

# HARTLAUER BITS

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**ONSRUD**  
ONSRUD CUTTER LP

**BOSCH**

**ROBB JACK**

*Her-Saf*  
Made in the USA

**Belin.Y**



## Spirals

PLASTIC - WOOD - METAL

PLASTIC - WOOD - METAL



63-725

63-700, 62-700 & 63-750 series

### Solid Carbide 1 Edge O Flute Spiral

Bit #	Dia	CEL	Shk	OAL	List
<b>Hard Plastic &amp; Aluminum</b>					
<i>Upcut</i>					
63-700	1/16	1/4	1/4	2	24.50
63-701	1/16	1/4	1/8	2	22.00
63-710	1/8	1/4	1/4	2	24.50
63-711	1/8	1/4	1/8	2	22.75
63-712	1/8	1/2	1/4	2	24.50
63-713	1/8	1/2	1/8	2	22.00
63-706	1/8	5/8	1/4	2-1/2	27.75
63-707*	1/8	3/4	1/4	2-1/2	29.25
63-715	5/32	9/16	1/4	2	23.75
63-716	3/16	3/8	3/16	2	22.00
63-717	3/16	3/8	1/4	2	24.50
63-718	3/16	5/8	1/4	2	24.50
63-719	3/16	5/8	3/16	2	22.75
63-720	7/32	3/4	1/4	2-1/2	23.75
63-724	1/4	3/8	1/4	2	23.25
63-725	1/4	3/4	1/4	2-1/2	24.50
63-726*	1/4	1-1/4	1/4	3	29.00
63-727	1/4	1-1/2	1/4	3	29.25
63-731	3/8	1-1/8	3/8	3	39.75
63-733	3/8	3/4	3/8	3	42.25
<i>Dowcut</i>					
62-712	1/8	1/2	1/4	2	24.50
62-718	3/16	5/8	1/4	2	24.50
62-725	1/4	3/4	1/4	2-1/2	24.50
62-726*	1/4	1-1/4	1/4	3	29.00
<b>Soft Plastic - Upcut</b>					
63-750	1/16	1/4	1/4	2	24.50
63-762	1/8	1/2	1/4	2	24.50
63-768	3/16	5/8	1/4	2	24.50
63-775	1/4	3/4	1/4	2-1/2	24.50
63-776*	1/4	1-1/4	1/4	3	29.00

\*Extreme CEL, not for hard woods or metals



63-610

63-600, 63-000 & 63-200 series

### Solid Carbide 1 Edge O Flute Upcut Spiral

Bit #	Dia	CEL	Shk	OAL	List
<b>All Aluminum, Copper, Brass &amp; Plastic</b>					
63-602	1/16	1/4	1/8	1-1/2	24.25
63-604	1/8	1/4	1/8	1-1/2	25.50
63-606	1/8	1/4	1/4	2	30.00
63-610	1/8	1/2	1/4	2	32.00
63-612	3/16	3/8	3/16	1-1/2	29.25
63-614	3/16	3/8	1/4	2	32.00
63-618	3/16	5/8	1/4	2	33.75
63-620	1/4	3/8	1/4	2	31.75
63-622	1/4	3/4	1/4	2-1/2	34.50
63-624*	1/4	1-1/4	1/4	3	49.75
63-625	3/8	3/4	3/8	3	59.00
63-626	3/8	1-1/8	3/8	3	71.50
<b>Wood Composites &amp; Soft Aluminum</b>					
63-040	1/8	1/2	1/4	2	25.75
63-040TiN	1/8	1/2	1/4	2	28.00
63-060	3/16	5/8	1/4	2	25.75
63-060TiN	3/16	5/8	1/4	2	28.00
63-080	1/4	3/4	1/4	2-1/2	25.75
63-080TiN	1/4	3/4	1/4	2-1/2	28.00
<b>Natural &amp; Composite Woods - Wood Routs</b>					
63-240	1/8	1/2	1/4	2	25.75
63-260	3/16	3/4	1/4	2	25.75
63-280	1/4	7/8	1/4	2-1/2	25.75
63-285	1/4	1	1/4	2-1/2	27.00

**10%  
Bit Discount**

Free UPS Ground Shipping  
On All Bit Orders

-Next Day, 2nd Day and 3rd Day also Available-

sales@hartlauerbits.com  
www.hartlauer-bits.com



63-080

65-000 Series - **All New Super-O**

### Solid Carbide 1 Edge O Flute Upcut Spiral

Bit #	Dia	CEL	Shk	OAL	List
<b>Plastic, Wood, Aluminum</b>					
65-000	1/16	1/4	1/8	2	28.75
65-010	1/8	1/4	1/4	2	31.00
65-013	1/8	1/2	1/8	2	29.50
65-012	1/8	1/2	1/4	2	31.00
65-019	3/16	5/8	3/16	2	34.25
65-018	3/16	5/8	1/4	2	42.75
65-021	3/16	7/8	1/4	2-1/2	46.25
65-020	3/16	1-1/4	1/4	3	49.50
65-023	1/4	5/8	1/4	2	39.25
65-025	1/4	7/8	1/4	2-1/2	45.50
65-026	1/4	1-1/4	1/4	3	55.75
65-027	1/4	1-1/2	1/4	3	59.50
65-033	3/8	1-1/8	3/8	3	78.00

