

*2018 / 2019*  
**PRODUCT CATALOG**

**ARCH**<sup>TM</sup>  
GLOBAL PRECISION

AMERICAN MANUFACTURING, SERVING THE WORLD

# NEW PRODUCTS FOR 2018

## CHAMFER MILLS



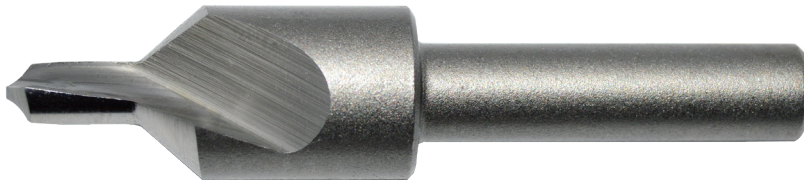
- 2- flute or 4-flute
- Single end (SE) or Double end (DE)
- 60°, 82°, 90°, 100° included angles
- Designed for deburring and chamfering

## DRILL MILLS



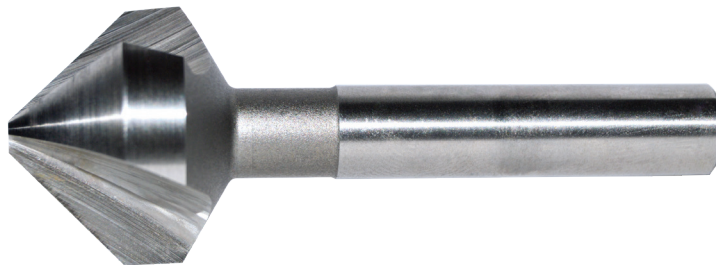
- 2- flute or 4-flute
- Single end (SE)
- 60°, 82°, 90°, 100° included angles
- Used for a variety of applications milling, chamfering and spotting

# CAP SCREW CENTERDRILLS



- HSS tools designed to produce a hole and countersink (82°) to accommodate certain flat head socket cap screw sizes - #5, #6, #8, #10, #12, 1/4", 5/16", 3/8" – in two versions:
- High Performance
- Sized to produce a hole diameter to clear the threaded portion of the screw and to allow tapping.

# EURO-STYLE 3-FLUTE COUNTERSINK



- High Performance
- Much more aggressive countersink than the 3-flute center reamer
- Premium M42 material
- Diameters: 1/4", 3/8", 1/2", 5/8", 3/4", 1" 1/4".
- Angles: 60°, 82°, 90°, 100°
- Body relieved to cut

# ***A Name You Can Trust***



KEO is the recognized world leader in performance solid cutting tools since its inception back in the 1940s, with plants located in Warren, Michigan, and sister company KEO Milling Cutters, in Athol, Massachusetts. 9,000+ standard tools are produced here and ready to ship!

The KEO brand is synonymous with quality and our products are used by the most successful machining businesses around the world. Over seventy years of commitment to providing the best value is evident in our extensive product offering and our competitive pricing. Whether we are producing our standard catalog offering or quickly turning a special order for our customers, all tools are produced here in the USA by our highly skilled and prideful associates. In today's global market you need quality, precision and speed; that's what you get from KEO, an American made product and a name you can trust.

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**Warning:**  
*Cutting tools may shatter when broken. The wearing of eye protection is strongly advised in the vicinity of their use.*

Special diameters, flute lengths, long reach, tool coatings etc. are quoted on request.  
**Please call 888.390.2050.**

A

COMBINED DRILL & COUNTERSINKS



**Combined Drill & Countersinks 2**

Double-End Plain Type	3,4
Solid Carbide Plain Type	5
Double-End Radius Type	6
Double-End Bell Type	7
Single-End Plain Type Hey	8
Single-End Bell Type Hey	9
Double-End Plain Type Hey	10
Double-End Bell Type Hey	11
Jig Bore Type	12

**Metric Combined Drill & Countersinks 13-15**

Metric Double-End Type A	13
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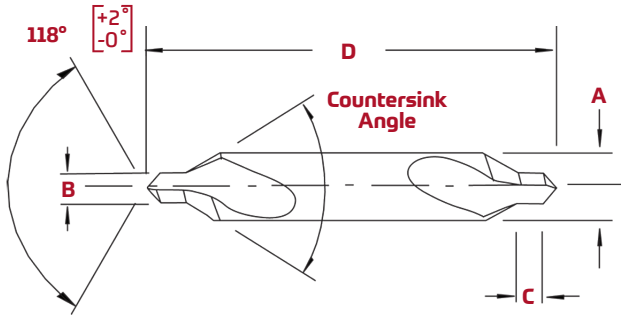
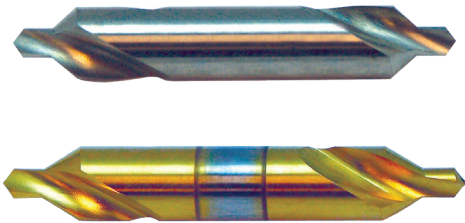
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**COMBINED DRILL & COUNTERSINKS**

KEO Plain Type combined drill and countersinks are used for producing center holes in components or workpieces which require machining between centers.

Also available with titanium-nitride coating or in a 5-piece set. For set information see **page 70**.



**HSS COBALT**

**60° Countersink Angle**

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	A	B	C	D										
Size	Body Dia.	Point Dia.	Point Length	OAL	HSS	Price	HSS-TiN	Price	HSS-LH	Price	CO	Price	T15	Price
#5-0	1/8	0.010	0.010	1-1/4	10010	\$8.57	10010-TiN	\$9.55	10013	\$31.99	10012	\$33.70	10011	\$50.57
#4-0	1/8	0.015	0.015	1-1/4	10015	\$7.87	10015-TiN	\$8.86	10018	\$31.99	10017	\$32.75	10016	\$49.16
#3-0	1/8	0.020	0.020	1-1/4	10020	\$7.45	10020-TiN	\$8.46	10023	\$20.16	10022	\$22.25	10021	\$33.40
#2-0	1/8	0.025	0.025	1-1/4	10025	\$7.45	10025-TiN	\$8.46	10028	\$20.16	10027	\$22.25	10026	\$33.40
#0	1/8	1/32	1/32	1-1/4	10032	\$7.45	10032-TiN	\$8.46	10035	\$20.16	10034	\$22.25	10033	\$33.40
#1	1/8	3/64	3/64	1-1/4	10100	\$5.20	10100-TiN	\$6.19	10150	\$11.09	10142	\$12.05	10115	\$17.92
#2	3/16	5/64	5/64	1-7/8	10200	\$5.43	10200-TiN	\$6.83	10250	\$11.32	10242	\$12.44	10215	\$18.43
#3	1/4	7/64	7/64	2	10300	\$5.66	10300-TiN	\$7.56	10350	\$11.62	10342	\$12.85	10315	\$18.93
#4	5/16	1/8	1/8	2-1/8	10400	\$5.83	10400-TiN	\$9.04	10450	\$11.96	10442	\$13.39	10415	\$19.10
#4-1/2	3/8	9/64	9/64	2-1/2	14500	\$8.04	14500-TiN	\$11.24	14550	\$16.73	14542	\$19.90	14515	\$25.13
#5	7/16	3/16	3/16	2-3/4	10500	\$9.25	10500-TiN	\$14.35	10550	\$18.20	10542	\$21.10	10515	\$30.01
#6	1/2	7/32	7/32	3	10600	\$13.91	10600-TiN	\$19.02	10650	\$26.41	10642	\$32.73	10615	\$46.29
#7	5/8	1/4	1/4	3-1/4	10700	\$21.10	10700-TiN	\$29.13	10750	\$36.68	10742	\$49.25	10715	\$68.75
#8	3/4	5/16	5/16	3-1/2	10800	\$28.99	10800-TiN	\$38.12	10850	\$49.65	10842	\$69.73	10815	\$99.72
#9	7/8	11/32	11/32	3-5/8	10900	\$52.59	10900-TiN	\$65.14	10950	\$91.27	10942	\$129.10	10915	\$185.61
#10	1	3/8	3/8	3-3/4	11000	\$69.03	11000-TiN	\$85.01	11050	\$119.81	11042	\$169.51	11015	\$243.69

Product numbers 10010,10015,10020,10025,10032,10100,10200,10300,10400,10500,10600,and 10700 are sold in Packs of 12  
 Product number 10800 is sold in packs of 6  
 Product numbers 10900 and 11000 are sold in packs of 3  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.

**Continues on next page**

Tolerances		High	Low
OAL		+1/32	-1/16
Point Ø		+0.003	-0.0
Point Length	Point Ø < 1/32	+0.005	-0.005
	1/32 ≤ Point Ø ≤ 5/64	+0.008	-0.008
	Point > 5/64	+1/64	-1/64
CS Angle		+1°	-1°
Body Ø		+0.0	-0.002

**A**

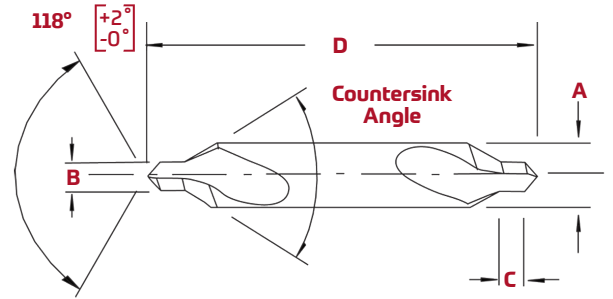
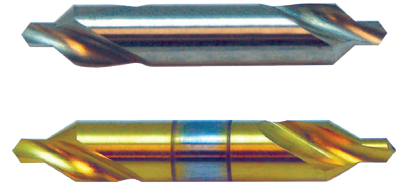
**COMBINED DRILL & COUNTERSINKS**



# DOUBLE-END PLAIN TYPE (CONT.)

## HSS

Size	HSS				82° Countersink Angle			
	Body Dia.	Point Dia.	Point Length	OAL	HSS	Price	HSS-TiN	Price
#5-0	1/8	0.010	0.010	1-1/4	10038	\$28.04	10038-TiN	\$30.57
#4-0	1/8	0.015	0.015	1-1/4	10039	\$28.04	10039-TiN	\$30.57
#3-0	1/8	0.020	0.020	1-1/4	10040	\$17.97	10040-TiN	\$19.93
#2-0	1/8	0.025	0.025	1-1/4	10029	\$18.96	10029-TiN	\$19.93
#0	1/8	1/32	1/32	1-1/4	10036	\$18.96	10036-TiN	\$19.93
#1	1/8	3/64	3/64	1-1/4	10182	\$8.50	10182-TiN	\$9.46
#2	3/16	5/64	5/64	1-7/8	10282	\$8.70	10282-TiN	\$10.11
#3	1/4	7/64	7/64	2	10382	\$9.00	10382-TiN	\$10.87
#4	5/16	1/8	1/8	2-1/8	10482	\$9.36	10482-TiN	\$12.48
#4-1/2	3/8	9/64	9/64	2-1/2	14582	\$12.81	14582-TiN	\$15.95
#5	7/16	3/16	3/16	2-3/4	10582	\$14.27	10582-TiN	\$19.25
#6	1/2	7/32	7/32	3	10682	\$21.59	10682-TiN	\$26.58
#7	5/8	1/4	1/4	3-1/4	10782	\$30.56	10782-TiN	\$38.39
#8	3/4	5/16	5/16	3-1/2	10882	\$42.85	10882-TiN	\$51.75
#9	7/8	11/32	11/32	3-5/8	10982	\$79.03	10982-TiN	\$91.27
#10	1	3/8	3/8	3-3/4	11082	\$103.97	11082-TiN	\$119.56



A

AIRCRAFT

COMBINED DRILL & COUNTERSINKS

## 90° Countersink Angle

Size	HSS				90° Countersink Angle			
	Body Dia.	Point Dia.	Point Length	OAL	HSS	Price	HSS-TiN	Price
#5-0	1/8	0.010	0.010	1-1/4	10014	\$29.60	10014-TiN	\$30.57
#4-0	1/8	0.015	0.015	1-1/4	10019	\$29.60	10019-TiN	\$30.57
#3-0	1/8	0.020	0.020	1-1/4	10024	\$18.96	10024-TiN	\$19.93
#2-0	1/8	0.025	0.025	1-1/4	10030	\$18.96	10030-TiN	\$19.93
#0	1/8	1/32	1/32	1-1/4	10037	\$18.96	10037-TiN	\$19.93
#1	1/8	3/64	3/64	1-1/4	10190	\$8.50	10190-TiN	\$9.46
#2	3/16	5/64	5/64	1-7/8	10290	\$8.70	10290-TiN	\$10.09
#3	1/4	7/64	7/64	2	10390	\$9.00	10390-TiN	\$10.85
#4	5/16	1/8	1/8	2-1/8	10490	\$9.36	10490-TiN	\$12.48
#4-1/2	3/8	9/64	9/64	2-1/2	14590	\$12.81	14590-TiN	\$15.94
#5	7/16	3/16	3/16	2-3/4	10590	\$14.27	10590-TiN	\$19.24
#6	1/2	7/32	7/32	3	10690	\$21.59	10690-TiN	\$26.58
#7	5/8	1/4	1/4	3-1/4	10790	\$30.56	10790-TiN	\$38.39
#8	3/4	5/16	5/16	3-1/2	10890	\$42.85	10890-TiN	\$51.75
#9	7/8	11/32	11/32	3-5/8	10990	\$79.03	10990-TiN	\$91.27
#10	1	3/8	3/8	3-3/4	11090	\$103.97	11090-TiN	\$119.56

Tolerances		High	Low
OAL		+1/32	-1/16
Point Ø		+0.003	-0.0
Point Length	Point Ø < 1/32	+0.005	-0.005
	1/32 ≤ Point Ø ≤ 5/64	+0.008	-0.008
	Point > 5/64	+1/64	-1/64
CS Angle		+1°	-1°
Body Ø		+0.0	-0.002

Product numbers 10014, 10019, 10024, 10030, 10037, 10190, 10290, 10390, 10490, 10590, 10690, and 10790 are sold in Packs of 12

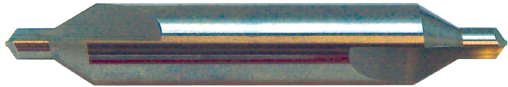
Product number 10890 is sold in packs of 6

Product numbers 10990 and 11090 are sold in packs of 3

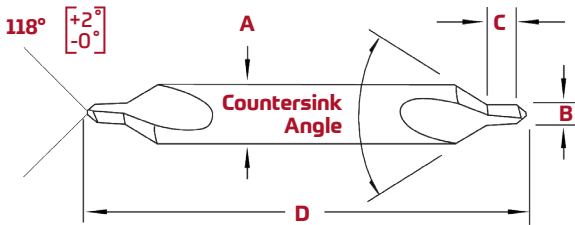
All dimensions in inches. Many tools are available with additional coatings. Please call for quote.



KEO Plain Type solid carbide combined drill and countersinks with straight flutes are used for producing center holes in components or workpieces which require machining between centers.



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## 60° Countersink Angle

Size	Body Dia.	Point Dia.	Point Length	OAL	Cut	60°	
						60°	Price
#5-0	1/8	0.010	0.010 SE	1-1/2	RH	19010	\$27.83
#4-0	1/8	0.015	0.015 SE	1-1/2	RH	19015	\$26.14
#3-0	1/8	0.020	0.020 SE	1-1/2	RH	19020	\$19.17
#2-0	1/8	0.025	0.025	1-1/2	RH	19025	\$15.46
#0	1/8	1/32	1/32	1-1/2	RH	19032	\$14.04
#1	1/8	3/64	3/64	1-1/2	RH	19105	\$14.04
#2	3/16	5/64	5/64	1 7/8	RH	19205	\$21.17
#3	1/4	7/64	7/64	2	RH	19305	\$28.18
#4	5/16	1/8	1/8	2-1/8	RH	19405	\$35.86
#5	7/16	3/16	3/16	2 3/4	RH	19505	\$55.90
#6	1/2	7/32	7/32	3	RH	19605	\$73.65
#7	5/8	1/4	1/4	3-1/4	RH	19705	\$164.48
#8	3/4	5/16	5/16	3-1/2	RH	19805	\$224.31

All dimensions in inches. SE denotes single-end combined drill and countersinks. Many tools are available with additional coatings.

Please call for quote.

Refer to page 17 for Long Series Solid Carbide Combined Drill and Countersinks  
Refer to page 4 for Tolerances table

## 82° and 90° Countersink Angle

Size	Body Dia.	Point Dia.	Point Length	OAL	Cut	82° and 90°			
						82°	Price	90°	Price
#5-0	1/8	0.010	0.010 SE	1-1/2	RH	19011	\$27.83	19012	\$27.83
#4-0	1/8	0.015	0.015 SE	1-1/2	RH	19018	\$26.14	19019	\$26.14
#3-0	1/8	0.020	0.020 SE	1-1/2	RH	19021	\$19.17	19022	\$19.17
#2-0	1/8	0.025	0.025	1-1/2	RH	19028	\$14.76	19029	\$14.76
#0	1/8	1/32	1/32	1-1/2	RH	19038	\$13.41	19039	\$13.41
#1	1/8	3/64	3/64	1-1/2	RH	19108	\$13.41	19109	\$13.41
#2	3/16	5/64	5/64	1 7/8	RH	19208	\$20.21	19209	\$20.21
#3	1/4	7/64	7/64	2	RH	19308	\$26.91	19309	\$26.91
#4	5/16	1/8	1/8	2-1/8	RH	19408	\$34.26	19409	\$34.26
#5	7/16	3/16	3/16	2 3/4	RH	19508	\$53.39	19509	\$53.39
#6	1/2	7/32	7/32	3	RH	19608	\$70.35	19609	\$70.35
#7	5/8	1/4	1/4	3-3/4	RH	19708	\$157.10	19709	\$157.10
#8	3/4	5/16	5/16	4	RH	19808	\$214.24	19809	\$214.24

All dimensions in inches. SE denotes single-end combined drill and countersinks. Many tools are available with additional coatings.

Please call for quote.

Refer to page 17 for Long Series Solid Carbide Combined Drill and Countersinks  
Refer to page 4 for Tolerances table

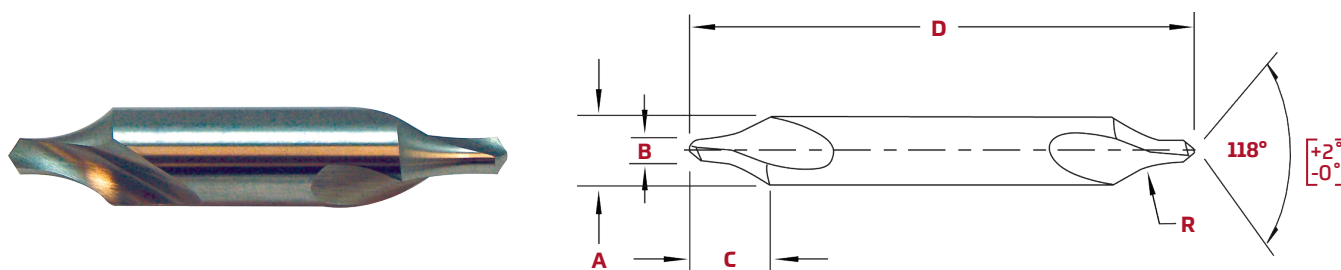
**A**

**COMBINED DRILL & COUNTERSINKS**



# DOUBLE-END RADIUS TYPE

KEO Radius Type combined drill and countersinks are available in the American standard sizes. These “radius” drills are designed to reduce the bearing surface of the center hole and provide a protected centering seat while reducing the risk of breakage.



