat	4	
H25Q22-008080224	1/8"	1/2"	1/8"	1-1/2"	Flat	2	
H25Q42-008080224	1/8"	1/2"	1/8"	1-1/2"	Flat	4	
H25Q22-016120440	1/4"	3/4"	1/4"	2-1/2"	Flat	2	
H25Q42-016120440	1/4"	3/4"	1/4"	2-1/2"	Flat	4	
H25Q22-024140640	3/8"	7/8"	3/8"	2-1/2"	Flat	2	
H25Q42-024140640	3/8"	7/8"	3/8"	2-1/2"	Flat	4	
H25Q22-032160848	1/2"	1"	1/2"	3"	Flat	2	
H25Q42-032160848	1/2"	1"	1/2"	3"	Flat	4	