**Belin.Y**

### Solid Carbide Spirals

Bit #	Dia	CEL	Shk	OAL	List
<b>Aluminum, Brass &amp; Copper 1-Edge</b>					
33317	1/8	5/16	1/4	1-1/2	36.50
33476	3/16	1/2	1/4	2	36.50
33635	1/4	5/8	1/4	2	36.50
<b>Plastics 1-Edge</b>					
13317	1/8	1/2	1/4	1-1/2	30.00
13317A	1/8	1/2	1/8	2	22.00
13476	3/16	5/8	1/4	2	30.00
13476B*	3/16	1-1/4	1/4	3	38.00
13635	1/4	3/4	1/4	2	30.00
13635A*	1/4	1-1/2	1/4	3	38.00
13635B*	1/4	2-1/4	1/4	3-3/4	46.50
13635C*	1/4	1-1/8	1/4	3	35.00
13952A*	3/8	3-3/16	3/8	5	69.00
<b>Stainless Steel - 3-Edge</b>					
102317	1/8	3/8	1/4	1-1/2	38.00
102476	3/16	7/16	1/4	1-7/8	38.00
102635	1/4	5/8	1/4	2-3/8	38.00

(Prices subject to change without notice)  
Revised: February, 2009

Distributor for:

**ONSRUD**  
ONSRUD CUTTER LP

# Spirals

PLASTIC - WOOD - METAL



52-040



85-910



55-080

52-000 & 57-000 series

**Solid Carbide**  
2 Edge Spiral

Bit #	Dia	CEL	Shk	OAL	List
<b>Wood &amp; Plastic Composites &amp; Hard Aluminum</b>					
<i>Upcut</i>					
52-044h	1/8	5/16	1/4	2	23.00
52-044TiN	1/8	5/16	1/4	2	25.50
<b>52-040</b>	1/8	1/2	1/4	2	23.00
52-040TiN	1/8	1/2	1/4	2	25.50
<b>52-141h*</b>	1/8	5/8	1/4	2	29.00
<b>52-142h*</b>	1/8	3/4	1/4	2-1/2	33.00
<b>52-554*</b>	1/8	1-1/16	1/4	2-1/2	41.75
52-050	5/32	9/16	1/4	2	23.00
52-050TiN	5/32	9/16	1/4	2	25.50
<b>52-060</b>	3/16	5/8	1/4	2	23.00
52-060TiN	3/16	5/8	1/4	2	25.50
<b>52-160h*</b>	3/16	1-1/8	1/4	2-1/2	34.00
52-558	3/16	1-1/8	3/16	2-1/2	41.75
52-560	3/16	1-5/8	3/16	3	45.25
52-088h	1/4	1/2	1/4	2	23.00
52-088TiN	1/4	1/2	1/4	2	25.50
<b>52-080</b>	1/4	3/4	1/4	2-1/2	23.00
52-080TiN	1/4	3/4	1/4	2-1/2	25.50
85-910	1/4	3/4	1/4	2	21.50
52-180h*	1/4	1-1/4	1/4	2-1/2	30.00
52-181h*	1/4	1-3/8	1/4	3	36.00
<b>52-281h*</b>	1/4	1-3/4	1/4	3-1/2	46.50
<b>52-564*</b>	1/4	2-1/4	1/4	4	47.75
52-570	5/16	3-1/8	5/16	4-1/2	53.50
52-090	9/32	3/4	3/8	2-1/2	39.50
52-120	3/8	7/8	3/8	2-1/2	39.50
52-574	3/8	3-1/2	3/8	5	59.50
52-160O	1/2	1	1/2	3	65.75

Old #  
52-140

Old #  
52-282

**Natural & Composite Woods**

*Wood Routs - Upcut*

52-240	1/8	1/2	1/4	2	20.00
52-260	3/16	3/4	1/4	2	20.00
52-280	1/4	7/8	1/4	2-1/2	22.50
52-285	1/4	1	1/4	2-1/2	23.25
52-287	1/4	1-1/8	1/4	3	26.00

**Composite Woods**

*Heavy Duty - Upcut*

52-910	1/4	7/8	1/4	2-1/2	19.00
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**Hard Plastic**

52-622UP	1/4	3/8	1/4	2-1/2	21.00
52-624Up	1/4	3/4	1/4	2-1/2	22.25
85-611Down	1/4	1	1/4	2-1/2	23.00

\*Extreme CEL, not for hard woods or metals

C8 & GTS series

**Solid Carbide**  
ROBB JACK 2 Edge

Bit #	Dia	CEL	Shk	OAL	List
<b>Hard Aluminum - Upcut Spiral</b>					
<i>Stub Length</i>					
C8-201-4	1/8	1/4	1/4	2	19.00
C8-201-6	3/16	3/8	1/4	2	19.00
C8-201-8	1/4	1/2	1/4	2	19.00
<i>Standard Length</i>					
C8-203-4	1/8	1/2	1/4	2-1/2	25.75
C8-203-6	3/16	5/8	1/4	2-1/2	25.75
C8-203-8	1/4	3/4	1/4	2-1/2	25.75
<b>Hard Plastic - 2 Edge Straight</b>					
GTS-201-4	1/8	1/2	1/4	2	22.25
GTS-201-8	1/4	3/4	1/4	2-1/2	22.25