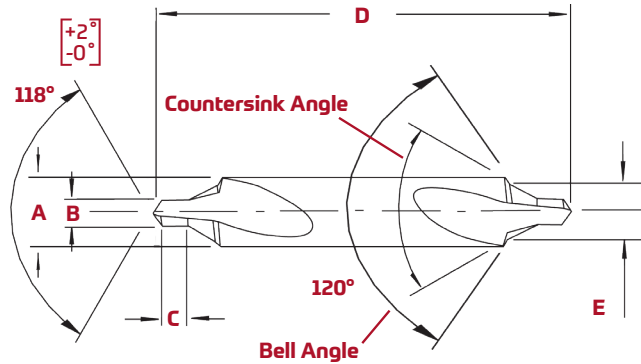
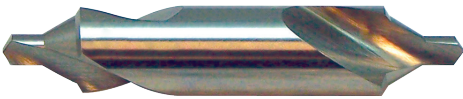
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**COMBINED DRILL & COUNTERSINKS**

		HSS					Radius Type			
		A	B	C	D	R				
AIR CRAFT	Size	Body Dia.	Point Dia.	Point Length	OAL	Radius	HSS	Price	HSS-TiN	Price
	#5-0	1/8	0.010	0.068	1-1/4	1/16	10050	\$10.01	10050-TiN	\$11.00
	#4-0	1/8	0.015	0.083	1-1/4	5/64	10055	\$9.49	10055-TiN	\$10.49
	#3-0	1/8	0.020	0.097	1-1/4	3/32	10060	\$8.21	10060-TiN	\$9.20
	#2-0	1/8	0.025	0.109	1-1/4	7/64	10065	\$8.21	10065-TiN	\$9.20
	#0	1/8	1/32	0.118	1-1/4	1/8	10070	\$8.21	10070-TiN	\$9.20
	#1	1/8	3/64	0.132	1-1/4	5/32	10110	\$6.42	10110-TiN	\$7.40
	#2	3/16	5/64	0.204	1-7/8	7/32	10210	\$6.81	10210-TiN	\$8.24
	#3	1/4	7/64	0.275	2	9/32	10310	\$7.37	10310-TiN	\$9.28
	#4	5/16	1/8	11/32	2-1/8	3/8	10410	\$8.27	10410-TiN	\$11.49
	#4-1/2	3/8	9/64	13/32	2-1/2	7/16	14510	\$10.14	14510-TiN	\$13.35
	#5	7/16	3/16	31/64	2-3/4	1/2	10510	\$11.52	10510-TiN	\$16.65
	#6	1/2	7/32	35/64	3	9/16	10610	\$17.41	10610-TiN	\$22.53
	#7	5/8	1/4	43/64	3-1/4	45/64	10710	\$25.53	10710-TiN	\$33.59
	#8	3/4	5/16	13/16	3-1/2	7/8	10810	\$34.49	10810-TiN	\$43.65
	#9	7/8	11/32	15/16	3-5/8	1	10910	\$64.48	10910-TiN	\$77.09
	#10	1	3/8	1-1/16	3-3/4	1 7/64	11010	\$84.33	11010-TiN	\$100.37

Product numbers 10050, 10055, 10060, 10065, 10070, 10110, 10210, 10310, 10410, 10510, 10610, and 10710 are sold in packs of 12  
 Product number 10810 is sold in packs of 6  
 Product numbers 10910 and 11010 are sold in packs of 3  
 All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

KEO Bell Type combined drill and countersinks are used for producing protected center holes in components or workpieces which require machining between centers as the additional 120° included chamfer eliminates the risk of deforming the countersink seat.



### HSS COBALT

	A	B	C	D	E	60° Countersink Angle									
Size	Body Dia.	Point Dia.	Point Length	OAL	Bell Dia.	HSS	Price	HSS-TIN	Price	HSS-LH	Price	CO	Price	T15	Price
#11	1/8	3/64	3/64	1-1/4	0.100	11100	\$6.20	11100-TIN	\$7.19	11150	\$14.42	11142	\$14.72	11115	\$19.72
#12	3/16	1/16	1/16	1-7/8	0.150	11200	\$6.50	11200-TIN	\$7.92	11250	\$14.88	11242	\$15.10	11215	\$20.19
#13	1/4	3/32	3/32	2	0.200	11300	\$6.59	11300-TIN	\$8.50	11350	\$15.31	11342	\$15.50	11315	\$20.73
#14	5/16	7/64	7/64	2-1/8	0.250	11400	\$6.81	11400-TIN	\$10.02	11450	\$15.91	11442	\$16.02	11415	\$21.18
#15	7/16	5/32	5/32	2-3/4	0.350	11500	\$10.35	11500-TIN	\$15.48	11550	\$22.23	11542	\$25.54	11515	\$33.49
#16	1/2	3/16	3/16	3	0.400	11600	\$15.96	11600-TIN	\$21.08	11650	\$32.39	11642	\$39.49	11615	\$50.98
#17	5/8	7/32	7/32	3-1/4	0.500	11700	\$24.71	11700-TIN	\$32.77	11750	\$45.65	11742	\$58.78	11715	\$76.53
#18	3/4	1/4	1/4	3-1/2	0.600	11800	\$32.75	11800-TIN	\$41.91	11850	\$60.11	11842	\$82.01	11815	\$109.06
#19	7/8	5/16	5/16	3-5/8	0.700	11900	\$56.52	11900-TIN	\$69.12	11950	\$106.23	11942	\$139.09	11915	\$186.15
#20	1	3/8	3/8	3-3/4	0.800	12000	\$72.84	12000-TIN	\$88.88	12050	\$136.92	12042	\$179.32	12015	\$240.07

Product numbers 11150,11142,11115, 11200,11300,11400,11500,11600,11700 are sold in packs of 12  
 Product numbers 11800,11850,11842,and 11815 are sold in packs of 6  
 Product numbers 11900,11950,11942,12000,12050,12042,and 12015 are sold in packs of 3  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.

### CARBIDE

	A	B	C	D	E	60° Countersink Angle - Double End	
Size	Body Dia.	Point Dia.	Point Length	OAL	Bell Dia.	Product #	Price
#11	1/8	3/64	3/64	1-1/4	0.100	19110	\$22.27
#12	3/16	1/16	1/16	1-7/8	0.150	19120	\$25.89
#13	1/4	3/32	3/32	2	0.200	19130	\$33.87
#14	5/16	7/64	7/64	2-1/8	0.250	19140	\$43.50
#15	7/16	5/32	5/32	2-3/4	0.350	19150	\$69.00
#16	1/2	3/16	3/16	3	0.400	19160	\$89.30

All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.

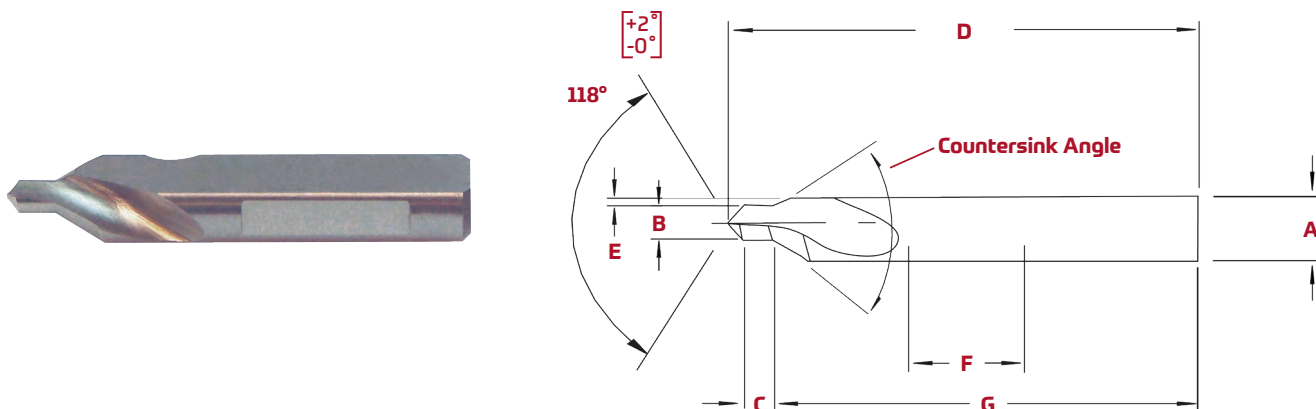
Tolerances	High	Low
OAL	+1/32	-1/16
Point Ø	+0.003	-0.0
Point Length	Point Ø < 1/32	+0.005 -0.005
	1/32 ≤ Point Ø ≤ 5/64	+0.008 -0.008
	Point > 5/64	+1/64 -1/64
Point Angle	2°	0°
Bell Dia.	+0.005	-0.005
Angles	+1°	-1°
Body Ø	+0.0	-0.002

# A

# COMBINED DRILL & COUNTERSINKS



KEO Plain-Hey Type combined drill and countersinks are designed for use with inserts for producing center holes in components as well as facing the surface of the workpiece, thus combining two machining operations into one.



## HSS

	A	B	C	D	E	F	G	60° Countersink Angle-Plain Type					
Size	Body Dia.	Point Dia.	Point Length	OAL	Full Flat depth	Body Flat Length	C'Sink Body Length ±.003	Body Flat Offset	Body Flat Depth	HSS	Price	HSS-TiN	Price
#1	1/8	3/64	3/64	1-1/4	0.020	5/16	1.191	3/8	0.020	10121	\$10.37	10121-TiN	\$11.44
#2	3/16	5/64	5/64	1-7/8	0.043	5/16	1.777	13/32	0.018	10221	\$11.65	10221-TiN	\$13.20
#3	1/4	7/64	7/64	2	0.055	1/2	1.863	15/32	0.040	10321	\$11.85	10321-TiN	\$13.90
#4	5/16	1/8	1/8	2-1/8	0.075	1/2	1.969	11/16	0.023	10421	\$12.00	10421-TiN	\$15.48
#5	7/16	3/16	3/16	2-1/4	0.086	3/4	2.016	11/16	0.023	10521	\$14.06	10521-TiN	\$19.59
#6	1/2	7/32	7/32	2-1/2	0.086	3/4	2.227	11/16	0.020	10621	\$17.64	10621-TiN	\$23.15
#7	5/8	1/4	1/4	2-3/4	0.105	3/4	2.438	11/16	0.020	10721	\$24.63	10721-TiN	\$33.31
#8	3/4	5/16	5/16	3	0.100	3/4	2.610	11/16	0.020	10821	\$32.74	10821-TiN	\$42.62

Product numbers 10121, 10221, 10321, 10421, 10521, 10621, and 10721 are sold in packs of 12

Product number 10821 is sold in packs of 6

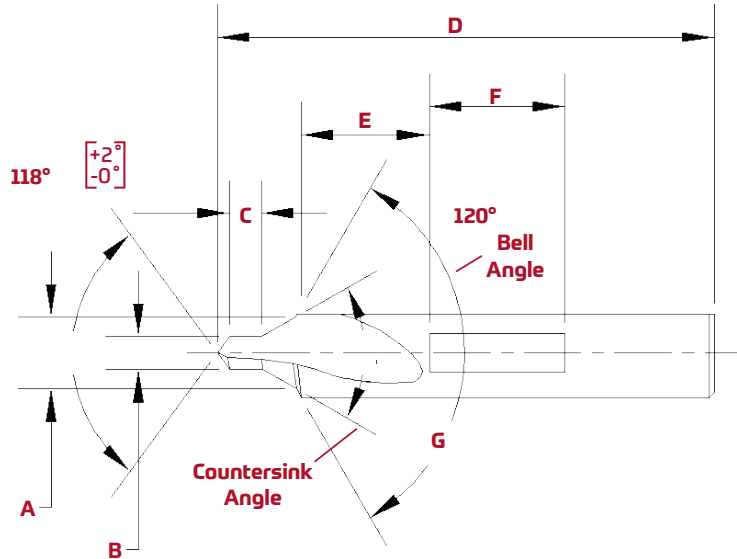
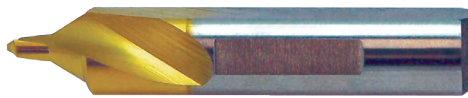
All dimensions in inches. Many tools are available with additional coatings.

Please call for quote.

# A

# COMBINED DRILL & COUNTERSINKS

KEO Bell-Hey Type combined drill and countersinks are designed for use with inserts for producing protective center holes in components as well as facing the surface of the workpiece, thus combining two machining operations into one.



## HSS

	A	B	C	D	E	F	G	60° Countersink Angle-Bell Type						
Size	Body Dia.	Point Dia.	Point Length	OAL	Full Flat Depth	Body Flat Length	C'Sink Body Length ±.003	Body Flat Offset	Body Flat Depth	Bell Dia.	HSS	Price	HSS-TiN	Price
#11	1/8	3/64	3/64	1-1/4	0.020	5/16	1.191	3/8	0.020	0.100	11121	\$20.02	11121-TiN	\$21.06
#12	3/16	1/16	1/16	1-7/8	0.038	5/16	1.797	15/32	0.018	0.150	11221	\$13.22	11221-TiN	\$14.79
#13	1/4	3/32	3/32	2	0.035	5/16	1.883	15/32	0.015	0.200	11321	\$13.12	11321-TiN	\$15.17
#14	5/16	7/64	7/64	2-1/8	0.051	1/2	1.988	11/16	0.023	0.250	11421	\$13.29	11421-TiN	\$16.76
#15	7/16	5/32	5/32	2-1/4	0.066	3/4	2.055	11/16	0.023	0.350	11521	\$15.61	11521-TiN	\$21.13
#16	1/2	3/16	3/16	2-1/2	0.066	3/4	2.266	11/16	0.020	0.400	11621	\$19.66	11621-TiN	\$25.19
#17	5/8	7/32	7/32	2-3/4	0.085	3/4	2.477	11/16	0.020	0.500	11721	\$27.33	11721-TiN	\$36.00
#18	3/4	1/4	1/4	3	0.080	3/4	2.688	11/16	0.020	0.600	11821	\$36.32	11821-TiN	\$46.20

Product numbers 11121, 11221, 11321, 11421, 11521, 11621, and 11721 are sold in packs of 12

Product number 11821 is sold in packs of 6

All dimensions in inches. Many tools are available with additional coatings.

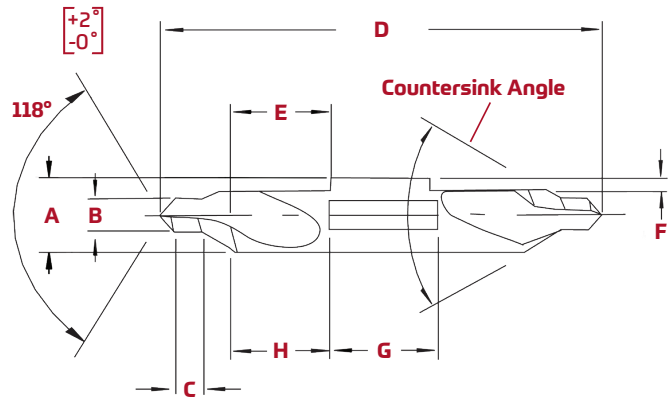
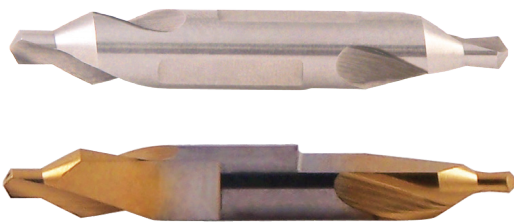
Please call for quote.

# A

# COMBINED DRILL & COUNTERSINKS



KEO Plain-Hey Type combined drill and countersinks are designed for use with inserts for producing center holes in components as well as facing the surface of the workpiece, thus combining two machining operations into one.



## HSS

	A	B	C	D	E	F	G	H	60° Countersink Angle-Plain Type				
Size	Body Dia.	Point Dia.	Point Length	OAL	End Flat Length	End Flat Depth	Body Flat Length	Body Flat Offset	Body Flat Depth	HSS	Price	HSS-TiN	Price
#1	1/8	3/64	3/64	1-1/4	1/4	0.016	3/8	3/8	0.020	10120	\$15.82	10120-TiN	\$16.88
#2	3/16	5/64	5/64	1-7/8	1/4	0.038	3/8	13/32	0.032	10220	\$17.77	10220-TiN	\$19.31
#3	1/4	7/64	7/64	2	1/2	0.055	1/2	15/32	0.040	10320	\$18.06	10320-TiN	\$20.12
#4	5/16	1/8	1/8	2-1/8	9/16	0.071	1/2	11/16	0.033	10420	\$18.31	10420-TiN	\$21.78
#5	7/16	3/16	3/16	2-3/4	5/8	0.093	5/8	5/8	0.048	10520	\$21.45	10520-TiN	\$26.97
#6	1/2	7/32	7/32	3	5/8	0.098	1/2	3/4	0.035	10620	\$26.90	10620-TiN	\$32.43
#7	5/8	1/4	1/4	3-1/4	5/8	0.113	1/2	3/4	0.050	10720	\$37.57	10720-TiN	\$46.25
#8	3/4	5/16	5/16	3-1/2	5/8	0.120	9/16	3/4	0.040	10820	\$49.94	10820-TiN	\$59.81

Product numbers 10120, 10220, 10320, 10420, 10520, 10620, and 10720 are sold in packs of 12

Product number 10820 is sold in packs of 6

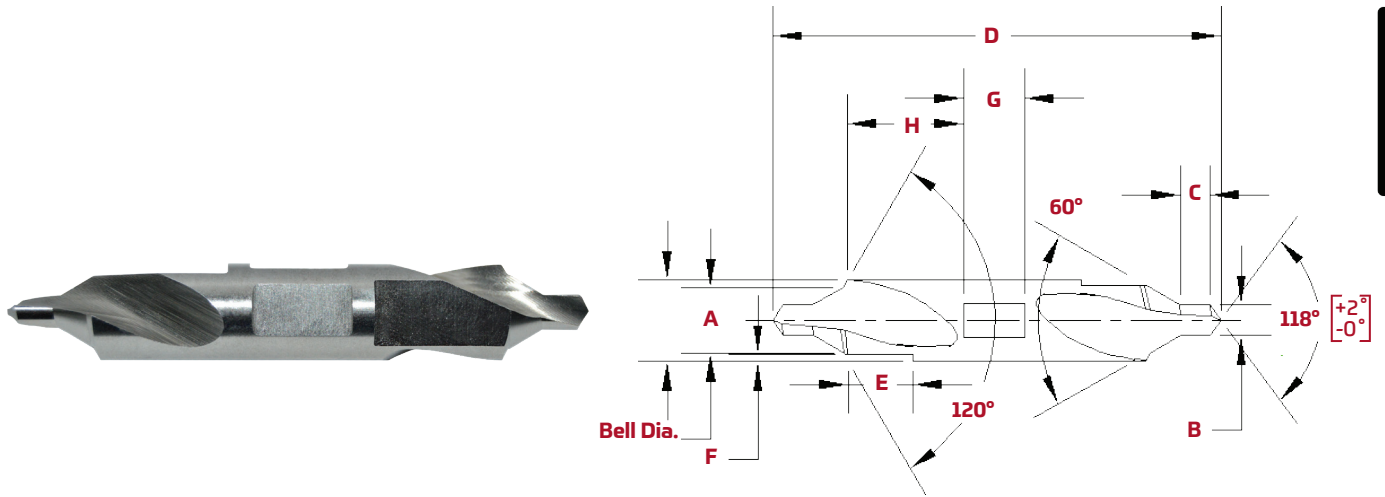
All dimensions in inches. Many tools are available with additional coatings.