92-000 series End Mills

**Solid Carbide**  
2 & 4 Edge Upcut Spiral

Bit #	Dia	CEL	Shk	OAL	List
<b>Hard Aluminum &amp; Wood</b>					
<i>2 Edge Spiral End Mills</i>					
92-05	1/32	1/8	1/8	1-1/2	12.00
92-105	3/64	3/32	1/8	1-1/2	10.00
92-10	3/64	1/8	1/8	1-1/2	10.00
92-20	1/16	1/4	1/8	1-1/2	10.00
92-21*	1/16	3/8	1/8	1-1/2	10.00
92-30	3/32	5/16	1/8	1-1/2	10.00
92-40	1/8	7/16	1/8	1-1/2	10.00
92-040	1/8	7/16	1/4	2	13.00
92-140*	1/8	1-1/16	1/8	3	22.00
92-60	3/16	5/8	3/16	2	12.00
92-060	3/16	5/8	1/4	2-1/2	13.00
92-262*	3/16	1-5/8	3/16	3	20.00
92-80	1/4	3/4	1/4	2-1/2	14.00
92-85	3/8	1	3/8	2-1/2	27.00
92-90	1/2	1-1/2	1/2	3	46.00
<i>4 Edge Spiral End Mills</i>					
92-101	3/64	1/8	1/8	1-1/2	11.00
92-201	1/16	3/16	1/8	1-1/2	10.00
92-202	1/16	1/4	1/8	1-1/2	10.00
92-204*	1/16	3/8	1/8	1-1/2	10.00
92-301	3/32	5/16	1/8	1-1/2	10.00
92-401	1/8	7/16	1/8	1-1/2	10.00
92-141*	1/8	1-1/16	1/8	3	21.00
92-601	3/16	5/8	3/16	2	12.00
92-801	1/4	3/4	1/4	2-1/2	14.00
92-184*	1/4	1-1/4	1/4	2-1/2	20.00
92-284*	1/4	2-1/4	1/4	3-1/2	35.00
92-81	5/16	1	5/16	3	39.00
92-484*	1/2	3	1/2	6	130.00

\*Extreme CEL, not for hard woods or metals

58-000 & 55-000 series

**Solid Carbide**  
3 & 4 Edge Upcut Spiral

Bit #	Dia	CEL	Shk	OAL	List
<b>Hard Aluminum &amp; Abrasives</b>					
<i>3 Edge Spiral</i>					
58-040	1/8	1/2	1/4	2	25.75
58-060	3/16	5/8	1/4	2	25.75
58-080	1/4	3/4	1/4	2-1/2	25.75
<i>4 Edge Spiral</i>					
55-040	1/8	1/2	1/4	2	25.75
55-060	3/16	5/8	1/4	2	25.75
55-088h	1/4	1/2	1/4	2	21.00
55-088TiN	1/4	1/2	1/4	2	24.00
55-080	1/4	3/4	1/4	2-1/2	25.75

40-100 & 40-000 series

**High Speed Steel**  
1, 2 & 4 Edge Spiral

Bit #	Dia	CEL	Shk	OAL	List
<b>Natural Wood &amp; Hard Aluminum</b>					
<i>2 Edge Spiral - Upcut</i>					
<b>40-101h</b>	1/8	3/8	1/4	2	7.25
40-101TiN	1/8	3/8	1/4	2	10.00
40-101Long	1/8	3/8	1/4	2-5/8	7.25
40-201h*	1/8	1-1/16	1/4	2-1/2	19.00
<b>40-103h</b>	3/16	5/8	1/4	2-1/4	7.25
40-103TiN	3/16	5/8	1/4	2-1/4	10.00
40-103Long	3/16	5/8	1/4	2-7/8	8.00
<b>40-107</b>	1/4	3/4	1/4	2-3/4	6.00
40-107TiN	1/4	3/4	1/4	2-3/4	8.50
40-111*	1/4	1	1/4	3	7.50
40-282h*	1/4	2-1/8	1/4	3-1/2	22.00
40-212h*	5/16	3-1/8	5/16	5-1/4	45.00
<i>2 Edge Spiral - Downcut</i>					
40-102	1/8	5/16	1/4	2-5/8	7.25
40-104	3/16	5/8	1/4	2-7/8	8.00
40-106	1/4	5/8	1/4	2-3/4	6.75
40-108	1/4	3/4	1/4	2-3/4	6.50
<i>1 Edge Spiral - Upcut</i>					
<b>40-001</b>	1/8	3/8	1/4	2-5/8	10.25
40-003	3/16	5/8	1/4	2-7/8	9.00
40-007	1/4	3/4	1/4	2-3/4	7.50
40-011	1/4	1	1/4	3	8.25
<b>Thick Foam 4- Edge Spiral - Upcut</b>					
92-384*	3/8	2-5/8	3/8	4-1/4	20.00
92-414*	1/2	3	1/2	5	24.00
40-564*	1/2	4-1/8	1/2	6-1/2	47.25

\*Extreme CEL, not for hard woods or metals

Distributor for:

# ONSRUD

ONSRUD CUTTER LP

# Straights

PLASTIC - WOOD



61-060



56-060



48-206h

61-000 & 61-200 series

<b>Solid Carbide</b>						
<b>1 Edge Straight</b>						
Bit #	Dia	CEL	Shk	OAL	List	
<b>Soft Plastic &amp; Natural Wood</b>						
O Flute						
92-020	1/16	3/16	1/8	1-1/2	11.00	
SC01	1/16	5/16	1/4	1-1/2	21.00	
92-030	3/32	1/4	1/8	1-1/2	11.00	
61-040	1/8	1/2	1/4	2	28.50	
61-140h*	1/8	13/16	1/4	2	32.00	
61-060	3/16	5/8	1/4	2	28.50	
61-080	1/4	3/4	1/4	2-1/2	28.50	
<b>Soft Plastic - O Flute</b>						
61-041	1/8	5/16	1/4	2	24.25	
61-042	1/8	1/2	1/4	2	25.75	
61-061	3/16	3/8	1/4	2	24.25	
61-062	3/16	5/8	1/4	2	25.75	
61-063h*	3/16	1	1/4	2-1/2	31.50	
61-082	1/4	3/4	1/4	2-1/2	27.00	
61-081	1/4	3/8	1/4	2-1/2	26.00	
<b>Natural &amp; Composite Woods - Wood Routs</b>						
V Flute						
61-240	1/8	1/2	1/4	2	28.50	
61-260	3/16	3/4	1/4	2	28.50	
61-280	1/4	7/8	1/4	2-1/2	28.50	
61-285*	1/4	1	1/4	2-1/2	29.75	