Please call for quote.

# A

# COMBINED DRILL & COUNTERSINKS

KEO Bell-Hey Type combined drill and countersinks are designed for use with inserts for producing protective center holes in components as well as facing the surface of the workpiece, thus combining two machining operations into one.



**HSS**

	A	B	C	D	E	F	G	H	<b>60° Countersink Angle-Bell Type</b>					
Size	Body Dia.	Point Dia.	Point Length	OAL	End Flat Length	End Flat Depth	Body Flat Length	Body Flat Offset	Body Flat Depth	Bell Dia.	HSS	Price	HSS-TiN	Price
#11	1/8	3/64	3/64	1-1/4	1/4	0.019	13/32	11/32	0.020	0.100	11120	\$30.52	11120-TiN	\$31.59
#12	3/16	1/16	1/16	1-7/8	1/4	0.038	25/64	13/32	0.032	0.150	11220	\$20.17	11220-TiN	\$21.72
#13	1/4	3/32	3/32	2	1/2	0.048	1/2	.470	0.040	0.200	11320	\$19.99	11320-TiN	\$22.05
#14	5/16	7/64	7/64	2-1/8	9/16	0.068	1/2	11/16	0.033	0.250	11420	\$20.28	11420-TiN	\$23.75
#15	7/16	5/32	5/32	2-3/4	5/8	0.068	5/8	5/8	0.048	0.350	11520	\$23.81	11520-TiN	\$29.34
#16	1/2	3/16	3/16	3	5/8	0.067	1/2	3/4	0.035	0.400	11620	\$29.99	11620-TiN	\$35.53
#17	5/8	7/32	7/32	3-1/4	5/8	0.067	1/2	3/4	0.050	0.500	11720	\$41.68	11720-TiN	\$50.36
#18	3/4	1/4	1/4	3-1/2	5/8	0.067	9/16	3/4	0.040	0.600	11820	\$55.38	11820-TiN	\$65.27

Product numbers 11120, 11220, 11320, 11420, 11520, 11620, and 11720 are sold in packs of 12

Product number 11820 is sold in packs of 6

All dimensions in inches. Many tools are available with additional coatings.

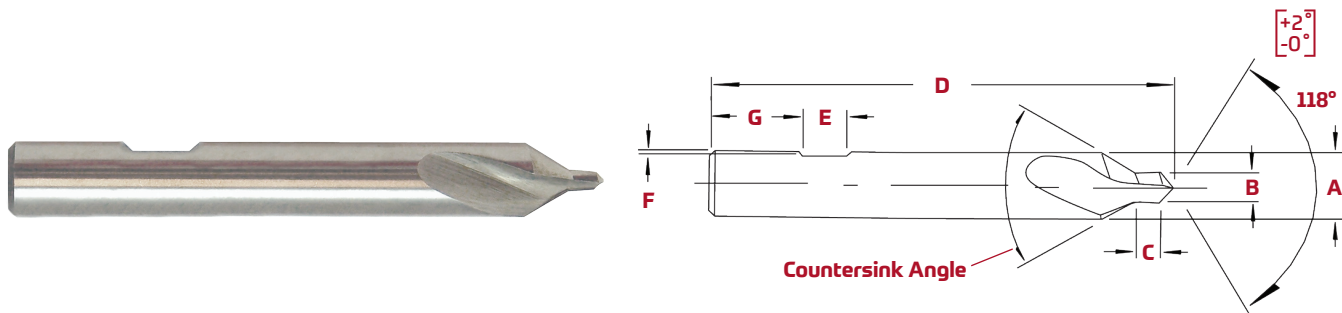
Please call for quote.

**A**

**COMBINED DRILL & COUNTERSINKS**



KEO Jig Bore Type combined drill and countersinks are used for producing center holes in components or workpieces which require machining between centers and are manufactured with a locking set screw flat. Also available in a 5-piece set. For set information see **page 70**



Size	HSS							60° Countersink Angle	
	A	B	C	D	E	F	G	HSS	Price
3/8 x 1/16	3/8	1/16	1/16	3	9/32	0.50	41/64	13116	\$19.98
3/8 x 3/32	3/8	3/32	3/32	3	9/32	0.50	41/64	13332	\$19.98
3/8 x 1/8	3/8	1/8	1/8	3	9/32	0.50	41/64	13180	\$19.98
3/8 x 5/32	3/8	5/32	5/32	3	9/32	0.50	41/64	13532	\$19.98
3/8 x 3/16	3/8	3/16	3/16	3	9/32	0.50	41/64	13316	\$19.98
1/2 x 1/8	1/2	1/8	1/8	3-1/2	21/64	0.60	23/32	12180	\$24.21
1/2 x 3/16	1/2	3/16	3/16	3-1/2	21/64	0.60	23/32	12316	\$24.21
1/2 x 7/32	1/2	7/32	7/32	3-1/2	21/64	0.60	23/32	12732	\$24.21
1/2 x 1/4	1/2	1/4	1/4	3-1/2	21/64	0.60	23/32	12140	\$24.21
1/2 x 9/32	1/2	9/32	9/32	3-1/2	21/64	0.60	23/32	12932	\$24.21

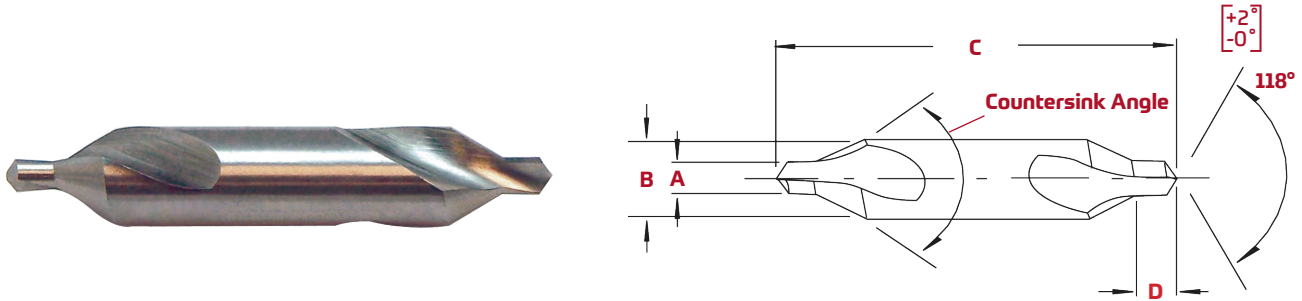
All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

A

COMBINED DRILL & COUNTERSINKS



KEO Metric Type A combined drill and countersinks provide the same advantages as KEO standard plain type combined drills and countersinks but are available in standard metric sizes according to DIN333 specifications.



**HSS COBALT CARBIDE**

**60° Countersink Angle Plain Type**

Size	Point Dia. (h9)	Body Dia. (k13)	OAL	Point Length	HSS	Price	CO	Price	Carbide	Price
0.5 x 3.15	0.50	3.15	25.0 SE	0.8	16001	\$5.14	16401	\$15.19	16901	\$15.44
0.8 x 3.15	0.80	3.15	25.0 SE	1.1	16002	\$5.14	16402	\$15.19	16902	\$13.92
1.0 x 3.15	1.00	3.15	31.5	1.3	16003	\$4.69	16403	\$13.86	16903	\$14.05
1.25 x 3.15	1.25	3.15	31.5	1.6	16004	\$4.52	16404	\$13.35	16904	\$14.05
1.6 x 4.0	1.60	4.00	35.5	2.0	16040	\$4.41	16440	\$9.99	16940	\$21.17
2.0 x 5.0	2.00	5.00	40.0	2.5	16050	\$4.79	16450	\$10.84	16950	\$21.92
2.5 x 6.3	2.50	6.30	45.0	3.1	16060	\$5.44	16460	\$12.35	16960	\$23.03
3.15 x 8.0	3.15	8.00	50.0	3.9	16080	\$6.82	16480	\$15.47	16980	\$31.98
4.0 x 10.0	4.00	10.0	56.0	5.0	16100	\$11.30	16410	\$25.03	16910	\$48.90
5.0 x 12.5	5.00	12.50	63.0	6.3	16120	\$16.13	16412	\$37.46	16912	\$61.10
6.3 x 16.0	6.30	16.00	71.0	8.0	16160	\$22.89	16416	\$51.94	16916	\$157.10
8.0 x 20.0	8.00	20.00	80.0	10.1	16200	\$37.44	16420	\$86.98	N/A	-
10.0 x 25.0	10.00	25.00	100.0	12.8	16250	\$72.01	16425	\$175.62	N/A	-
12.5 x 31.5	12.50	31.50	125.0	16.5	16310	\$121.33	16431	\$295.94	N/A	-

Product numbers 16001,16002,16003,16004,16040,16050,16060,16100,16120 and 16160 are sold in packs of 12

Product number 16200 is sold in packs of 6

Product number 16250 is sold in packs of 3

SE denotes single-end combined drill and countersinks.

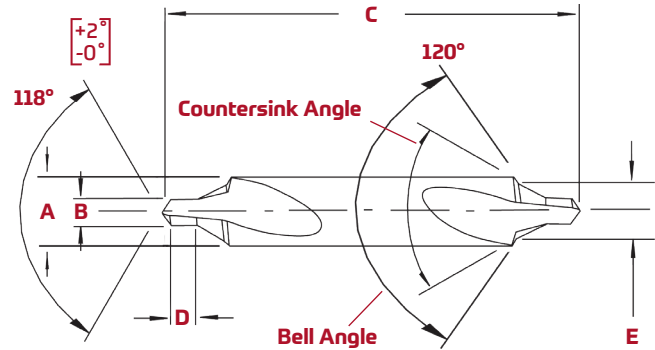
All dimensions in millimeters.

**A**

**COMBINED DRILL & COUNTERSINKS**



KEO Metric Type B combined drill and countersinks provide the same advantages as KEO Standard Bell Type combined drill and countersinks but are available in standard metric sizes according to DIN333 specifications.



**HSS COBALT**

**60° Countersink Angle - Bell Type**

Size	Body Dia. (h9)	Point Dia. (k13)	OAL	Point Length	Bell Dia. (js12)	HSS	Price	CO	Price
1.0 x 4.0	4.00	1.00	35.5	1.3	2.12	17040	\$6.62	17440	\$16.52
1.25 x 5.0	5.00	1.25	40.0	1.6	2.65	17050	\$6.66	17450	\$17.03
1.6 x 6.3	6.30	1.60	45.0	2	3.35	17060	\$7.06	17460	\$17.61
2.0 x 8.0	8.00	2.00	50.0	2.5	4.25	17080	\$8.45	17480	\$22.51
2.5 x 10.0	10.00	2.50	56.0	3.1	5.30	17100	\$11.09	17410	\$29.01
3.15 x 11.2	11.20	3.15	60.0	3.9	6.70	17110	\$13.71	17411	\$35.90
4.0 x 14.0	14.00	4.00	67.0	5	8.50	17140	\$17.74	17414	\$46.44
5.0 x 18.0	18.00	5.00	75.0	6.3	10.60	17180	\$24.01	17418	\$62.82
6.3 x 20.0	20.00	6.30	80.0	8	13.20	17200	\$31.72	17420	\$85.11
8.0 x 25.0	25.00	8.00	100.0	10.1	17.00	17250	\$62.71	17425	\$168.19
10.0 x 31.5	31.50	10.00	125.0	12.8	21.20	17310	\$125.52	17431	\$326.72

Product numbers 17040, 17050, 17060, 17080, 17100 and 17110 are sold in packs of 12

Product numbers 17140, 17180 and 17200 are sold in packs of 6

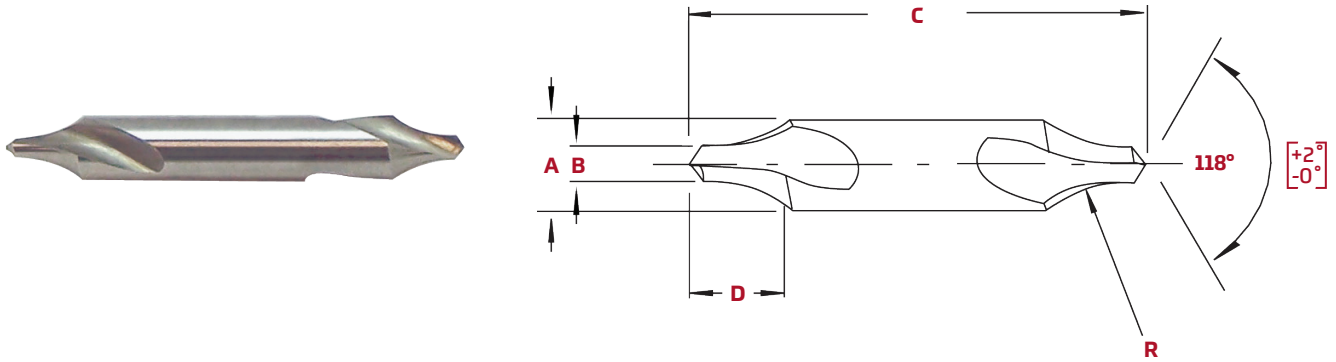
All dimensions in millimeters. Many tools are available with additional coatings.

Please call for quote.

**A**

**COMBINED DRILL & COUNTERSINKS**

KEO Metric Type R combined drill and countersinks provide the same advantages as KEO Standard Radius combined drill and countersinks but are available in standard metric sizes according to DIN333 specifications.



Size	Material					Radius Type			
	A	B	C	D	R	HSS	Price	CO	Price
0.5 x 3.15	3.15	0.50	25.0 SE	2.12	1.6	18001	\$5.14	18401	\$15.19
0.8 x 3.15	3.15	0.80	25.0 SE	2.65	2.5	18002	\$5.14	18402	\$15.19
1.0 x 3.15	3.15	1.00	31.5	3.0	3.15	18003	\$4.69	18403	\$13.86
1.25 x 3.15	3.15	1.25	31.5	3.35	4.0	18004	\$4.52	18404	\$13.35
1.6 x 4.0	4.00	1.60	35.5	4.25	5.0	18040	\$4.41	18440	\$9.99
2.0 x 5.0	5.00	2.00	40.0	5.3	6.3	18050	\$4.79	18450	\$10.84
2.5 x 6.3	6.30	2.50	45.0	6.7	8.0	18060	\$5.44	18460	\$12.35
3.15 x 8.0	8.00	3.15	50.0	8.5	10.0	18080	\$6.82	18480	\$15.47
4.0 x 10.0	10.0	4.00	56.0	10.6	12.5	18100	\$11.30	18410	\$25.03
5.0 x 12.5	12.50	5.00	63.0	13.2	16.0	18120	\$16.13	18412	\$37.46
6.3 x 16.0	16.00	6.30	71.0	17.0	20.0	18160	\$22.89	18416	\$51.94
8.0 x 20.0	20.00	8.00	80.0	21.2	25.0	18200	\$37.44	18420	\$86.98
10.0 x 25.0	25.00	10.00	100.0	26.5	31.5	18250	\$72.01	18425	\$175.62
12.5 x 31.5	31.50	12.50	125.0	33.5	40.0	18310	\$121.33	18431	\$295.94

Product numbers 18001,18002,18003,18004,18040,18050,18060,18080,18100,18120,and 18160 are sold in packs of 12

Product numbers 18200 and 18250 are sold in packs of 6

SE denotes single-end combined drill and countersinks.

All dimensions in millimeters.

Many tools are available with additional coatings.

Please call for quote.

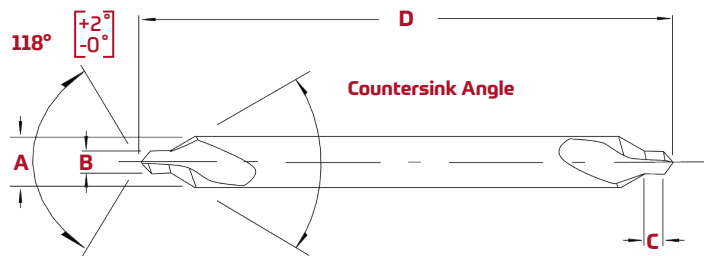
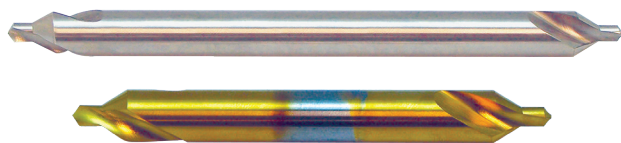
**A**

**COMBINED DRILL & COUNTERSINKS**



# DOUBLE-END LONG SERIES

KEO Long Series combined drill and countersinks are used for producing center holes in components or workpieces with the extra length allowing access to difficult-to-reach areas.



Size	HSS				Long Series 8"	
	A	B	C	D	HSS 60°	Price
#1 x 8	1/8	3/64	3/64	8	21080	\$31.57
#2 x 8	3/16	5/64	5/64	8	22080	\$32.03
#3 x 8	1/4	7/64	7/64	8	23080	\$32.41
#4 x 8	5/16	1/8	1/8	8	24080	\$32.98
#4-1/2 x 8	3/8	9/64	9/64	8	24580	\$34.10
#5 x 8	7/16	3/16	3/16	8	25080	\$35.52
#6 x 8	1/2	7/32	7/32	8	26080	\$41.08
#7 x 8	5/8	1/4	1/4	8	27080	\$74.52
#8 x 8	3/4	5/16	5/16	8	28080	\$82.68

All dimensions in inches

Size	HSS				COBALT									
	A	B	C	D	Long Series					Long Series				
Size	Body Dia.	Point Dia.	Point Length	OAL	HSS 60°	Price	HSS-TiN	Price	HSS 82°	Price	HSS 90°	Price	CO 60°	Price
#1 x 3	1/8	3/64	3/64	3	21030	\$12.56	21030-TiN	\$13.86	21033	\$19.42	21034	\$19.42	21032	\$37.71
#1 x 4	1/8	3/64	3/64	4	21040	\$13.11	21040-TiN	\$14.40	21043	\$22.06	21044	\$22.06	21042	\$38.99
#1 x 5	1/8	3/64	3/64	5	21050	\$18.21	21050-TiN	\$19.51	21053	\$30.65	21054	\$30.65	21052	\$54.25
#1 x 6	1/8	3/64	3/64	6	21060	\$23.85	21060-TiN	\$26.12	21063	\$40.11	21064	\$40.11	21062	\$70.89
#2 x 3	3/16	5/64	5/64	3	22030	\$12.71	22030-TiN	\$14.45	22033	\$21.32	22034	\$21.32	22032	\$37.81
#2 x 4	3/16	5/64	5/64	4	22040	\$14.37	22040-TiN	\$16.10	22043	\$24.13	22044	\$24.13	22042	\$42.74
#2 x 5	3/16	5/64	5/64	5	22050	\$18.41	22050-TiN	\$20.13	22053	\$30.65	22054	\$30.65	22052	\$54.79
#2 x 6	3/16	5/64	5/64	6	22060	\$23.94	22060-TiN	\$27.10	22063	\$40.29	22064	\$40.29	22062	\$71.33
#3 x 3	1/4	7/64	7/64	3	23030	\$13.27	23030-TiN	\$15.83	23033	\$22.30	23034	\$22.30	23032	\$39.42
#3 x 4	1/4	7/64	7/64	4	23040	\$15.14	23040-TiN	\$18.32	23043	\$25.44	23044	\$25.44	23042	\$44.94
#3 x 5	1/4	7/64	7/64	5	23050	\$19.91	23050-TiN	\$23.76	23053	\$33.51	23054	\$33.51	23052	\$59.29
#3 x 6	1/4	7/64	7/64	6	23060	\$24.16	23060-TiN	\$28.65	23063	\$40.57	23064	\$40.57	23062	\$71.89
#4 x 3	5/16	1/8	1/8	3	24030	\$15.58	24030-TiN	\$18.76	24033	\$26.15	24034	\$26.15	24032	\$46.31
#4 x 4	5/16	1/8	1/8	4	24040	\$16.77	24040-TiN	\$20.74	24043	\$28.22	24044	\$28.22	24042	\$49.92
#4 x 5	5/16	1/8	1/8	5	24050	\$21.44	24050-TiN	\$26.22	24053	\$36.04	24054	\$36.04	24052	\$63.78
#4 x 6	5/16	1/8	1/8	6	24060	\$24.75	24060-TiN	\$30.31	24063	\$41.66	24064	\$41.66	24062	\$73.63

Product numbers 21030, 21040, 21050, 21060, 22030, 22040, 22050, 22060, 23030, 23040, 23050, 23060, 24030, 24040, 24050, and 24060 are sold in packs of 12. All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

Continues on next page

A

COMBINED DRILL & COUNTERSINKS

KEO Long Series combined drill and countersinks are used for producing center holes in components or workpieces with the extra length allowing access to difficult-to-reach areas.

HSS					COBALT					Long Series (Cont.)				
	A	B	C	D										
Size	Body Dia.	Point Dia.	Point Length	OAL	HSS 60°	Price	HSS-TiN	Price	HSS 82°	Price	HSS 90°	Price	CO 60°	Price
#4-1/2 x 4	3/8	9/64	9/64	4	24540	\$18.85	24540-TiN	\$22.83	24543	\$31.04	24544	\$31.04	24542	\$54.85
#4-1/2 x 5	3/8	9/64	9/64	5	24550	\$22.28	24550-TiN	\$27.08	24553	\$36.81	24554	\$36.81	24552	\$65.03
#4-1/2 x 6	3/8	9/64	9/64	6	24560	\$26.89	24560-TiN	\$32.43	24563	\$44.38	24564	\$44.38	24562	\$78.47
#5 x 4	7/16	3/16	3/16	4	25040	\$22.04	25040-TiN	\$28.39	25043	\$36.35	25044	\$36.35	25042	\$64.32
#5 x 5	7/16	3/16	3/16	5	25050	\$25.52	25050-TiN	\$33.15	25053	\$42.14	25054	\$42.14	25052	\$74.46
#5 x 6	7/16	3/16	3/16	6	25060	\$28.65	25060-TiN	\$37.57	25063	\$47.27	25064	\$47.27	25062	\$83.56
#6 x 4	1/2	7/32	7/32	4	26040	\$23.91	26040-TiN	\$30.27	26043	\$29.73	26044	\$29.73	26042	\$68.30
#6 x 5	1/2	7/32	7/32	5	26050	\$27.42	26050-TiN	\$35.06	26053	\$44.38	26054	\$44.38	26052	\$78.56
#6 x 6	1/2	7/32	7/32	6	26060	\$33.14	26060-TiN	\$42.07	26063	\$53.57	26064	\$53.57	26062	\$94.77
#7 x 6	5/8	1/4	1/4	6	27060	\$61.76	27060-TiN	\$72.89	27063	\$99.49	27064	\$99.49	27062	\$175.75
#8 x 6	3/4	5/16	5/16	6	28060	\$66.69	28060-TiN	\$79.42	28063	\$107.52	28064	\$107.52	28062	\$189.74

Product numbers 24540,24550,24560, 25040,25050,25060,26040,26050, and 26060 are sold in packs of 12

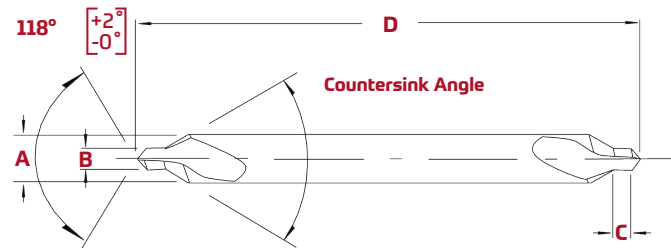
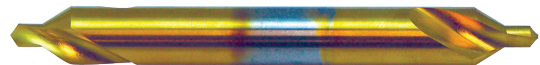
Product Number 27060 is sold in packs of 4

All dimensions in inches. Many tools are available with additional coatings.

Please call for quote.

CARBIDE					60° Countersink Angle Solid Carbide	
	A	B	C	D		
Size	Body Dia.	Point Dia.	Point Length	OAL	Car	Price
#2-0 x 4	1/8	0.025	0.025	4	29004	\$62.06
#2-0 x 6	1/8	0.025	0.025	6	29006	\$68.41
#0 x 4	1/8	1/32	1/32	4	29014	\$62.06
#0 x 6	1/8	1/32	1/32	6	29016	\$68.41
#1 x 4	1/8	3/64	3/64	4	29104	\$57.01
#1 x 6	1/8	3/64	3/64	6	29106	\$63.31
#2 x 4	3/16	5/64	5/64	4	29204	\$59.30
#2 x 6	3/16	5/64	5/64	6	29206	\$68.65
#3 x 4	1/4	7/64	7/64	4	29304	\$72.23
#3 x 6	1/4	7/64	7/64	6	29306	\$86.21
#4 x 4	5/16	1/8	1/8	4	29404	\$81.84
#4 x 6	5/16	1/8	1/8	6	29406	\$99.16
#5 x 4	7/16	3/16	3/16	4	29504	\$123.77
#5 x 6	7/16	3/16	3/16	6	29506	\$159.59
#6 x 4	1/2	7/32	7/32	4	29604	\$170.60
#6 x 6	1/2	7/32	7/32	6	29606	\$212.65
#7 x 6	5/8	1/4	1/4	6	29706	\$304.95
#8 x 6	3/4	5/16	5/16	6	29806	\$420.70

All dimensions in inches



# A

# COMBINED DRILL & COUNTERSINKS



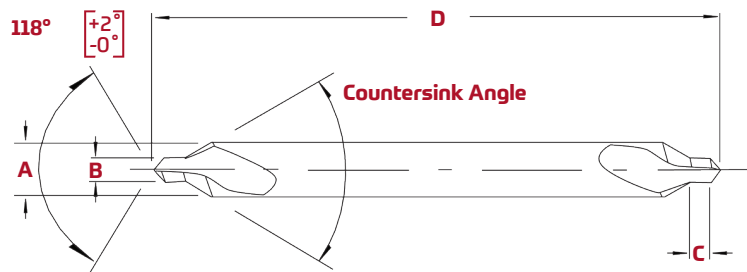
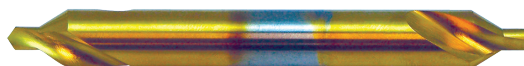
# DOUBLE-END LONG SERIES : METRIC COBALT

KEO Long Series combined drill and countersinks are used for producing center holes in components or workpieces with the extra length allowing access to difficult-to-reach areas.

## COBALT

### Metric 60° Countersink Angle

A	B	C	D	CO	Price
3.5	0.75	1	60	15061	\$34.66
4	1	1.3	60	15062	\$35.84
5	1.5	2	60	15063	\$37.56
6	2	2.5	80	15081	\$38.12
8	2.5	3.1	80	15082	\$39.01
8	3	3.9	80	15083	\$39.84
4	1	1.3	100	15101	\$40.53
5	1.5	2	100	15102	\$41.91
6	2	2.5	100	15103	\$43.26
8	2.5	3.1	100	15104	\$44.20
8	3	3.9	100	15105	\$46.91
10	3	3.9	100	15106	\$56.11
10	4	5	100	15107	\$57.06
12	4	5	100	15108	\$64.31
12	5	6.3	100	15109	\$64.90
3.5	0.75	1	120	15121	\$54.13
4	1	1.3	120	15122	\$54.83
5	1.5	2	120	15132	\$55.66
5	1.6	2	120	15123	\$56.64
6	2	2.5	120	15124	\$58.47
8	2.5	3.1	120	15125	\$59.90
8	3	3.9	120	15126	\$60.55
10	3	3.9	120	15127	\$66.06
10	3.15	3.9	120	15128	\$68.68
10	4	5	120	15129	\$70.73
12	4	5	120	15130	\$75.73
14	5	6.3	120	15131	\$81.17
4	1	1.3	150	15151	\$69.65
5	1.5	2	150	15152	\$70.98
6	2	2.5	150	15153	\$71.37
8	2.5	3.1	150	15154	\$73.07
8	3	3.9	150	15155	\$73.66
10	3	3.9	150	15156	\$77.01
10	4	5	150	15157	\$78.40
12	4	5	150	15158	\$84.96
16	6.3	8	150	15159	\$173.77
5	2	2.5	200	15201	\$80.23
6.3	2.5	3.1	200	15202	\$82.75
8	3.15	3.9	200	15203	\$85.43
10	4	5	200	15204	\$89.67



Point Length C	
Nominal	Tolerance
0 – 1.0 mm	+ 0.3/-0.0
1.1 – 1.4	+ 0.4/-0.0
1.5 – 2.4	+ 0.6/-0.0
2.5 – 3.9	+ 0.7/-0.0
4.0 +	+ 0.9/-0.0

All dimensions in millimeters.

A

COMBINED DRILL & COUNTERSINKS

**Spotting Drills**

NC Spotting Drills	20
NC Spotting Drills Carbide	21
NC Spotting Drills Metric	22
Spotting & Centering Drills	23

**19**

20  
21  
22  
23

# SPOTTING DRILLS

**B**

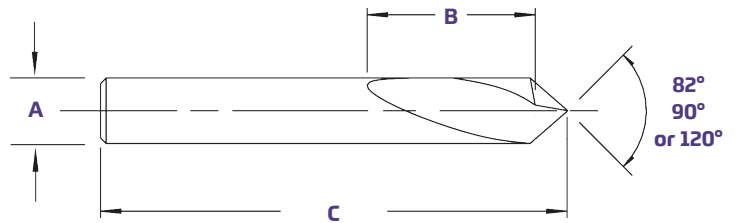
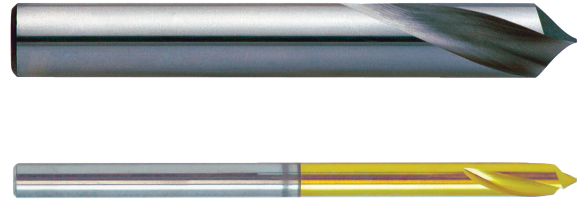
SPOTTING DRILLS



## HSS COBALT

			82° Point Angle			
A	B	C	HSS	Price	CO	Price
Body Dia.	Flute Length	OAL				
1/4	3/4	2-1/2	38142	\$23.64	38143	\$28.00
1/4	3/4	4	38144	\$34.01	38145	\$40.30
1/4	3/4	6	38146	\$46.61	38147	\$55.35
3/8	1-1/8	3-1/8	38382	\$25.51	38383	\$30.24
3/8	1-1/8	5	38384	\$36.25	38385	\$42.97
3/8	1-1/8	7	38386	\$50.24	38387	\$59.52
1/2	1-3/8	3-3/4	38122	\$32.71	38123	\$38.76
1/2	1-3/8	6	38124	\$45.35	38125	\$53.73
1/2	1-3/8	8	38126	\$61.67	38127	\$73.08
5/8	1-5/8	4-3/8	38582	\$42.57	38583	\$50.44
5/8	1-5/8	7	38584	\$57.31	38585	\$67.91
5/8	1-5/8	9	38586	\$79.23	38587	\$93.88
3/4	1-7/8	5	38342	\$58.24	38343	\$69.00
3/4	1-7/8	8	38344	\$78.73	38345	\$93.29
3/4	1-7/8	10	38346	\$105.23	38347	\$124.68
1	2-1/4	6	38102	\$100.18	38103	\$118.71
1	2-1/4	8	38104	\$106.64	38105	\$126.36
1	2-1/4	10	38106	\$131.24	38107	\$155.50

KEO NC Spotting Drills are designed with a narrow chisel edge for quick starting and a constant web to allow for resharpening without the need for web thinning.



All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

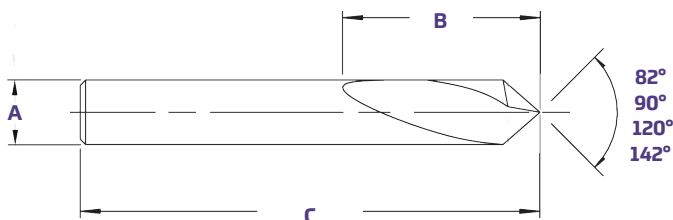
## HSS COBALT

			90° and 120° Point Angle											
A	B	C	HSS 90°	Price	HSS-TiN 90°	Price	CO 90°	Price	HSS 120°	Price	HSS-TiN 120°	Price	CO 120°	Price
Body Dia.	Flute Length	OAL												
1/4	3/4	2-1/2	32140	\$24.74	32140-TiN	\$27.22	32143	\$28.00	33140	\$24.74	33140-TiN	\$27.22	33143	\$28.00
1/4	3/4	4	32142	\$35.61	32142-TiN	\$38.70	32145	\$40.30	33142	\$35.61	33142-TiN	\$38.70	33145	\$40.30
1/4	3/4	6	32144	\$48.90	32144-TiN	\$53.25	32147	\$55.35	33144	\$48.90	33144-TiN	\$53.25	33147	\$55.35
3/8	1-1/8	3-1/8	32380	\$26.71	32380-TiN	\$30.58	32383	\$30.24	33380	\$26.71	33380-TiN	\$30.58	33383	\$30.24
3/8	1-1/8	5	32382	\$37.96	32382-TiN	\$42.63	32385	\$42.97	33382	\$37.96	33382-TiN	\$42.63	33385	\$42.97
3/8	1-1/8	7	32384	\$52.60	32384-TiN	\$58.78	32387	\$59.52	33384	\$52.60	33384-TiN	\$58.78	33387	\$59.52
1/2	1-3/8	3-3/4	32120	\$34.24	32120-TiN	\$39.19	32123	\$38.76	33120	\$34.24	33120-TiN	\$39.19	33123	\$38.76
1/2	1-3/8	6	32122	\$47.48	32122-TiN	\$56.15	32125	\$53.73	33122	\$47.48	33122-TiN	\$56.15	33125	\$53.73
1/2	1-3/8	8	32124	\$64.56	32124-TiN	\$75.72	32127	\$73.08	33124	\$64.56	33124-TiN	\$75.72	33127	\$73.08
5/8	1-5/8	4-3/8	32580	\$44.57	32580-TiN	\$53.88	32583	\$50.44	33580	\$44.57	33580-TiN	\$53.88	33583	\$50.44
5/8	1-5/8	7	32582	\$60.00	32582-TiN	\$72.39	32585	\$67.91	33582	\$60.00	33582-TiN	\$72.39	33585	\$67.91
5/8	1-5/8	9	32584	\$82.95	32584-TiN	\$98.40	32587	\$93.88	33584	\$82.95	33584-TiN	\$98.40	33587	\$93.88
3/4	1-7/8	5	32340	\$60.98	32340-TiN	\$71.58	32343	\$69.00	33340	\$60.98	33340-TiN	\$71.58	33343	\$69.00
3/4	1-7/8	8	32342	\$82.43	32342-TiN	\$98.30	32345	\$93.29	33342	\$82.43	33342-TiN	\$98.30	33345	\$93.29
3/4	1-7/8	10	32344	\$110.17	32344-TiN	\$129.59	32347	\$124.68	33344	\$110.17	33344-TiN	\$129.59	33347	\$124.68
1	2-1/4	6	32100	\$104.90	32100-TiN	\$126.55	32103	\$118.71	33100	\$104.90	33100-TiN	\$126.55	33103	\$118.71
1	2-1/4	8	32102	\$111.65	32102-TiN	\$139.48	32105	\$126.36	33102	\$111.65	33102-TiN	\$139.48	33105	\$126.36
1	2-1/4	10	32104	\$137.41	32104-TiN	\$171.44	32107	\$155.50	33104	\$137.41	33104-TiN	\$171.44	33107	\$155.50

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.



KEO NC Spotting Drills are designed with a narrow chisel edge for quick starting and a constant web to allow for resharpening without the need for web thinning.



### CARBIDE

#### 82°, 90° and 120° Point Angles

A	B	C										
Body Dia.	Flute Length	OAL	82°	Price	90°	Price	90°-TiN	Price	120°	Price	120°-TiN	Price
1/8	3/8	1-1/2	34182	\$15.93	34180	\$16.68	34180-TiN	\$17.69	34181	\$16.68	34181-TiN	\$17.69
3/16	9/16	2	34185	\$20.94	34187	\$21.92	34187-TiN	\$23.39	34188	\$21.92	34188-TiN	\$23.39
1/4	3/4	2-1/2	34145	\$26.72	34140	\$27.97	34140-TiN	\$30.63	34141	\$27.97	34141-TiN	\$30.63
5/16	3/4	2-1/2	34315	\$32.24	34312	\$33.74	34312-TiN	\$37.05	34313	\$33.74	34313-TiN	\$37.05
3/8	3/4	2-1/2	34385	\$36.89	34380	\$38.62	34380-TiN	\$41.98	34381	\$38.62	34381-TiN	\$41.98
1/2	1	3	34125	\$57.68	34120	\$60.39	34120-TiN	\$65.75	34121	\$60.39	34121-TiN	\$65.75
5/8	1	3-1/2	34585	\$106.23	34580	\$111.22	34580-TiN	\$119.65	34581	\$111.22	34581-TiN	\$119.65
3/4	1-1/8	4	34345	\$177.29	34340	\$185.63	34340-TiN	\$196.78	34341	\$185.63	34341-TiN	\$196.78

All dimensions in inches. Many tools are available with additional coatings.  
Please call for quote.