10-00 series

<b>High Speed Steel</b>						
<b>1 Edge O Flute Straight</b>						
Bit #	Dia	CEL	Shk	OAL	List	
<b>Soft Plastic &amp; Natural Soft Wood</b>						
10-00	1/16	3/16	1/4	2	8.75	
10-01	3/32	3/8	1/4	2	8.25	
10-02	1/8	3/8	1/4	2	8.50	
10-20	1/8	1/2	1/4	2	9.50	
85-152*	1/8	5/8	1/4	2	6.75	
10-04	3/16	5/8	1/4	2	7.00	
10-22	3/16	3/4	1/4	2	9.25	
10-24	1/4	5/8	1/4	2-1/8	7.25	
10-07*	1/4	1	1/4	2-3/8	7.00	
85-154*	1/4	1	1/4	2-3/8	5.75	
10-78*	1/4	1-1/4	1/4	2-5/8	8.00	

56-000, 56-200 & 56-600 series

<b>Solid Carbide</b>						
<b>2 Edge Straight</b>						
Bit #	Dia	CEL	Shk	OAL	List	
<b>Composites &amp; Natural Hardwoods - V Flute</b>						
85-213	1/8	3/8	1/4	1-1/2	14.50	
56-040	1/8	1/2	1/4	2	23.00	
56-060	3/16	5/8	1/4	2	23.00	
56-080	1/4	3/4	1/4	2-1/2	23.00	
56-281h*	1/4	1-5/8	1/4	3	43.00	
56-282h*	1/4	2-1/4	1/4	3-1/2	50.00	
<b>All Wood - V Flute Wood Routs</b>						
56-240	1/8	1/2	1/4	2	20.25	
56-260	3/16	3/4	1/4	2	20.25	
56-280	1/4	7/8	1/4	2-1/2	23.00	
56-285	1/4	1	1/4	2-1/2	23.75	
56-287	1/4	1-1/8	1/4	3	26.50	
<b>Hard Plastic &amp; Foam - V Flute</b>						
56-041	1/8	1/4	1/4	2	22.00	
56-062	3/16	5/8	1/4	2	23.00	
56-082	1/4	3/4	1/4	2-1/2	24.25	
<b>Soft Plastic - O Flute</b>						
56-612	1/8	1/2	1/4	2	22.25	
56-618	3/16	5/8	1/4	2	22.25	
56-625	1/4	1	1/4	2-1/2	24.50	

53-000 series

<b>Solid Carbide</b>						
<b>3 Edge V Flute Straight</b>						
Bit #	Dia	CEL	Shk	OAL	List	
<b>Hard Plastic &amp; Natural Woods</b>						
53-040	1/8	1/2	1/4	2	27.00	
53-080	1/4	3/4	1/4	2-1/2	27.00	

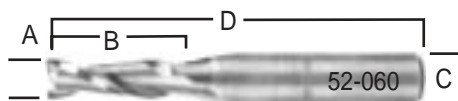
12-00 series

<b>High Speed Steel</b>						
<b>2 Edge V Flute Straight</b>						
Bit #	Dia	CEL	Shk	OAL	List	
<b>Hard Plastic &amp; Natural Hardwoods</b>						
12-01	1/4	1	1/4	2-3/8	8.00	
12-37*	1/4	1-1/4	1/4	3-1/4	13.25	

48-000 series

<b>Carbide Tipped</b>						
<b>1 &amp; 2 Edge Straight</b>						
Bit #	Dia	CEL	Shk	OAL	List	
<b>Hard Plastic, Wood Composite &amp; Foam</b>						
1 Edge V Flute Straight						
48-003	3/16	1/2	1/4	2	14.50	
48-007	1/4	1	1/4	2-3/8	14.25	
2 Edge V Flute Straight						
45-190	1/16	3/16	1/4	1-5/8	22.50	
48-008	1/8	5/16	1/4	2	17.75	
48-000	3/16	1/2	1/4	2	18.75	
48-004	1/4	5/8	1/4	2-1/8	17.50	
48-652P	1/4	3/4	1/4	2-1/8	19.00	
48-006	1/4	7/8	1/4	2-3/8	16.00	
48-106*	1/4	1	1/4	2-3/8	16.50	
48-206h*	1/4	1-1/4	1/4	2-3/4	27.50	
48-012	3/8	1	1/4	2-1/4	23.00	
48-058	3/8	1-1/4	3/8	2-3/4	21.25	
48-158	3/8	1-1/4	1/2	2-3/4	23.50	
48-014	1/2	3/4	1/4	2-1/8	19.75	
85-427	1/2	1	1/2	2-1/2	19.00	
48-080	1/2	1-1/2	1/2	3	25.00	
85-242	1/2	1-1/2	1/2	3	21.00	
85-251	1/2	2	1/2	4	22.00	
48-181	1/2	2-1/4	1/2	4-1/4	40.00	
48-086	5/8	1-1/4	1/2	2-3/4	26.00	
48-089	3/4	1-1/2	1/2	3	32.75	
85-243	1	1-1/8	1/2	2-1/2	26.50	