### CARBIDE

#### High Performance 142° Point Angle

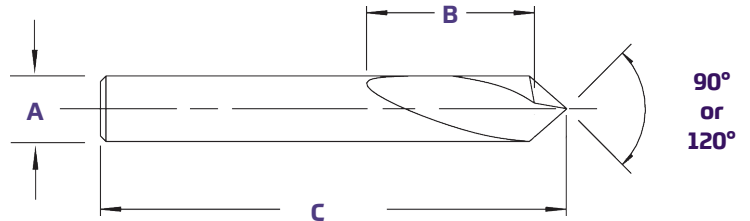
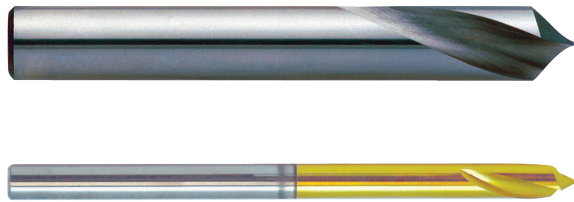
A	B	C		
Body Dia.	Flute Length	OAL	CAR	Price
1/8	3/8	1-1/2	34184	\$16.68
3/16	9/16	2	34189	\$21.92
1/4	3/4	2-1/2	34144	\$27.97
5/16	3/4	2-1/2	34314	\$33.74
3/8	3/4	2-1/2	34384	\$38.62
1/2	1	3	34124	\$60.39
5/8	1	3-1/2	34584	\$111.22
3/4	1-1/8	4	34344	\$185.63

All dimensions in inches.



# NC SPOTTING DRILLS METRIC

KEO NC Spotting Drills are designed with a narrow chisel edge for quick starting and a constant web to allow for resharping without the need for web thinning.



**B**

**SPOTTING DRILLS**

## COBALT

A	B	C	Metric Long 90° & 120° Angle			
Body Dia.	Flute Length	OAL	90°	Price	120°	Price
3	10	80	35640	\$41.84	35650	\$41.84
4	12	100	35641	\$40.04	35651	\$40.04
5	15	120	35642	\$41.13	35652	\$41.13
6	20	140	35643	\$42.41	35653	\$42.41
8	25	140	35644	\$50.86	35654	\$50.86
10	25	170	35645	\$55.98	35655	\$55.98
12	30	170	35646	\$59.49	35656	\$59.49
16	35	200	35647	\$79.22	35657	\$79.22
20	40	200	35648	\$94.60	35658	\$94.60

All dimensions in millimeters.

## COBALT

A	B	C	Metric 90° & 120° Angle			
Body Dia.	Flute Length	OAL	90°	Price	120°	Price
2	8	49	35600	\$27.89	35620	\$27.89
3	10	50	35601	\$24.02	35621	\$24.02
4	12	52	35602	\$25.00	35622	\$25.00
5	15	60	35603	\$26.91	35623	\$26.91
6	20	66	35604	\$27.60	35624	\$27.60
8	25	79	35605	\$28.18	35625	\$28.18
10	25	89	35606	\$32.26	35626	\$32.26
12	30	102	35607	\$35.23	35627	\$35.23
14	35	115	35608	\$40.29	35628	\$40.29
16	35	115	35609	\$49.53	35629	\$49.53
18	40	130	35610	\$64.87	35630	\$64.87
20	40	131	35611	\$73.44	35631	\$73.44
25	45	138	35612	\$113.56	35632	\$113.56

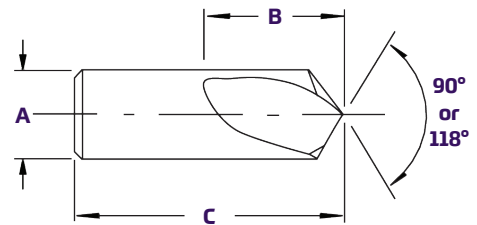
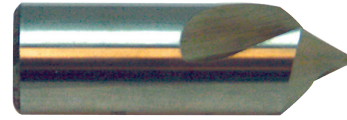
All dimensions in millimeters.

KEO Spotting & Centering Drills prevent misalignment frequently caused by using regular drills for centering. These short drills can be chucked close to the point, ensuring accuracy and true starts.

## HSS

			90° Point Angle					
A	B	C						
Body Dia.	Flute Length	OAL	RH	Price	RH-TiN	Price	LH	Price
1/8	3/8	1-1/4	30151	\$5.09	30151-TiN	\$6.07	30156	\$16.65
3/16	1/2	1-3/8	30181	\$5.52	30181-TiN	\$6.93	30186	\$14.84
1/4	5/8	1-1/2	30251	\$6.10	30251-TiN	\$7.97	30256	\$15.29
5/16	5/8	1-1/2	30311	\$6.93	30311-TiN	\$9.32	30316	\$16.38
3/8	1	2	30381	\$7.85	30381-TiN	\$10.23	30386	\$19.71
7/16	1	2	30761	\$10.57	30761-TiN	\$14.40	30766	\$20.86
1/2	1	2	30121	\$12.95	30121-TiN	\$16.78	30126	\$22.92
9/16	1	2	30961	\$19.28	30961-TiN	\$24.05	30966	\$25.70
5/8	1-1/8	2-1/4	30581	\$21.42	30581-TiN	\$27.77	30586	\$28.25
3/4	1-1/8	2-1/4	30341	\$29.77	30341-TiN	\$37.05	30346	\$41.14
7/8	1-1/4	2-1/2	30781	\$36.49	30781-TiN	\$46.47	30786	\$48.30
1	1-1/4	2-1/2	31001	\$46.64	31001-TiN	\$59.32	31006	\$62.25
1-1/4	2	4	31141	\$91.36	31141-TiN	\$110.38	31146	\$120.60
1-1/2	2-1/2	5	31121	\$142.49	31121-TiN	\$175.75	31126	\$188.13
1-3/4	2-3/4	5-1/2	31341	\$214.88	31341-TiN	\$268.10	31346	\$283.16

All dimensions in inches. Many tools are available with additional coatings.  
Please call for quote.



## HSS

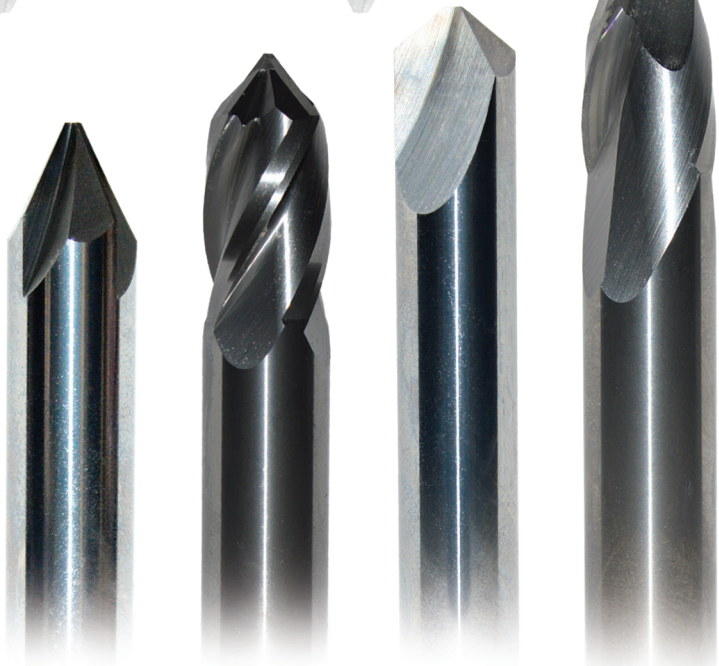
			118° Point Angle					
A	B	C						
Body Dia.	Flute Length	OAL	RH	Price	RH-TiN	Price	LH	Price
1/8	3/8	1-1/4	30150	\$5.09	30150-TiN	\$6.07	30155	\$16.65
3/16	1/2	1-3/8	30180	\$5.52	30180-TiN	\$6.93	30185	\$14.84
1/4	5/8	1-1/2	30250	\$6.10	30250-TiN	\$7.97	30255	\$15.29
5/16	5/8	1-1/2	30310	\$6.93	30310-TiN	\$9.32	30315	\$16.38
3/8	1	2	30380	\$7.85	30380-TiN	\$10.23	30385	\$19.71
7/16	1	2	30760	\$10.57	30760-TiN	\$14.40	30765	\$20.86
1/2	1	2	30120	\$12.95	30120-TiN	\$16.78	30125	\$22.92
9/16	1	2	30960	\$19.28	30960-TiN	\$24.05	30965	\$25.70
5/8	1-1/8	2-1/4	30580	\$21.42	30580-TiN	\$27.77	30585	\$28.25
3/4	1-1/8	2-1/4	30340	\$29.77	30340-TiN	\$37.05	30345	\$41.14
7/8	1-1/4	2-1/2	30780	\$36.49	30780-TiN	\$46.47	30785	\$48.30
1	1-1/4	2-1/2	31000	\$46.64	31000-TiN	\$59.32	31005	\$62.25
1-1/4	2	4	31140	\$91.36	31140-TiN	\$110.38	31145	\$120.60
1-1/2	2-1/2	5	31120	\$142.49	31120-TiN	\$175.75	31125	\$188.13
1-3/4	2-3/4	5-1/2	31340	\$214.88	31340-TiN	\$268.10	31345	\$283.16

Product Numbers 30150,30180,30250,30310,and 30380 are sold in packs of 12  
Product Numbers 30760,30120,30960,30580,and 30340 are sold in packs of 6  
Product Numbers 30780 and 31000 are sold in packs of 3  
All dimensions in inches. Many tools are available with additional coatings.  
Please call for quote.

**B**

**SPOTTING DRILLS**



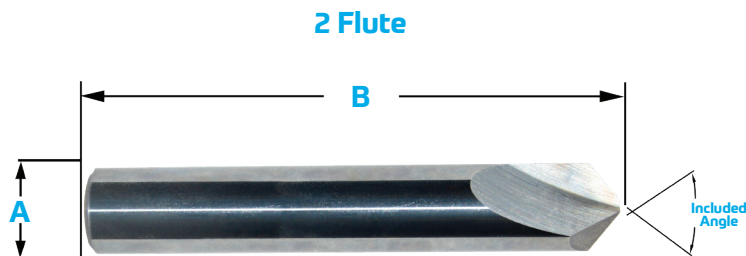


<b>Chamfer &amp; Drill Mills</b>	<b>24</b>
Chamfer Mills Single End 2 & 4 Flute	25
Chamfer Mills Double End 2 & 4 Flute	26
Drill Mills Single End 2 Flute	27
Drill Mills Single End 4 Flute	28

# CHAMFER & DRILL MILLS

Keo's Chamfer Mills in 2 Flute and 4 Flute are designed for deburring and chamfering. The 4 Flute Chamfer Mills improve tool life and finish for profiling and chamfering.

- General purpose
- End Shape: 60°, 82°, 90°, 100° or 120°
- Cutter Type: Chamfer Mill
- 2 and 4 Flute
- Solid Carbide
- Single End



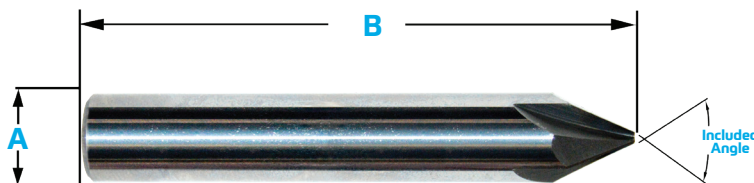
## CARBIDE

60°, 82°, 90°, 100° and 120° included Angles

A	B	60°, 82°, 90°, 100° and 120° included Angles											
Body Dia.	OAL	Flutes	End	60°	Price	82°	Price	90°	Price	100°	Price	120°	Price
1/8	1-1/2	2	SE	41226	\$15.67	41228	\$15.67	41229	\$15.67	41220	\$15.67	41222	\$15.67
1/4	2 1/2	2	SE	41246	\$25.27	41248	\$25.27	41249	\$25.27	41240	\$25.27	41242	\$25.27
3/8	2-1/2	2	SE	41266	\$32.24	41268	\$32.24	41269	\$32.24	41260	\$32.24	41262	\$32.24
1/2	3	2	SE	41286	\$54.10	41288	\$54.10	41289	\$54.10	41280	\$54.10	41282	\$54.10

All dimensions in inches. Many tools are available with additional coatings.  
Please call for quote.

## 4 Flute



## CARBIDE

60°, 82°, 90°, 100° and 120° included Angles

A	B	60°, 82°, 90°, 100° and 120° included Angles											
Body Dia.	OAL	Flutes	End	60°	Price	82°	Price	90°	Price	100°	Price	120°	Price
1/8	1-1/2	4	SE	41426	\$15.67	41428	\$15.67	41429	\$15.67	41420	\$15.67	41422	\$15.67
1/4	2 1/2	4	SE	41446	\$25.27	41448	\$25.27	41449	\$25.27	41440	\$25.27	41442	\$25.27
3/8	2-1/2	4	SE	41466	\$32.24	41468	\$32.24	41469	\$32.24	41460	\$32.24	41462	\$32.24
1/2	3	4	SE	41486	\$54.10	41488	\$54.10	41489	\$54.10	41480	\$54.10	41482	\$54.10

All dimensions in inches. Many tools are available with additional coatings.  
Please call for quote.

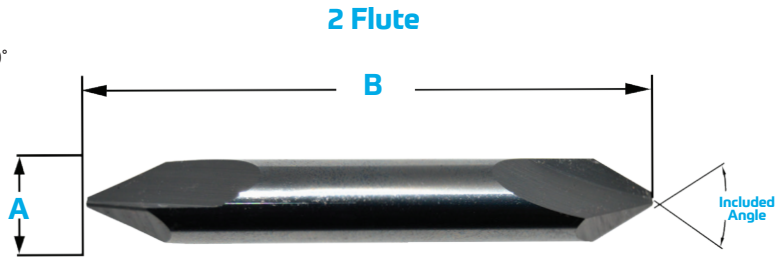
CHAMFER & DRILL MILLS



# CHAMFER MILLS DOUBLE-END 2 & 4 FLUTE

Keo's Chamfer Mills in 2 and 4 Flute are designed for deburring and chamfering. The 4 Flute Chamfer Mills improve tool life and finish for profiling and chamfering.

- General purpose
- End Shape: 60°, 82°, 90°, 100° or 120°
- Cutter Type: Chamfer Mill
- 2 and 4 Flute
- Solid Carbide
- Double End



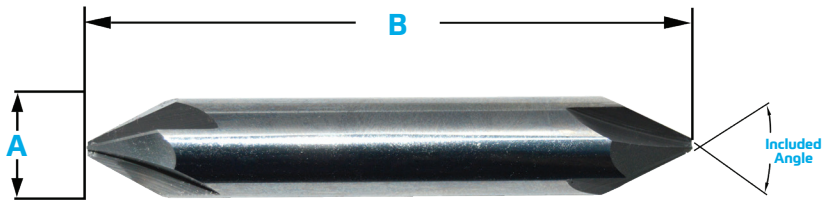
## CARBIDE

60°, 82°, 90°, 100° and 120° included Angles

Body Dia.	OAL	Flutes	End	60°	Price	82°	Price	90°	Price	100°	Price	120°	Price
1/8	2	2	DE	42226	\$24.92	42228	\$24.92	42229	\$24.92	42220	\$24.92	42222	\$24.92
3/16	2-1/2	2	DE	42236	\$29.92	42238	\$29.92	42239	\$29.92	42230	\$29.92	42232	\$29.92
1/4	2-1/2	2	DE	42246	\$37.27	42248	\$37.27	42249	\$37.27	42240	\$37.27	42242	\$37.27
5/16	2-1/2	2	DE	42256	\$47.68	42258	\$47.68	42259	\$47.68	42250	\$47.68	42252	\$47.68
3/8	2-1/2	2	DE	42266	\$58.12	42268	\$58.12	42269	\$58.12	42260	\$58.12	42262	\$58.12
1/2	3	2	DE	42286	\$96.42	42288	\$96.42	42289	\$96.42	42280	\$96.42	42282	\$96.42

All dimensions in inches. Many tools are available with additional coatings.  
Please call for quote.

## 4 Flute



## CARBIDE

60°, 82°, 90°, 100° and 120° included Angles

Body Dia.	OAL	Flutes	End	60°	Price	82°	Price	90°	Price	100°	Price	120°	Price
1/8	2	4	DE	42426	\$24.92	42428	\$24.92	42429	\$24.92	42420	\$24.92	42422	\$24.92
3/16	2-1/2	4	DE	42436	\$29.92	42438	\$29.92	42439	\$29.92	42430	\$29.92	42432	\$29.92
1/4	2-1/2	4	DE	42446	\$37.27	42448	\$37.27	42449	\$37.27	42440	\$37.27	42442	\$37.27
5/16	2-1/2	4	DE	42456	\$47.68	42458	\$47.68	42459	\$47.68	42450	\$47.68	42452	\$47.68
3/8	2-1/2	4	DE	42466	\$58.12	42468	\$58.12	42469	\$58.12	42460	\$58.12	42462	\$58.12
1/2	3	4	DE	42486	\$96.42	42488	\$96.42	42489	\$96.42	42480	\$96.42	42482	\$96.42

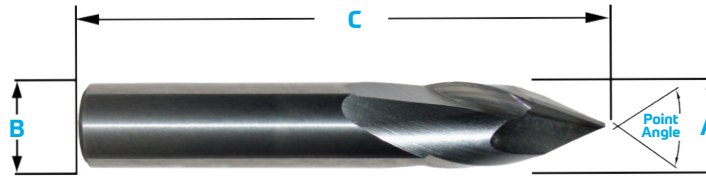
All dimensions in inches. Many tools are available with additional coatings.  
Please call for quote.



Keo's Drill Mills are offered in both 2 and 4 Flutes. Drill Mills are used in a variety of applications such as chamfering, milling, drilling, countersinking and spotting.

- Used for chamfering, milling and spotting applications
- End Shape: 60° and 90° drill point
- Cutter Type: Drill Mill
- 2 Flute
- Solid Carbide

## 2 Flute/Single End



### CARBIDE

### 60° and 90° Point Angles

A	B	C						
Cut Dia.	Shank Dia.	OAL	LOC	Flutes	60°	Price	90°	Price
1/32	1/8	1-1/2	1/8	2	43016	\$19.70	43019	\$19.70
1/16	1/8	1-1/2	3/16	2	43026	\$19.70	43029	\$19.70
3/32	1/8	1-1/2	3/8	2	43036	\$19.70	43039	\$19.70
1/8	1/8	1-1/2	1/2	2	43046	\$19.70	43049	\$19.70
3/16	3/16	2	5/8	2	43066	\$20.87	43069	\$20.87
1/4	1/4	2-1/2	3/4	2	43086	\$22.60	43089	\$22.60
5/16	5/16	2-1/2	13/16	2	43106	\$23.87	43109	\$23.87
3/8	3/8	2-1/2	1	2	43126	\$29.81	43129	\$29.81
7/16	7/16	2-3/4	1	2	43146	\$38.63	43149	\$38.63
1/2	1/2	3	1	2	43166	\$46.67	43169	\$46.67
5/8	5/8	3-1/2	1-1/4	2	43206	\$90.59	43209	\$90.59
3/4	3/4	4	1-1/2	2	43246	\$131.75	43249	\$131.75

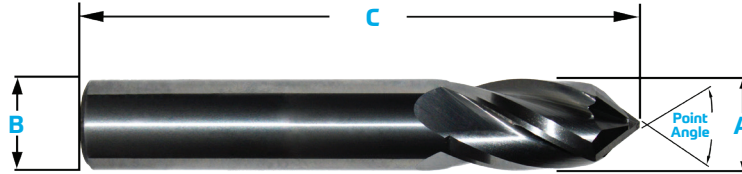
All dimensions in inches. Many tools are available with additional coatings.  
Please call for quote.



Keo's Drill Mills are offered in both 2 and 4 Flutes. Drill Mills are used in a variety of applications such as chamfering, milling, drilling, countersinking and spotting.

## 4 Flute/Single End

- Used for chamfering, milling and some spotting applications
- End Shape: 60° and 90° drill point
- Cutter Type: Drill Mill
- 4 Flute
- Solid Carbide



### CARBIDE

### 60° and 90° Point Angles

A	B	C						
Cut Dia.	Shank Dia	OAL	LOC	Flutes	60°	Price	90°	Price
1/32	1/8	1-1/2	1/8	4	44016	\$19.70	44019	\$19.70
1/16	1/8	1-1/2	3/16	4	44026	\$19.70	44029	\$19.70
3/32	1/8	1-1/2	3/8	4	44036	\$19.70	44039	\$19.70
1/8	1/8	1-1/2	1/2	4	44046	\$19.70	44049	\$19.70
3/16	3/16	2	5/8	4	44066	\$20.87	44069	\$20.87
1/4	1/4	2-1/2	3/4	4	44086	\$22.60	44089	\$22.60
5/16	5/16	2-1/2	13/16	4	44106	\$23.87	44109	\$23.87
3/8	3/8	2-1/2	1	4	44126	\$29.81	44129	\$29.81
7/16	7/16	2-3/4	1	4	44146	\$38.63	44149	\$38.63
1/2	1/2	3	1	4	44166	\$46.67	44169	\$46.67
5/8	5/8	3-1/2	1-1/4	4	44206	\$90.59	44209	\$90.59
3/4	3/4	4	1-1/2	4	44246	\$131.75	44249	\$131.75

All dimensions in inches. Many tools are available with additional coatings.  
Please call for quote.



**Countersinks & Counterbores**

**29**


ZErO Flute Cobalt Countersinks	30,31
Single Flute HSS Countersinks	32,33
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# COUNTERSINKS & COUNTERBORES

**D**

COUNTERSINKS & COUNTERBORES



KEO  Flute Countersink & Deburring tools are simple, all-purpose tools made of Cobalt that provide flawless countersinking and deburring. The chatter-free cutting action requires minimal power. The micro-smooth CNC precision ground construction produces clean, smooth cutting without smearing on a variety of materials. The tool especially excels in countersinking or deburring holes in aluminum, plastics and other nonmetallics. For set information see **page 71**.

# D

# COUNTERSINKS & COUNTERBORES

## COBALT

A	B	C	Dia. of Cut		60° Countersink Angle			
			Min.	Max.	Uncoated	Price	TiN	Price
Head Dia.	OAL	Shank Dia.						
5/16	1-7/8	1/4	7/64	9/32	53500	\$13.48	53500-TiN	\$15.89
3/8	1-7/8	1/4	5/32	11/32	53501	\$15.40	53501-TiN	\$17.80
1/2	2	5/16	11/64	29/64	53502	\$18.44	53502-TiN	\$22.30
5/8	2-1/2	3/8	3/16	37/64	53503	\$21.17	53503-TiN	\$27.57
3/4	2-3/4	3/8	1/4	45/64	53504	\$32.23	53504-TiN	\$39.58
1	3	3/8	19/64	27/32	53505	\$40.09	53505-TiN	\$52.89
1-1/4	3-1/2	1/2	27/64	1-1/32	53506	\$97.13	53506-TiN	\$116.33

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

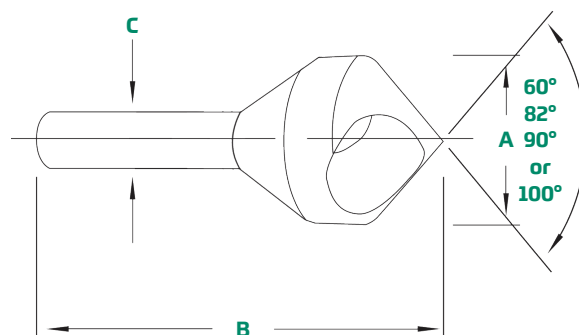


## COBALT

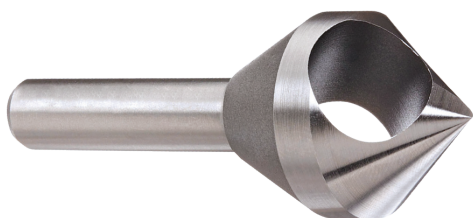
A	B	C	Dia. of Cut		82° Countersink Angle			
			Min.	Max.	Uncoated	Price	TiN	Price
Head Dia.	OAL	Shank Dia.						
5/16	1-5/8	1/4	3/32	9/32	53510	\$13.48	53510-TiN	\$15.89
3/8	1-3/4	1/4	9/64	11/32	53511	\$15.40	53511-TiN	\$17.80
1/2	1-3/4	5/16	5/32	29/64	53512	\$18.44	53512-TiN	\$22.30
5/8	2-1/8	3/8	11/64	37/64	53513	\$21.17	53513-TiN	\$27.57
3/4	2-3/8	3/8	13/64	45/64	53514	\$32.23	53514-TiN	\$39.58
1	2-5/8	3/8	19/64	59/64	53515	\$40.09	53515-TiN	\$52.89
1-1/4	3-1/8	1/2	23/64	1-3/32	53516	\$97.13	53516-TiN	\$116.33

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

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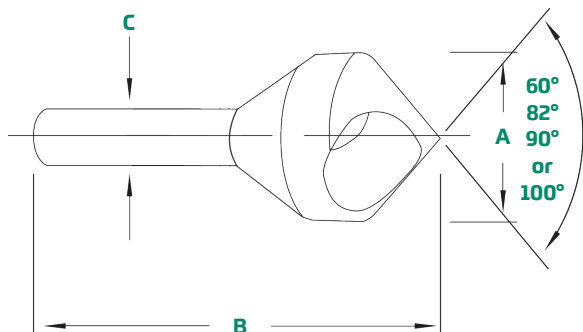
KEO **ZEP** Flute Countersink & Deburring tools are simple, all-purpose tools made of Cobalt that provide flawless countersinking and deburring. The chatter-free cutting action requires minimal power. The micro-smooth CNC precision ground construction produces clean, smooth cutting without smearing on a variety of materials. The tool especially excels in countersinking or deburring holes in aluminum, plastics and other nonmetallics. For set information see **page 71**.



## COBALT

A	B	C	Dia. of Cut		90° Countersink Angle			
			Min.	Max.	Uncoated	Price	TiN	Price
5/16	1-5/8	1/4	3/32	9/32	53520	\$13.48	53520-TiN	\$15.89
3/8	1-3/4	1/4	9/64	11/32	53521	\$15.40	53521-TiN	\$17.80
1/2	1-3/4	5/16	5/32	29/64	53522	\$18.44	53522-TiN	\$22.30
5/8	2-1/8	3/8	11/64	37/64	53523	\$21.17	53523-TiN	\$27.57
3/4	2-3/8	3/8	13/64	45/64	53524	\$32.23	53524-TiN	\$39.58
1	2-5/8	3/8	19/64	59/64	53525	\$40.09	53525-TiN	\$52.89
1-1/4	3-1/8	1/2	23/64	1-3/32	53526	\$97.13	53526-TiN	\$116.33

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.



## COBALT

A	B	C	Dia. of Cut		100° Countersink Angle			
			Min.	Max.	Uncoated	Price	TiN	Price
5/16	1-5/8	1/4	3/32	9/32	53530	\$13.48	53530-TiN	\$15.89
3/8	1-3/4	1/4	9/64	11/32	53531	\$15.40	53531-TiN	\$17.80
1/2	1-3/4	5/16	5/32	29/64	53532	\$18.44	53532-TiN	\$22.30
5/8	2-1/8	3/8	11/64	37/64	53533	\$21.17	53533-TiN	\$27.57
3/4	2-3/8	3/8	13/64	45/64	53534	\$32.23	53534-TiN	\$39.58
1	2-5/8	3/8	19/64	59/64	53535	\$40.09	53535-TiN	\$52.89
1-1/4	3-1/8	1/2	23/64	1-1/8	53536	\$97.13	53536-TiN	\$116.33

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.



# SINGLE-FLUTE HSS COUNTERSINKS

KEO Single Flute Countersinks are ideal for chamfering, deburring and countersinking. The large positive rake and single flute construction provide a smooth surface finish on a wide variety of materials. The versatility of this tool should increase productivity on all general purpose applications. Also available in a 5-piece set. For set information see **page 70**

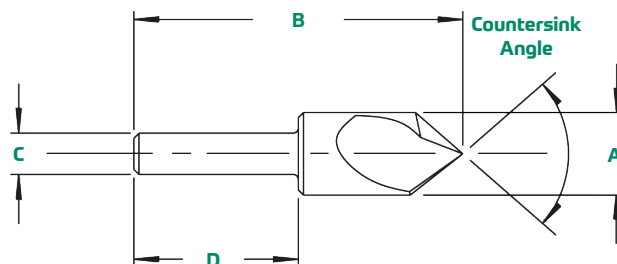
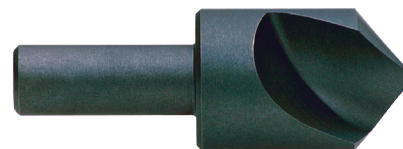
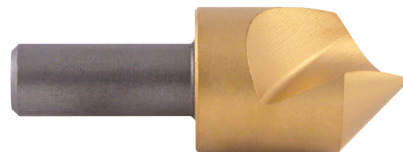
D

COUNTERSINKS & COUNTERBORES

## HSS

A	B	C	D	60° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price
1/8	1-1/4	1/8	N/A	53186	\$8.35	53186-TiN	\$9.32
3/16	1-3/8	3/16	N/A	53176	\$8.56	53176-TiN	\$9.95
1/4	1-1/2	1/4	N/A	53146	\$8.91	53146-TiN	\$10.76
3/8	1-3/4	1/4	7/8	53386	\$10.16	53386-TiN	\$12.52
1/2	2	1/4	1	53126	\$12.43	53126-TiN	\$16.22
5/8	2-1/4	3/8	1	53586	\$16.64	53586-TiN	\$22.88
3/4	2-5/8	1/2	1-1/4	53346	\$24.28	53346-TiN	\$31.46
1	2-3/4	1/2	1-1/4	53106	\$41.65	53106-TiN	\$54.13
1-1/4	3	1/2	1-1/4	53246	\$81.52	53246-TiN	\$96.49
1-1/2	3-1/4	3/4	1-1/4	53226	\$110.38	53226-TiN	\$133.80
1-3/4	3-1/2	3/4	1-1/4	53446	\$140.92	53446-TiN	\$178.38
2	3-3/4	3/4	1-1/4	53206	\$197.23	53206-TiN	\$234.69

Product Numbers 53186,53176,53146,and 53386 are sold in packs of 12  
 Product Numbers 53586 and 53346 are sold in packs of 6  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.



## HSS

A	B	C	D	82° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price
1/8	1-1/4	1/8	N/A	53188	\$8.35	53188-TiN	\$9.32
3/16	1-3/8	3/16	N/A	53178	\$8.56	53178-TiN	\$9.95
1/4	1-1/2	1/4	N/A	53148	\$8.91	53148-TiN	\$10.76
3/8	1-3/4	1/4	7/8	53388	\$10.16	53388-TiN	\$12.52
1/2	2	1/4	1	53128	\$12.43	53128-TiN	\$16.22
5/8	2-1/4	3/8	1	53588	\$16.64	53588-TiN	\$22.88
3/4	2-5/8	1/2	1-1/4	53348	\$24.28	53348-TiN	\$31.46
1	2-3/4	1/2	1-1/4	53108	\$41.65	53108-TiN	\$54.13
1-1/4	2-3/4	1/2	1-1/4	53248	\$81.52	53248-TiN	\$96.49
1-1/2	2-7/8	3/4	1-1/4	53228	\$110.38	53228-TiN	\$133.80
1-3/4	3	3/4	1-1/4	53448	\$140.92	53448-TiN	\$178.38
2	3-1/4	3/4	1-1/4	53208	\$197.23	53208-TiN	\$234.69

Product Numbers 53188,53178,53148,and 53388 are sold in packs of 12  
 Product Numbers 53588 and 53348 are sold in packs of 6  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.

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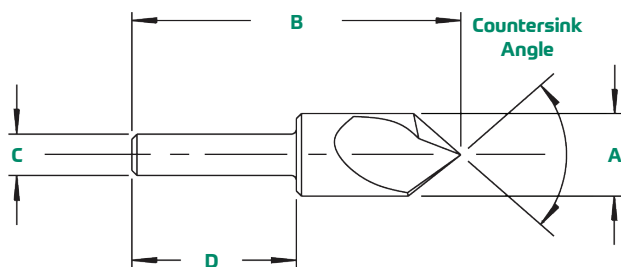
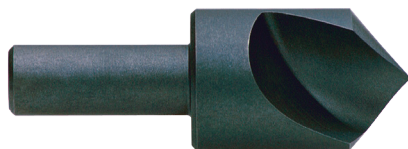
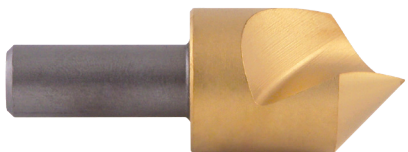
## HSS

A	B	C	D	90° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price
1/8	1-1/4	1/8	N/A	53189	\$8.35	53189-TiN	\$9.32
3/16	1-3/8	3/16	N/A	53179	\$8.56	53179-TiN	\$9.95
1/4	1-1/2	1/4	N/A	53149	\$8.91	53149-TiN	\$10.76
3/8	1-3/4	1/4	7/8	53389	\$10.16	53389-TiN	\$12.52
1/2	2	1/4	1	53129	\$12.43	53129-TiN	\$16.22
5/8	2-1/4	3/8	1	53589	\$16.64	53589-TiN	\$22.88
3/4	2-5/8	1/2	1-1/4	53349	\$24.28	53349-TiN	\$31.46
1	2-3/4	1/2	1-1/4	53109	\$41.65	53109-TiN	\$54.13
1-1/4	2-3/4	1/2	1-1/4	53249	\$81.52	53249-TiN	\$96.49
1-1/2	2-7/8	3/4	1-1/4	53229	\$110.38	53229-TiN	\$133.80
1-3/4	3	3/4	1-1/4	53449	\$140.92	53449-TiN	\$178.38
2	3-1/4	3/4	1-1/4	53209	\$197.23	53209-TiN	\$234.69

Product Numbers 53189,53179,53149,and 53389 are sold in packs of 12  
 Product Numbers 53589 and 53349 are sold in packs of 6  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.

# SINGLE-FLUTE HSS COUNTERSINKS (CONT.)

KEO Single Flute Countersinks are ideal for chamfering, deburring and countersinking. The large positive rake and single flute construction provide a smooth surface finish on a wide variety of materials. The versatility of this tool should increase productivity on all general purpose applications. Also available in a 5-piece set. For set information see **page 70**



## HSS

A	B	C	D	100° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price
1/8	1-1/4	1/8	N/A	53180	\$8.35	53180-TiN	\$9.32
3/16	1-3/8	3/16	N/A	53170	\$8.56	53170-TiN	\$9.95
1/4	1-1/2	1/4	N/A	53140	\$8.91	53140-TiN	\$10.76
3/8	1-3/4	1/4	7/8	53380	\$10.16	53380-TiN	\$12.52
1/2	2	1/4	1	53120	\$12.43	53120-TiN	\$16.22
5/8	2-1/4	3/8	1	53580	\$16.64	53580-TiN	\$22.88
3/4	2-5/8	1/2	1-1/4	53340	\$24.28	53340-TiN	\$31.46
1	2-3/4	1/2	1-1/4	53100	\$41.65	53100-TiN	\$54.13
1-1/4	2-3/4	1/2	1-1/4	53240	\$81.52	53240-TiN	\$96.49
1-1/2	2-7/8	3/4	1-1/4	53220	\$110.38	53220-TiN	\$133.80
1-3/4	3	3/4	1-1/4	53440	\$140.92	53440-TiN	\$178.38
2	3-1/4	3/4	1-1/4	53200	\$197.23	53200-TiN	\$234.69

Product Numbers 53180,53170,53140,and 53380 are sold in packs of 12

Product Numbers 53580 and 53340 are sold in packs of 6

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## HSS

A	B	C	D	110° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price
1/8	1-1/4	1/8	N/A	53181	\$8.35	53181-TiN	\$9.32
3/16	1-3/8	3/16	N/A	53171	\$8.56	53171-TiN	\$9.95
1/4	1-1/2	1/4	N/A	53141	\$8.91	53141-TiN	\$10.76
3/8	1-3/4	1/4	7/8	53381	\$10.16	53381-TiN	\$12.52
1/2	2	1/4	1	53121	\$12.43	53121-TiN	\$16.22
5/8	2-1/4	3/8	1	53581	\$16.64	53581-TiN	\$22.88
3/4	2-5/8	1/2	1-1/4	53341	\$24.28	53341-TiN	\$31.46
1	2-3/4	1/2	1-1/4	53101	\$41.65	53101-TiN	\$54.13
1-1/4	2-3/4	1/2	1-1/4	53241	\$81.52	53241-TiN	\$96.49
1-1/2	2-7/8	3/4	1-1/4	53221	\$110.38	53221-TiN	\$133.80
1-3/4	3	3/4	1-1/4	53441	\$140.92	53441-TiN	\$178.38
2	3-1/4	3/4	1-1/4	53201	\$197.23	53201-TiN	\$234.69

Product Numbers 53181,53171,53141,and 53381 are sold in packs of 12

Product Numbers 53581 and 53341 are sold in packs of 6

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## HSS

A	B	C	D	120° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price
1/8	1-1/4	1/8	N/A	53182	\$8.35	53182-TiN	\$9.32
3/16	1-3/8	3/16	N/A	53172	\$8.56	53172-TiN	\$9.95
1/4	1-1/2	1/4	N/A	53142	\$8.91	53142-TiN	\$10.76
3/8	1-3/4	1/4	7/8	53382	\$10.16	53382-TiN	\$12.52
1/2	2	1/4	1	53122	\$12.43	53122-TiN	\$16.22
5/8	2-1/4	3/8	1	53582	\$16.64	53582-TiN	\$22.88
3/4	2-5/8	1/2	1-1/4	53342	\$24.28	53342-TiN	\$31.46
1	2-3/4	1/2	1-1/4	53102	\$41.65	53102-TiN	\$54.13
1-1/4	2-3/4	1/2	1-1/4	53242	\$81.52	53242-TiN	\$96.49
1-1/2	2-7/8	3/4	1-1/4	53222	\$110.38	53222-TiN	\$133.80
1-3/4	3	3/4	1-1/4	53442	\$140.92	53442-TiN	\$178.38
2	3-1/4	3/4	1-1/4	53202	\$197.23	53202-TiN	\$234.69

Product Numbers 53182,53172,53142,and 53382 are sold in packs of 12

Product Numbers 53582 and 53342 are sold in packs of 6

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.