## LEGEND



A- Dia (Diameter) C- Shk (Shank)  
B- CEL (Cutting Edge Length) D- OAL (Over All Length)

► New Item  
h - hartlauer specialties  
B - Ball end  
\*Long Cutting Edge Lengths

Toll Free: 1-800-644-2487

Phone: 1-541-343-0390  
Fax: 1-541-343-1409

**10%  
Bit Discount**

Free UPS Ground Shipping  
On All Bit Orders

-Next Day, 2nd Day and 3rd Day also Available-

Our Top 40 Best Selling Bits

## Plastic Cutting

### Hard Plastic

(Hard Plastics chips don't curl) Cast Acrylic, Polycarbonate, Expanded PVC, Foam, Solid Surface & Fiberglass

- 63-700, 63-600 Series Page 1
- 52-600, 52-000 Series Page 2
- 56-000, 48-000, 53-000 Series Page 3  
(Soft Plastic cutters will also cut hard plastics)

### Soft Plastic

(Soft Plastics chips will curl when cut) Extruded Acrylic, Polypropylene & Polyethylene

- 63-750 Series Page 1
- 56-600, 61-000, 10-00 Series Page 3

Log onto [www.plasticrouting.com](http://www.plasticrouting.com)

## Wood Cutting

### Soft Natural Wood

Pine, Fir, Cedar & Redwood

- 63-200, 40-000 Series Page 1
- 52-200, 40-100 Series Page 2
- 61-200, 56-200, 10-00 Series Page 3
- 60-100 Series Page 4

### Hard Natural Wood

Oak, Cherry, Maple & Walnut

- 63-200, 40-000 Series Page 1
- 52-200, 40-100 Series Page 2
- 61-200, 56-000, 56-200, 12-00 Series Page 3
- 60-100 Series Page 3

### Wood Composites

MDO, MDF, Particle Board & Masonite

- 63-000, 63-200 Series Page 1
- 52-000, 52-200, 52-900 Series Page 2
- 56-000, 56-200, 48-000 Series Page 3
- 60-100 Series Page 4

### Plywood

- 52-200 Series Page 2
- 56-200, 48-000 Series Page 3
- 60-100 Series Page 4

## Metal Cutting

### Soft Aluminium & Copper

(O Rated & 3003 Aluminum)

- 63-700, 63-600, 63-000, 40-000 Series Page 1
- Belin Y Bis Page 1

### Hard Aluminium & Brass

(T Rated Aluminum)

- 63-600 Series Page 1
- 52-000, 58-000, 55-000, 40-100 Series Page 2
- All TiN Coated, Belin Y Pages 1 & 2  
(Soft Aluminium cutters will also cut hard Aluminium)

## Feed Rates

$$\text{Feedrate} = (\text{chipload}) \times (\text{RPM}) \times (\# \text{ of flutes})$$

Based on 1/4" dia. 1/4" deep at 18,000 RPM.

### Plastic Feed Rates

- Hard Plastic: 125 ipm to 250 ipm
- Soft Plastic: 125 ipm to 250 ipm
- Foam: 100 ipm to 300ipm

### Wood Feed Rates

- Wood Routs: 125 ipm to 250 ipm

### Aluminum Feed Rates

- 63-600 series: 125 ipm to 300 ipm
- SC spirals: 90 ipm to 175 ipm (lower RPM's)
- HSS spirals: 75 to 150 ipm (lower RPM's)

**(These feed rates are only guidelines).**

#### \*Adjustments for Above Feed Rates\*

- a) For diameter smaller than 1/4" decrease by 20% for every 1/8". For larger diameters increase by 10-15%.
- b) For depths over 1/4" decrease by 25% for each multiple of the depth of cut.
- c) Single edge flutes should be increased by 10%. V flutes should be decreased by 10%.
- d) For meters per minutes divide by 40.

### Finding the Perfect Feed Rate

1. Start at the low end of the feed rates.
2. Increase the feed rate until:
  - a. The edge finish deteriorates.
  - b. Or the router bit risk breakage.
3. After one of the above happens, decrease feed rate by 10% and reduce the RPM's until the edge finish once again deteriorates.

**THIS IS THE POINT OF MAXIMUM PRODUCTIVITY AND BEST TOOL LIFE!**

## Chiploads

$$\text{Chipload} = \frac{\text{feed rate in inches per minutes}}{(\text{RPM}) \times (\# \text{ of flutes})}$$

Chiploads:

- Plastic between .006 to .012
- Wood between .012 to .030
- Aluminum between .003 to .008

### Make chips not dust!

1. Can you throw the chips or do they float in the air?
2. To make chips not sawdust. You need to increase the chipload by increasing the feed rate or lowering the RPM's or using less flutes.
3. The larger the chip removed, the more heat that is removed with it. This keeps the bit cool, and increases tool life.

## Proper Colleting

1. Collets should be changed every 400 to 600 hours of run time. Also change collet nuts when wear is evident.
2. Clean the collet after every bit change with a brass brush and non flammable cleaner. Even the smallest deposits will cause run out.
3. Wax the threads with paraffin wax occasionally. This helps to tighten the hold.
4. Place the bit in the collet to the fadeout area. This is the part of the bit that the machine markings stop. The collet should be full, but not touching the end. Use a collet plug, if necessary to fill collet.