# SINGLE-FLUTE COBALT COUNTERSINKS

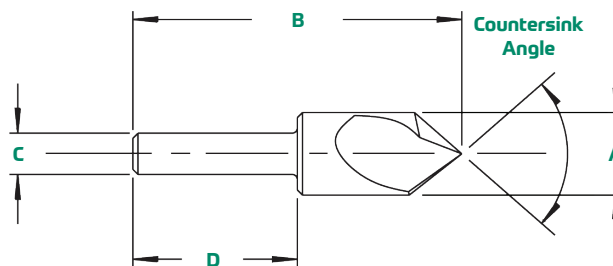
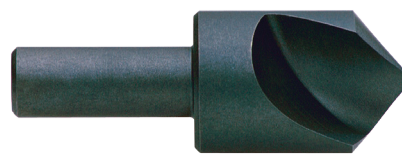
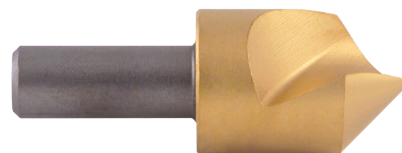
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COUNTERSINKS & COUNTERBORES

## COBALT

A	B	C	D	60° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/8	1-1/4	1/8	N/A	55400	\$9.61	55400-TiN	\$10.71
3/16	1-3/8	3/16	N/A	55401	\$9.85	55401-TiN	\$11.45
1/4	1-1/2	1/4	N/A	55402	\$10.25	55402-TiN	\$12.39
3/8	1-3/4	1/4	7/8	55403	\$11.69	55403-TiN	\$14.39
1/2	2	1/4	1	55404	\$14.31	55404-TiN	\$18.64
5/8	2-1/4	3/8	1	55405	\$19.13	55405-TiN	\$26.31
3/4	2-5/8	1/2	1-1/4	55406	\$27.92	55406-TiN	\$36.18
1	2-3/4	1/2	1-1/4	55407	\$47.89	55407-TiN	\$62.26
1-1/4	3	1/2	1-1/4	55408	\$93.75	55408-TiN	\$110.97
1-1/2	3-1/4	3/4	1-1/4	55409	\$126.94	55409-TiN	\$153.87
1-3/4	3-1/2	3/4	1-1/4	55410	\$162.06	55410-TiN	\$205.14
2	3-3/4	3/4	1-1/4	55411	\$226.81	55411-TiN	\$269.89

Product Numbers 55400, 55402, and 55403 are sold in packs of 12  
 Product Numbers 55404, 55405, and 55406 are sold in packs of 6  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.



## COBALT

A	B	C	D	82° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/8	1-1/4	1/8	N/A	55412	\$9.61	55412-TiN	\$10.71
3/16	1-3/8	3/16	N/A	55413	\$9.85	55413-TiN	\$11.45
1/4	1-1/2	1/4	N/A	55414	\$10.25	55414-TiN	\$12.39
3/8	1-3/4	1/4	7/8	55415	\$11.69	55415-TiN	\$14.39
1/2	2	1/4	1	55416	\$14.31	55416-TiN	\$18.64
5/8	2-1/4	3/8	1	55417	\$19.13	55417-TiN	\$26.31
3/4	2-5/8	1/2	1-1/4	55418	\$27.92	55418-TiN	\$36.18
1	2-3/4	1/2	1-1/4	55419	\$47.89	55419-TiN	\$62.26
1-1/4	2-3/4	1/2	1-1/4	55420	\$93.75	55420-TiN	\$110.97
1-1/2	2-7/8	3/4	1-1/4	55421	\$126.94	55421-TiN	\$153.87
1-3/4	3	3/4	1-1/4	55422	\$162.06	55422-TiN	\$205.14
2	3-1/4	3/4	1-1/4	55423	\$226.81	55423-TiN	\$269.89

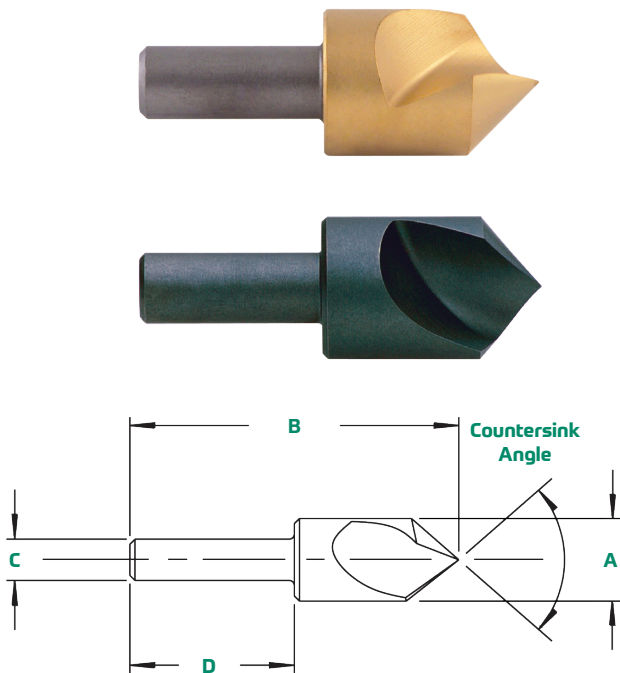
Product Numbers 55412, 55413, 55414, and 55415 are sold in packs of 12  
 Product Numbers 55416, 55417, and 55418 are sold in packs of 6  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.

Continues on next page

## COBALT

A	B	C	D	90° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/8	1-1/4	1/8	N/A	55424	\$9.61	55424-TiN	\$10.71
3/16	1-3/8	3/16	N/A	55425	\$9.85	55425-TiN	\$11.45
1/4	1-1/2	1/4	N/A	55426	\$10.25	55426-TiN	\$12.39
3/8	1-3/4	1/4	7/8	55427	\$11.69	55427-TiN	\$14.39
1/2	2	1/4	1	55428	\$14.31	55428-TiN	\$18.64
5/8	2-1/4	3/8	1	55429	\$19.13	55429-TiN	\$26.31
3/4	2-5/8	1/2	1-1/4	55430	\$27.92	55430-TiN	\$36.18
1	2-3/4	1/2	1-1/4	55431	\$47.89	55431-TiN	\$62.26
1-1/4	2-3/4	1/2	1-1/4	55432	\$93.75	55432-TiN	\$110.97
1-1/2	2-7/8	3/4	1-1/4	55433	\$126.94	55433-TiN	\$153.87
1-3/4	3	3/4	1-1/4	55434	\$162.06	55434-TiN	\$205.14
2	3-1/4	3/4	1-1/4	55435	\$226.81	55435-TiN	\$269.89

Product Numbers 55424, 55425, 55426 and 55427 are sold in packs of 12  
 Product Numbers 55428, 55429, and 55430 are sold in packs of 6  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.



## COBALT

A	B	C	D	100° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/8	1-1/4	1/8	N/A	55436	\$9.61	55436-TiN	\$10.71
3/16	1-3/8	3/16	N/A	55437	\$9.85	55437-TiN	\$11.45
1/4	1-1/2	1/4	N/A	55438	\$10.25	55438-TiN	\$12.39
3/8	1-3/4	1/4	7/8	55439	\$11.69	55439-TiN	\$14.39
1/2	2	1/4	1	55440	\$14.31	55440-TiN	\$18.64
5/8	2-1/4	3/8	1	55441	\$19.13	55441-TiN	\$26.31
3/4	2-5/8	1/2	1-1/4	55442	\$27.92	55442-TiN	\$36.18
1	2-3/4	1/2	1-1/4	55443	\$47.89	55443-TiN	\$62.26
1-1/4	2-3/4	1/2	1-1/4	55444	\$93.75	55444-TiN	\$110.97
1-1/2	2-7/8	3/4	1-1/4	55445	\$126.94	55445-TiN	\$153.87
1-3/4	3	3/4	1-1/4	55446	\$162.06	55446-TiN	\$205.14
2	3-1/4	3/4	1-1/4	55447	\$226.81	55447-TiN	\$269.89

Product Numbers 55436, 55437, 55438, and 55439 are sold in packs of 12  
 Product Numbers 55440, 55441, 55442 are sold in packs of 6  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.

## COBALT

A	B	C	D	110° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/8	1-1/4	1/8	N/A	55448	\$9.61	55448-TiN	\$10.71
3/16	1-3/8	3/16	N/A	55449	\$9.85	55449-TiN	\$11.45
1/4	1-1/2	1/4	N/A	55450	\$10.25	55450-TiN	\$12.39
3/8	1-3/4	1/4	7/8	55451	\$11.69	55451-TiN	\$14.39
1/2	2	1/4	1	55452	\$14.31	55452-TiN	\$18.64
5/8	2-1/4	3/8	1	55453	\$19.13	55453-TiN	\$26.31
3/4	2-5/8	1/2	1-1/4	55454	\$27.92	55454-TiN	\$36.18
1	2-3/4	1/2	1-1/4	55455	\$47.89	55455-TiN	\$62.26
1-1/4	2-3/4	1/2	1-1/4	55456	\$93.75	55456-TiN	\$110.97
1-1/2	2-7/8	3/4	1-1/4	55457	\$126.94	55457-TiN	\$153.87
1-3/4	3	3/4	1-1/4	55458	\$162.06	55458-TiN	\$205.14
2	3-1/4	3/4	1-1/4	55459	\$226.81	55459-TiN	\$269.89

Product Numbers 55448, 55449, 55450 and 55451 are sold in packs of 12  
 Product Numbers 55452, 55453, 55454 are sold in packs of 6  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.

## COBALT

A	B	C	D	120° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/8	1-1/4	1/8	N/A	55460	\$9.61	55460-TiN	\$10.71
3/16	1-3/8	3/16	N/A	55461	\$9.85	55461-TiN	\$11.45
1/4	1-1/2	1/4	N/A	55462	\$10.25	55462-TiN	\$12.39
3/8	1-3/4	1/4	7/8	55463	\$11.69	55463-TiN	\$14.39
1/2	2	1/4	1	55464	\$14.31	55464-TiN	\$18.64
5/8	2-1/4	3/8	1	55465	\$19.13	55465-TiN	\$26.31
3/4	2-5/8	1/2	1-1/4	55466	\$27.92	55466-TiN	\$36.18
1	2-3/4	1/2	1-1/4	55467	\$47.89	55467-TiN	\$62.26
1-1/4	2-3/4	1/2	1-1/4	55468	\$93.75	55468-TiN	\$110.97
1-1/2	2-7/8	3/4	1-1/4	55469	\$126.94	55469-TiN	\$153.87
1-3/4	3	3/4	1-1/4	55470	\$162.06	55470-TiN	\$205.14
2	3-1/4	3/4	1-1/4	55471	\$226.81	55471-TiN	\$269.89

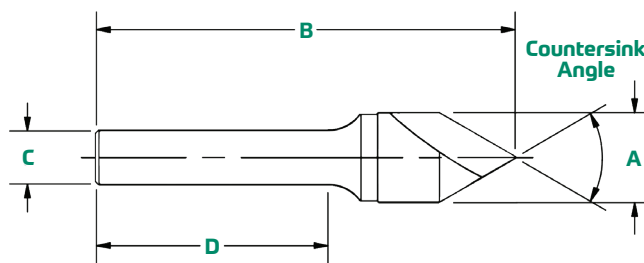
Product Numbers 55460, 55461, 55462, and 55463 are sold in packs of 12  
 Product Numbers 55464, 55465, 55466 are sold in packs of 6  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.

D

COUNTERSINKS & COUNTERBORES



# SINGLE-FLUTE CARBIDE COUNTERSINKS



D

COUNTERSINKS & COUNTERBORES

## CARBIDE

A	B	C	D	60° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55700	\$14.42	55700-TiALN	\$17.62
3/16	2	3/16	N/A	55701	\$15.33	55701-TiALN	\$19.34
1/4	2	1/4	N/A	55702	\$21.37	55702-TiALN	\$27.72
3/8	2-7/8	1/4	1 3/4	55703	\$30.66	55703-TiALN	\$41.15
1/2	2-7/8	1/4	1 5/8	55704	\$45.06	55704-TiALN	\$58.59
5/8	3	3/8	1 5/8	55705	\$66.59	55705-TiALN	\$84.99
3/4	3	3/8	1-1/2	55706	\$94.38	55706-TiALN	\$116.75
1	3-1/4	1/2	1-1/2	55707	\$156.94	55707-TiALN	\$185.09
1-1/4	3-3/4	3/4	1-1/2	55708	\$249.63	55708-TiALN	\$310.44

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## CARBIDE

A	B	C	D	82° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55710	\$14.42	55710-TiALN	\$17.62
3/16	2	3/16	N/A	55711	\$15.33	55711-TiALN	\$19.34
1/4	2	1/4	N/A	55712	\$21.37	55712-TiALN	\$27.72
3/8	2-5/8	1/4	1 3/4	55713	\$30.66	55713-TiALN	\$41.15
1/2	2-5/8	1/4	1 5/8	55714	\$45.06	55714-TiALN	\$58.59
5/8	2-3/4	3/8	1 5/8	55715	\$66.59	55715-TiALN	\$84.99
3/4	2-3/4	3/8	1-1/2	55716	\$94.38	55716-TiALN	\$116.75
1	3	1/2	1-1/2	55717	\$156.94	55717-TiALN	\$185.09
1-1/4	3-1/4	3/4	1-1/2	55718	\$249.63	55718-TiALN	\$310.44

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## CARBIDE

A	B	C	D	90° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55720	\$14.42	55720-TiALN	\$17.62
3/16	2	3/16	N/A	55721	\$15.33	55721-TiALN	\$19.34
1/4	2	1/4	N/A	55722	\$21.37	55722-TiALN	\$27.72
3/8	2-5/8	1/4	1 3/4	55723	\$30.66	55723-TiALN	\$41.15
1/2	2-5/8	1/4	1 5/8	55724	\$45.06	55724-TiALN	\$58.59
5/8	2-3/4	3/8	1 5/8	55725	\$66.59	55725-TiALN	\$84.99
3/4	2-3/4	3/8	1-1/2	55726	\$94.38	55726-TiALN	\$116.75
1	3	1/2	1-1/2	55727	\$156.94	55727-TiALN	\$185.09
1-1/4	3-1/4	3/4	1-1/2	55728	\$249.63	55728-TiALN	\$310.44

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

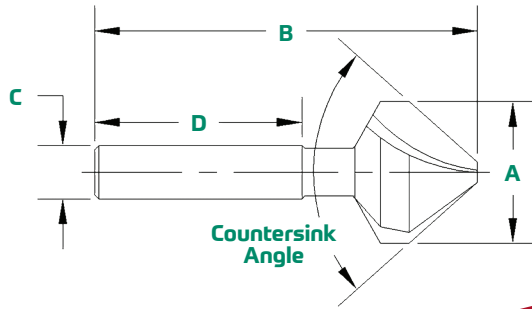
## CARBIDE

A	B	C	D	100° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55730	\$14.42	55730-TiALN	\$17.62
3/16	2	3/16	N/A	55731	\$15.33	55731-TiALN	\$19.34
1/4	2	1/4	N/A	55732	\$21.37	55732-TiALN	\$27.72
3/8	2-5/8	1/4	1 3/4	55733	\$30.66	55733-TiALN	\$41.15
1/2	2-5/8	1/4	1 5/8	55734	\$45.06	55734-TiALN	\$58.59
5/8	2-3/4	3/8	1 5/8	55735	\$66.59	55735-TiALN	\$84.99
3/4	2-3/4	3/8	1-1/2	55736	\$94.38	55736-TiALN	\$116.75
1	3	1/2	1-1/2	55737	\$156.94	55737-TiALN	\$185.09
1-1/4	3-1/4	3/4	1-1/2	55738	\$249.63	55738-TiALN	\$310.44

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.



# 3-FLUTE COBALT EURO STYLE COUNTERSINKS



## COBALT

### 60° Countersink Angle

A	B	C	D		
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price
1/4	1-3/4	13/64	1-1/4	54000	\$15.58
5/16	1-3/4	1/4	1-13/64	54001	\$15.05
3/8	1-3/4	1/4	1-13/64	54002	\$15.52
1/2	1-7/8	1/4	1-1/4	54003	\$16.13
5/8	2-1/4	3/8	1-1/2	54004	\$21.50
3/4	2-1/2	3/8	1-1/2	54005	\$24.08
1	2-3/4	3/8	1-1/2	54006	\$35.80
1-1/4	3-1/4	1/2	1-3/4	54007	\$73.58

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## COBALT

### 82° Countersink Angle

A	B	C	D		
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price
1/4	1-3/4	13/64	1-1/4	54010	\$13.52
5/16	1-3/4	1/4	1-13/64	54011	\$12.47
3/8	1-3/4	1/4	1-13/64	54012	\$12.55
1/2	1-7/8	1/4	1-1/4	54013	\$12.92
5/8	2-1/4	3/8	1-1/2	54014	\$17.28
3/4	2-1/2	3/8	1-1/2	54015	\$20.00
1	2-3/4	3/8	1-1/2	54016	\$27.62
1-1/4	3-1/4	1/2	1-3/4	54017	\$56.23

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## COBALT

### 90° Countersink Angle

A	B	C	D		
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price
1/4	1-3/4	13/64	1-1/4	54020	\$13.52
5/16	1-3/4	1/4	1-13/64	54021	\$12.47
3/8	1-3/4	1/4	1-13/64	54022	\$12.55
1/2	1-7/8	1/4	1-1/4	54023	\$12.92
5/8	2-1/4	3/8	1-1/2	54024	\$17.28
3/4	2-1/2	3/8	1-1/2	54025	\$20.00
1	2-3/4	3/8	1-1/2	54026	\$27.45
1-1/4	3-1/4	1/2	1-3/4	54027	\$54.90

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## COBALT

### 100° Countersink Angle

A	B	C	D		
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price
1/4	1-3/4	13/64	1-1/4	54030	\$15.58
5/16	1-3/4	1/4	1-13/64	54031	\$15.05
3/8	1-3/4	1/4	1-13/64	54032	\$15.52
1/2	1-7/8	1/4	1-1/4	54033	\$16.13
5/8	2-1/4	3/8	1-1/2	54034	\$21.50
3/4	2-1/2	3/8	1-1/2	54035	\$24.63
1	2-3/4	3/8	1-1/2	54036	\$34.70
1-1/4	3-1/4	1/2	1-3/4	54037	\$71.97

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

D

COUNTERSINKS & COUNTERBORES



# 3-FLUTE HSS CENTER REAMERS

KEO 3-Flute Center Reamers are versatile tools designed for countersinking holes for centers or for enlarging existing holes. Also available in a 5-piece set. For set information see page 71.