## Basic Tips

1. Use proper colleting and fixturing.
2. Make chips not dust. The bit should be relatively cool to the touch.
3. Use a larger diameter bit; they are stronger, throw the chips better, and leave better finishes.
4. Cut material in several passes (depth of cut should be no more than diameter of the bit, except when cutting foam).
5. Do a rough pass of .08 inches and then a finishing pass for smooth finishes.
6. Cutting edge lengths should be as short as possible to reduce vibration.
7. Do not run out of cutting edge length.
8. Listen for abnormal sounds.
9. Avoid adapter bushings for extended use, buy the right size of collet instead.
10. Use straight through shank bits, (3/16" dia. bit with 3/16" shank) they are stronger.
11. Do not dwell in the cut. Use a Ramp-in entry instead of plunging and loop the corners.
12. Enter from the edge of the material so that the chips have a place to exit.
13. Do not use dull bits.
14. Try a coolant or air spray. In metal cutting, always use a coolant.
15. Conventional versus climb cut. Which has a better finish the scrap or the finished product?
16. Check dust collector often.

Need more help? Then get the BOOK:

### "Your Future in Router Cutting"

-Written by Walter Hartlauer-

(The Router Man)

**\$19.95**

# Specialty Tools

PLASTIC - WOOD - METAL

PLASTIC - WOOD - METAL



60-100 series 1 Edge

### Up/Down COMPRESSION SPIRAL

For Cutting All Wood & Two-sided Laminates

Bit #	Dia	CEL	Shk	OAL	List
<b>Solid Carbide - 1 Edge Spiral</b>					
60-102	1/8	3/8	1/4	2-1/2	48.25
60-106	3/16	5/8	1/4	2-1/2	52.00
60-110	1/4	7/8	1/4	2-1/2	58.00
60-120	3/8	1-1/8	3/8	3	71.00
60-160	1/2	1	1/2	3	96.75

66-300 series 2 Edge

### BOTTOM SURFACERS

For Extra Smooth Routed Bottoms

Bit #	Dia	CEL	Shk	OAL	List
<b>Solid Carbide - 2 Edge Spiral</b>					
66-306	1/8	1/4	1/8	2	22.50
66-308	1/8	1/4	1/4	2	30.50
66-314	1/4	3/8	1/4	2	32.25
66-320	3/8	5/8	3/8	2-1/2	48.25

### TABLE SURFACER BITS

Bit #	DIA	Shk	OAL	List
<b>Carbide-Tipped - Carbide Insert</b>				
91-000	1-1/4	1/2	2	41.50
H-R1250	1-1/4	1/2	2-1/2	58.50
H-R2515	2-1/2	1/2	2-1/2	149.50



38-50 2 Edge

### BALL NOSE BITS

Bit #	Dia	CEL	Shk	OAL	List
<b>Solid Carbide - Straight Flute</b>					
38-50	1/8	3/8	1/4	2	35.25
38-51	3/16	5/8	1/4	2	33.75
38-52	1/4	3/4	1/4	2	33.75
<b>Solid Carbide - Spiral Flute</b>					
B-203-02	1/16	3/16	1/8	1-1/2	20.90
52-235Bh	1/16	1/4	1/4	2	31.00
52-240B	1/8	1/2	1/4	2	34.50
52-260B	3/16	3/4	1/4	2	34.50
52-280B	1/4	7/8	1/4	2-1/2	34.50
52-282Bh	1/4	2-1/4	1/4	3-1/2	55.00



77-102 2 Edge with 1/16" rad

### TAPERED BALL NOSE BITS

Bit #	DIA	CEL	Shk	OAL	Angle	List
77-102	1/8	1-1/2	1/4	3	1°	63.00
77-104	1/8	1	1/4	3	3°	54.50
77-106	1/8	3/4	1/4	3	5°	52.50
77-108	1/8	1/2	1/4	2	7°	50.25



85-445 2 Edge

### CORE BOX BITS

Bit #	Dia	CEL	Shk	OAL	List
<b>Carbide Tipped</b>					
85-444	1/4	3/8	1/4	2	21.00
85-445	3/8	5/16	1/4	2	26.00
85-446	1/2	3/8	1/4	2	27.00
85-447	5/8	7/16	1/4	2	28.00
92-06	3/4	5/8	1/4	2	18.00
92-07	7/8	5/8	1/2	2-1/2	24.00
92-08	1	3/4	1/2	2-1/2	30.00



18-00 1 Edge

### TAPERED BITS

Bit #	TIP	CEL	Shk	OAL	List
<b>7 Degree - Solid Carbide</b>					
16-48h	1/32	1/4	1/4	1-1/2	27.00
16-50	1/16	1/4	1/4	1-1/2	23.25
16-51	3/32	1/4	1/4	1-1/2	25.25
18-00h	3/32	13/16	1/4	2	36.00
16-52	1/8	1/4	1/4	1-1/2	26.00
<b>10 Degree - Solid Carbide</b>					
18-01h	3/32	3/8	1/4	2	26.00



37-51 2 Edge

### 'V' TIPPED BITS

Bit #	DIA	CEL	Shk	OAL	List
<b>90 Degree - Solid Carbide</b>					
37-50	3/16	5/8	1/4	2	36.00
37-51	1/4	3/4	1/4	2	34.25



92-61V 2 Edge

### 'V' BOTTOM BITS

Bit #	Wide	DOC	Shk	OAL	List
<b>45 Degree - Carbide Tipped</b>					
92-45V	5/8	3/4	1/4	2-1/4	25.00
<b>60 Degree - Carbide Tipped (WS1560 is SC)</b>					
92-60V	1/2	1/2	1/4	2-1/8	25.00
1541	1/4	7/32	1/4	2	18.00
1560	1/2	7/16	1/2	2-1/4	27.50
92-61V	3/4	3/4	1/4	2	39.00
<b>90 Degree - Carbide Tipped</b>					
85-219*	9/16	9/32	1/4	1-1/2	19.75
84-306	3/4	3/8	1/2	2	37.00
84-309	1	1/2	1/2	2-3/8	37.00
85-220*	1-1/4	5/8	1/4	1-3/4	33.00
92-24V	2	1	1/2	3-3/8	43.50
<b>120 Degree - Carbide Tipped</b>					
92-12V	1-1/4	3/8	1/4	1-7/8	36.00
92-120V	1-1/4	3/8	1/2	2	40.00
92-121V	2	1	1/2	2	66.50
<b>135 Degree - Carbide Tipped</b>					
92-135V	1-1/4	1/4	1/4	2	44.00
92-136V	2	7/8	1/2	2	66.50

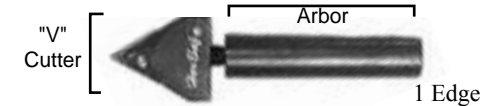
\*85-219 & 85-220 do not come to a true point



37-01 1 Edge

### ENGRAVING BITS

Bit #	Tip	DEG	Shk	OAL	List
<b>60 Degree - Solid Carbide</b>					
37-01	0.005	60	1/4	2	20.75
37-03	0.010	60	1/4	2	20.75
37-05	0.020	60	1/4	2	20.75
37-07	0.030	60	1/4	2	20.75
<b>30 Degree - Solid Carbide</b>					
37-21	0.005	30	1/4	2	20.75
37-23	0.010	30	1/4	2	20.75
37-25	0.020	30	1/4	2	20.75
37-27	0.030	30	1/4	2	20.75



1 Edge

### "V" Cutters

Part #	Width	ANGLE	List
<b>Her-Saf<sup>®</sup> in the USA</b>			
H-VS060	7/16	60	63.00
H-V090	1-1/4	90	63.00
H-V100	1-3/8	100	63.00
H-V110	1-7/16	110	63.00
H-V120	1-1/2	120	63.00
H-V130	1-9/16	130	63.00
H-V140	1-5/8	140	63.00
H-V150	1-3/4	150	63.00
H-V160	1-7/8	160	63.00
H-V170	2	170	63.00

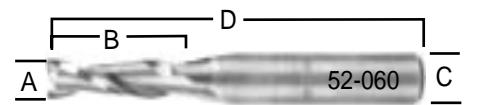
### Arbors - Screws onto "V" cutters for Shanks

Part #	SHK	OAL	List
HA-25A	1/4	1-7/8	7.75
HA-375A	3/8	1-7/8	7.75
HA-50AS	1/2	1-1/2	7.75
HA-50AL	1/2	2-3/8	7.75
HA-50AT	1/2	3-1/4	9.35

### Replaceable Blades - two useable sides

Blades for most "V" Cutters.....	10.50
Blades for H-VS060 (1 useable side) .....	13.50
Blades for Insert Cutters.....	5.00

### LEGEND



A- Dia (Diameter) C- Shk (Shank)  
B- CEL (Cutting Edge Length) D- OAL (Over All Length)

### New Item

DOC - Depth of Cut Wide - Widest End of Bit  
Deg - Degree CT - Carbide Tipped  
Rad - Radius SC - Solid Carbide  
Pt - Diameter of Flat Point B/B - Ball Bearing

85-000 Bosch Bits  
h - hartlauer specialties

# Specialty Tools

PLASTIC - WOOD - METAL

PLASTIC - WOOD - METAL



85-298

2 Edge

## CHAMFER BITS

Bit #	Deg	CEL	Shk	OAL	List
<b>Carbide Tipped</b> - With 1/2" Ball Bearing Pilot					
85-298	45	11/16	1/4	2-1/4	33.00
92-22	45	1	1/2	3	42.00
<b>High Speed Steel</b> - With 3/8" Self Pilot					
85-131	45	1/2	1/4	1-3/4	10.50



85-296

2 Edge

## ROUND-OVER BITS

Bit #	Rad	CEL	Shk	OAL	List
<b>Carbide Tipped</b> - With 1/2" Ball Bearing Pilot					
85-289	1/16	5/16	1/4	1-7/8	32.00
85-290	1/8	5/16	1/4	2	33.00
85-293	3/16	1/2	1/4	2-1/8	34.00
85-294	1/4	1/2	1/4	2-3/16	34.00
85-295	5/16	9/16	1/4	2-3/16	35.00
85-296	3/8	5/8	1/4	2-3/8	36.00
85-297	1/2	13/16	1/4	2-1/2	36.00
92-27	3/4	1	1/2	3-1/4	35.00
92-28	1	1	1/2	3-1/2	60.00



92-394

2 Edge

## ROUND-OVER BITS

Bit #	Rad	CEL	Shk	OAL	List
<b>Carbide Tipped</b> - Plunges for use in CNC machines					
Flat Bottom					
92-393	1/8	3/8	1/4	1-5/8	21.00
92-395	3/16	1/2	1/4	1-3/4	25.00
92-394	1/4	5/8	1/4	2-1/4	29.00
92-694	1/4	1/2	1/2	2-1/4	29.00
92-695	3/8	5/8	1/2	2-1/2	31.00
92-696	1/2	1	1/2	2-5/8	38.00
"V" Bottom					
92-394V	1/4	3/8	1/4	2-1/4	26.00
92-397V	3/8	5/8	1/4	2-1/2	33.00
92-396V	1/2	1/2	1/4	2-5/8	38.00



85-205

2 Edge

## COVE BITS

Bit #	Rad	CEL	Shk	OAL	List
<b>Carbide Tipped</b> - With 1/2" Ball Bearing Pilot					
85-205	1/4	1/2	1/4	2-1/8	35.00
85-206	3/8	9/16	1/4	2-1/4	35.00
85-207	1/2	5/8	1/4	2-1/4	37.00



28-55

1-3 Edges

## FLUSH TRIM BITS

Bit #	Dia	CEL	Shk	OAL	List
<b>Carbide Tipped</b>					
2 Edge - With Ball Bearing Pilot on Tip					
92-900	1/4	3/4	1/4	2-1/4	32.00
28-55	1/4	1	1/4	2-1/2	31.50
92-100	1/4	1-1/4	1/4	2-3/4	35.00
85-268	3/8	1	1/4	2-1/2	18.75
85-266	1/2	1	1/4	2-3/8	20.00
85-441	1/2	1	1/2	2-5/8	21.00
92-400	1/2	2-1/2	1/2	5	50.00
2 Edge - With 1/2" Ball Bearing on Shank					
85-680	1/2	1	1/4	2-1/2	29.75
3 Edge - With 1/2" Ball Bearing Pilot on Tip					
85-216	1/2	1	1/4	2-1/2	24.00
85-602	1/2	1-1/2	1/2	4-1/2	34.00
<b>Solid Carbide</b> - With 1/4" Self Pilot 1-Edge					
27-00	1/4	1/4	1/4	1-1/2	13.00

2 Edge

## OVER HANG BITS

Bit #	Dia	B/B	CEL	Shk	OAL	List
<b>Carbide Tipped</b> - With Ball Bearing Pilot						
92-200	3/8	1/2	1	1/4	2-1/2	23.00
85-210	1/2	5/8	1	1/4	2-5/8	24.00

## Accessories

### METAL ADAPTER BUSHINGS

1/8" - 1/4".....6.00	5/16" - 1/2".....10.00
3/16" - 1/4".....6.00	3/8" - 1/2".....10.00
1/4" - 1/2".....10.00	

### DOUBLE-STICK TAPE

(Used to hold the material down while being cut)

1/2" wide - 36 yd.....3.75 per roll
3/4" wide - 36 yd.....5.25 per roll
1" wide - 36 yd.....7.50 per roll
2" wide - 36 yd.....13.50 per roll
3" wide - 36 yd.....18.50 per roll

### MISCELLANEOUS

Porter Cable Routers:	
#690 (1-1/2 HP).....	159.00
#75182 (3-1/4 HP, 5 speed).....	350.00
Porter Cable Collets: 1/4"- 3/8"- 1/2".....12.50	
SYOZ-20 Collets: All Sizes .....	36.00
ER-25 & 32 Collets: All Sizes.....	27.00
Brass Collet Brushes: 1/4" - 3/8" - 1/2".....6.50ea	

### C.R.C OIL - #3-36 (do not dilute)

(Used in cutting aluminum to mist the bit)
Aerosol Can 5.00.....Gallon 25.00



48-206h



52-554

## EXTRA LONG Cutting Edge Lengths

Bit #	Dia	CEL	Shk	OAL	List
<b>Solid Carbide</b>					
1 Edge Up-Cut Spirals					
63-726	1/4	1-1/4	1/4	3	29.00
63-776	1/4	1-1/4	1/4	3	29.00
2 Edge Up-Cut Spirals					
52-554	1/8	1-1/16	1/4	2-1/2	41.75
92-140	1/8	1-1/16	1/8	3	22.00
52-558	3/16	1-1/8	3/16	2-1/2	41.75
52-160h	3/16	1-1/8	1/4	2-1/2	34.00
52-560	3/16	1-5/8	3/16	3-1/2	45.25
92-262*	3/16	1-5/8	3/16	3	20.00
52-287	1/4	1-1/8	1/4	3	26.00
52-180h	1/4	1-1/4	1/4	2-1/2	30.00
52-181h	1/4	1-3/8	1/4	3	36.00
52-281h	1/4	1-3/4	1/4	3-1/2	46.50
52-564	1/4	2-1/4	1/4	3-1/2	47.75
52-570	5/16	3-1/8	5/16	4-1/2	53.50
52-574	3/8	3-1/2	3/8	5	59.50
4 Edge Up-Cut Spirals					
92-141	1/8	1-1/16	1/8	3	21.00
92-184	1/4	1-1/4	1/4	2-1/2	20.00
92-284	1/4	2-1/4	1/4	3-1/2	35.00
92-484	1/2	3	1/2	6	130.00
1 Edge Straight					
61-140h	1/8	13/16	1/4	2	32.00
61-063h	3/16	1	1/4	2-1/2	31.50
2 Edge Straight					
56-287	1/4	1-1/8	1/4	3	26.50
56-281h	1/4	1-5/8	1/4	3	43.00
56-282h	1/4	2-1/4	1/4	3-1/2	50.00
<b>High Speed Steel</b>					
2 Edge Up-Cut Spirals					
40-201h	1/8	1-1/16	1/4	2-1/2	19.00
40-282h	1/4	2-1/8	1/4	3-1/2	22.00
40-212h	5/16	3-1/8	5/16	5-1/4	45.00
4 Edge Up-Cut Spirals					
92-384	3/8	2-5/8	3/8	4-1/4	20.00
92-414	1/2	3	1/2	5	24.00
40-564	1/2	4-1/8	1/2	6-1/2	47.25
<b>Carbide Tipped</b>					
2 Edge Straight					
48-206h	1/4	1-1/4	1/4	2-3/4	27.50
48-080	1/2	1-1/2	1/2	3	25.00
85-251	1/2	2	1/2	4	22.00
48-181	1/2	2-1/4	1/2	4-1/4	40.00

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