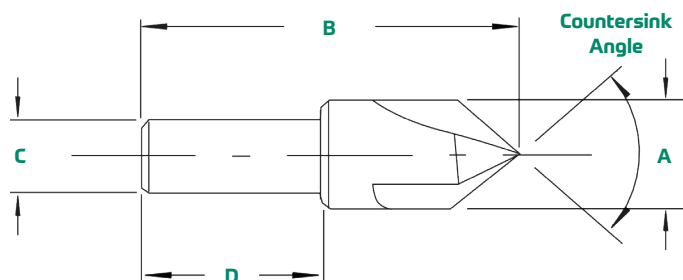
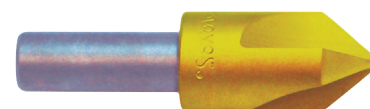
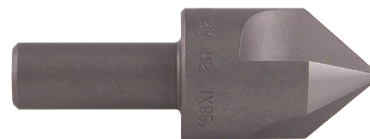
D

COUNTERSINKS & COUNTERBORES

## HSS

A	B	C	D	60° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price
1/4	1-1/2	1/4	N/A	50146	\$9.43	50146-TiN	\$11.36
3/8	1-3/4	1/4	7/8	50386	\$10.60	50386-TiN	\$13.05
1/2	2	1/4	1	50126	\$13.05	50126-TiN	\$17.00
5/8	2-1/4	3/8	1	50586	\$17.36	50586-TiN	\$23.88
3/4	2-5/8	1/2	1-1/4	50346	\$25.39	50346-TiN	\$32.87
1	2-3/4	1/2	1-1/4	51006	\$40.39	51006-TiN	\$53.43
1-1/4	3	1/2	1-1/4	51256	\$98.17	51256-TiN	\$113.81
1-1/2	3-1/4	3/4	1-1/4	51506	\$149.60	51506-TiN	\$174.05
1-3/4	3-1/2	3/4	1-1/4	51756	\$188.59	51756-TiN	\$227.68
2	3-3/4	3/4	1-1/4	52306	\$250.95	52306-TiN	\$290.05

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.



## HSS

A	B	C	D	82° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price
1/4	1-1/2	1/4	N/A	50148	\$9.43	50148-TiN	\$11.36
3/8	1-3/4	1/4	7/8	50388	\$10.60	50388-TiN	\$13.05
1/2	2	1/4	1	50128	\$13.05	50128-TiN	\$17.00
5/8	2-1/4	3/8	1	50588	\$17.36	50588-TiN	\$23.88
3/4	2-5/8	1/2	1-1/4	50348	\$25.39	50348-TiN	\$32.87
1	2-3/4	1/2	1-1/4	51008	\$40.39	51008-TiN	\$53.43
1-1/4	2-3/4	1/2	1-1/4	51258	\$94.72	51258-TiN	\$110.34
1-1/2	2-7/8	3/4	1-1/4	51508	\$135.58	51508-TiN	\$160.02
1-3/4	3	3/4	1-1/4	51758	\$179.47	51758-TiN	\$218.56
2	3-1/4	3/4	1-1/4	52308	\$220.56	52308-TiN	\$259.66

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

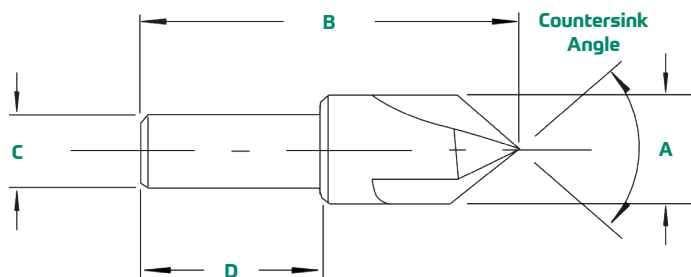
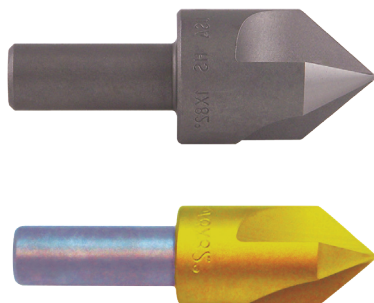
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## HSS

A	B	C	D	90° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price
1/4	1-1/2	1/4	N/A	50149	\$9.43	50149-TiN	\$11.36
3/8	1-3/4	1/4	7/8	50389	\$10.60	50389-TiN	\$13.05
1/2	2	1/4	1	50129	\$13.05	50129-TiN	\$17.00
5/8	2-1/4	3/8	1	50589	\$17.36	50589-TiN	\$23.88
3/4	2-5/8	1/2	1-1/4	50349	\$25.39	50349-TiN	\$32.87
1	2-3/4	1/2	1-1/4	51009	\$40.39	51009-TiN	\$53.43
1-1/4	2-3/4	1/2	1-1/4	51259	\$94.72	51259-TiN	\$110.34
1-1/2	2-7/8	3/4	1-1/4	51509	\$135.58	51509-TiN	\$160.02
1-3/4	3	3/4	1-1/4	51759	\$179.47	51759-TiN	\$218.56
2	3-1/4	3/4	1-1/4	52309	\$220.56	52309-TiN	\$259.66

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

KEO 3-Flute Center Reamers are versatile tools designed for countersinking holes for centers or for enlarging existing holes. Also available in a 5-piece set. For set information see page 71.



## HSS

A	B	C	D	100° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TIN	Price
1/4	1-1/2	1/4	N/A	50140	\$9.43	50140-TIN	\$11.36
3/8	1-3/4	1/4	7/8	50380	\$10.60	50380-TIN	\$13.05
1/2	2	1/4	1	50120	\$13.05	50120-TIN	\$17.00
5/8	2-1/4	3/8	1	50580	\$17.36	50580-TIN	\$23.88
3/4	2-5/8	1/2	1-1/4	50340	\$25.39	50340-TIN	\$32.87
1	2-3/4	1/2	1-1/4	51000	\$40.39	51000-TIN	\$53.43
1-1/4	2-3/4	1/2	1-1/4	51250	\$94.72	51250-TIN	\$110.34
1-1/2	2-7/8	3/4	1-1/4	51500	\$135.58	51500-TIN	\$160.02
1-3/4	3	3/4	1-1/4	51750	\$179.47	51750-TIN	\$218.56
2	3-1/4	3/4	1-1/4	52300	\$220.56	52300-TIN	\$259.66

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## HSS

A	B	C	D	110° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TIN	Price
1/4	1-1/2	1/4	N/A	50141	\$9.43	50141-TIN	\$11.36
3/8	1-3/4	1/4	7/8	50381	\$10.60	50381-TIN	\$13.05
1/2	2	1/4	1	50121	\$13.05	50121-TIN	\$17.00
5/8	2-1/4	3/8	1	50581	\$17.36	50581-TIN	\$23.88
3/4	2-5/8	1/2	1-1/4	50341	\$25.39	50341-TIN	\$32.87
1	2-3/4	1/2	1-1/4	51001	\$40.39	51001-TIN	\$53.43
1-1/4	2-3/4	1/2	1-1/4	51251	\$94.72	51251-TIN	\$110.34
1-1/2	2-7/8	3/4	1-1/4	51501	\$135.58	51501-TIN	\$160.02
1-3/4	3	3/4	1-1/4	51751	\$179.47	51751-TIN	\$218.56
2	3-1/4	3/4	1-1/4	52301	\$220.56	52301-TIN	\$259.66

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## HSS

A	B	C	D	120° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TIN	Price
1/4	1-1/2	1/4	N/A	50142	\$9.43	50142-TIN	\$11.36
3/8	1-3/4	1/4	7/8	50382	\$10.60	50382-TIN	\$13.05
1/2	2	1/4	1	50122	\$13.05	50122-TIN	\$17.00
5/8	2-1/4	3/8	1	50582	\$17.36	50582-TIN	\$23.88
3/4	2-5/8	1/2	1-1/4	50342	\$25.39	50342-TIN	\$32.87
1	2-3/4	1/2	1-1/4	51002	\$40.39	51002-TIN	\$53.43
1-1/4	2-3/4	1/2	1-1/4	51252	\$94.72	51252-TIN	\$110.34
1-1/2	2-7/8	3/4	1-1/4	51502	\$135.58	51502-TIN	\$160.02
1-3/4	3	3/4	1-1/4	51752	\$179.47	51752-TIN	\$218.56
2	3-1/4	3/4	1-1/4	52302	\$220.56	52302-TIN	\$259.66

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

# D

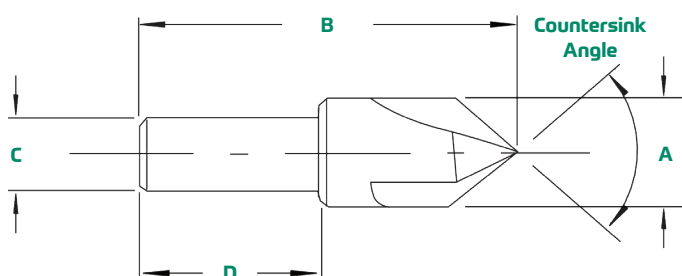
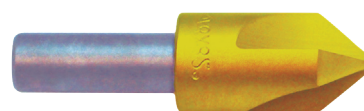
# COUNTERSINKS & COUNTERBORES



## COBALT

A	B	C	D	60° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/4	1-1/2	1/4	N/A	55300	\$10.83	55300-TiN	\$13.07
3/8	1-3/4	1/4	7/8	55301	\$12.19	55301-TiN	\$15.01
1/2	2	1/4	1	55302	\$15.01	55302-TiN	\$19.54
5/8	2-1/4	3/8	1	55303	\$19.97	55303-TiN	\$27.47
3/4	2-5/8	1/2	1-1/4	55304	\$29.19	55304-TiN	\$37.80
1	2-3/4	1/2	1-1/4	55305	\$46.44	55305-TiN	\$61.45
1-1/4	3	1/2	1-1/4	55306	\$112.90	55306-TiN	\$130.87
1-1/2	3-1/4	3/4	1-1/4	55307	\$172.05	55307-TiN	\$200.15
1-3/4	3-1/2	3/4	1-1/4	55308	\$216.88	55308-TiN	\$261.84
2	3-3/4	3/4	1-1/4	55309	\$288.59	55309-TiN	\$333.56

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.



## COBALT

A	B	C	D	82° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/4	1-1/2	1/4	N/A	55310	\$10.83	55310-TiN	\$13.07
3/8	1-3/4	1/4	7/8	55311	\$12.19	55311-TiN	\$15.01
1/2	2	1/4	1	55312	\$15.01	55312-TiN	\$19.54
5/8	2-1/4	3/8	1	55313	\$19.97	55313-TiN	\$27.47
3/4	2-5/8	1/2	1-1/4	55314	\$29.19	55314-TiN	\$37.80
1	2-3/4	1/2	1-1/4	55315	\$46.44	55315-TiN	\$61.45
1-1/4	2-3/4	1/2	1-1/4	55316	\$112.90	55316-TiN	\$130.87
1-1/2	2-7/8	3/4	1-1/4	55317	\$172.05	55317-TiN	\$200.15
1-3/4	3	3/4	1-1/4	55318	\$216.88	55318-TiN	\$261.84
2	3-1/4	3/4	1-1/4	55319	\$288.59	55319-TiN	\$333.56

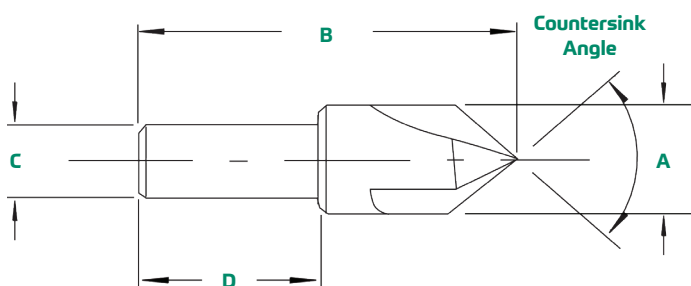
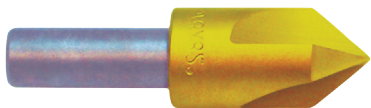
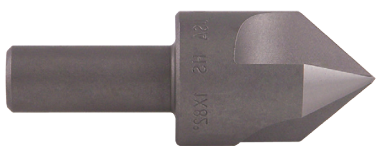
All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

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## COBALT

A	B	C	D	90° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/4	1-1/2	1/4	N/A	55320	\$10.83	55320-TiN	\$13.07
3/8	1-3/4	1/4	7/8	55321	\$12.19	55321-TiN	\$15.01
1/2	2	1/4	1	55322	\$15.01	55322-TiN	\$19.54
5/8	2-1/4	3/8	1	55323	\$19.97	55323-TiN	\$27.47
3/4	2-5/8	1/2	1-1/4	55324	\$29.19	55324-TiN	\$37.80
1	2-3/4	1/2	1-1/4	55325	\$46.44	55325-TiN	\$61.45
1-1/4	2-3/4	1/2	1-1/4	55326	\$112.90	55326-TiN	\$130.87
1-1/2	2-7/8	3/4	1-1/4	55327	\$172.05	55327-TiN	\$200.15
1-3/4	3	3/4	1-1/4	55328	\$216.88	55328-TiN	\$261.84
2	3-1/4	3/4	1-1/4	55329	\$288.59	55329-TiN	\$333.56

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.



## COBALT

A	B	C	D	100° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/4	1-1/2	1/4	N/A	55330	\$10.83	55330-TiN	\$13.07
3/8	1-3/4	1/4	7/8	55331	\$12.19	55331-TiN	\$15.01
1/2	2	1/4	1	55332	\$15.01	55332-TiN	\$19.54
5/8	2-1/4	3/8	1	55333	\$19.97	55333-TiN	\$27.47
3/4	2-5/8	1/2	1-1/4	55334	\$29.19	55334-TiN	\$37.80
1	2-3/4	1/2	1-1/4	55335	\$46.44	55335-TiN	\$61.45
1-1/4	2-3/4	1/2	1-1/4	55336	\$112.90	55336-TiN	\$130.87
1-1/2	2-7/8	3/4	1-1/4	55337	\$172.05	55337-TiN	\$200.15
1-3/4	3	3/4	1-1/4	55338	\$216.88	55338-TiN	\$261.84
2	3-1/4	3/4	1-1/4	55339	\$288.59	55339-TiN	\$333.56

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## COBALT

A	B	C	D	110° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/4	1-1/2	1/4	N/A	55340	\$10.83	55340-TiN	\$13.07
3/8	1-3/4	1/4	7/8	55341	\$12.19	55341-TiN	\$15.01
1/2	2	1/4	1	55342	\$15.01	55342-TiN	\$19.54
5/8	2-1/4	3/8	1	55343	\$19.97	55343-TiN	\$27.47
3/4	2-5/8	1/2	1-1/4	55344	\$29.19	55344-TiN	\$37.80
1	2-3/4	1/2	1-1/4	55345	\$46.44	55345-TiN	\$61.45
1-1/4	2-3/4	1/2	1-1/4	55346	\$112.90	55346-TiN	\$130.87
1-1/2	2-7/8	3/4	1-1/4	55347	\$172.05	55347-TiN	\$200.15
1-3/4	3	3/4	1-1/4	55348	\$216.88	55348-TiN	\$261.84
2	3-1/4	3/4	1-1/4	55349	\$288.59	55349-TiN	\$333.56

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## COBALT

A	B	C	D	120° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CO	Price	CO-TiN	Price
1/4	1-1/2	1/4	N/A	55350	\$10.83	55350-TiN	\$13.07
3/8	1-3/4	1/4	7/8	55351	\$12.19	55351-TiN	\$15.01
1/2	2	1/4	1	55352	\$15.01	55352-TiN	\$19.54
5/8	2-1/4	3/8	1	55353	\$19.97	55353-TiN	\$27.47
3/4	2-5/8	1/2	1-1/4	55354	\$29.19	55354-TiN	\$37.80
1	2-3/4	1/2	1-1/4	55355	\$46.44	55355-TiN	\$61.45
1-1/4	2-3/4	1/2	1-1/4	55356	\$112.90	55356-TiN	\$130.87
1-1/2	2-7/8	3/4	1-1/4	55357	\$172.05	55357-TiN	\$200.15
1-3/4	3	3/4	1-1/4	55358	\$216.88	55358-TiN	\$261.84
2	3-1/4	3/4	1-1/4	55359	\$288.59	55359-TiN	\$333.56

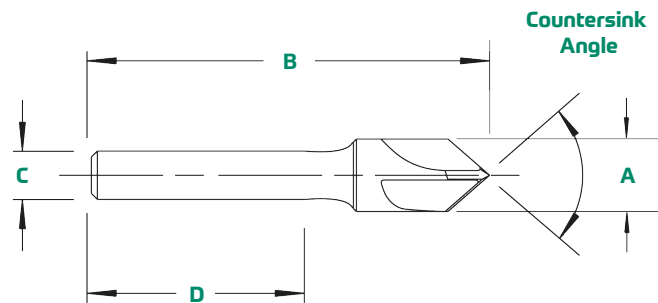
All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

# D

# COUNTERSINKS & COUNTERBORES

# 3-FLUTE CARBIDE COUNTERSINKS

For the carbide family of these tools, the three-flute represents the ideal "general purpose" countersink. They have enough chip clearance in the three-flute design for a variety of ferrous and non-ferrous materials, while providing enough strength with the radial relief design to attack hardened materials up to 40 Rc. For set information see page 71.



D

COUNTERSINKS & COUNTERBORES

## CARBIDE

A	B	C	D	60° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55740	\$14.71	55740-TiALN	\$17.97
3/16	2	3/16	N/A	55741	\$15.64	55741-TiALN	\$19.73
1/4	2	1/4	N/A	55742	\$21.80	55742-TiALN	\$28.27
3/8	2-7/8	1/4	1 3/4	55743	\$31.27	55743-TiALN	\$41.97
1/2	2-7/8	1/4	1 5/8	55744	\$45.96	55744-TiALN	\$59.76
5/8	3	3/8	1 5/8	55745	\$67.93	55745-TiALN	\$86.69
3/4	3	3/8	1-1/2	55746	\$96.27	55746-TiALN	\$119.08
1	3-1/4	1/2	1-1/2	55747	\$160.07	55747-TiALN	\$188.81
1-1/4	3-1/4	3/4	1-1/2	55748	\$254.62	55748-TiALN	\$316.64

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## CARBIDE

A	B	C	D	82° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55750	\$14.71	55750-TiALN	\$17.97
3/16	2	3/16	N/A	55751	\$15.64	55751-TiALN	\$19.73
1/4	2	1/4	N/A	55752	\$21.80	55752-TiALN	\$28.27
3/8	2-5/8	1/4	1 3/4	55753	\$31.27	55753-TiALN	\$41.97
1/2	2-5/8	1/4	1 5/8	55754	\$45.96	55754-TiALN	\$59.76
5/8	2-3/4	3/8	1 5/8	55755	\$67.93	55755-TiALN	\$86.69
3/4	2-3/4	3/8	1-1/2	55756	\$96.27	55756-TiALN	\$119.08
1	3	1/2	1-1/2	55757	\$160.07	55757-TiALN	\$188.81
1-1/4	3-1/4	3/4	1-1/2	55758	\$254.62	55758-TiALN	\$316.64

## CARBIDE

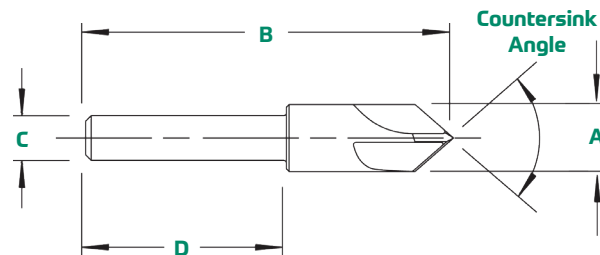
A	B	C	D	90° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55760	\$14.71	55760-TiALN	\$17.97
3/16	2	3/16	N/A	55761	\$15.64	55761-TiALN	\$19.73
1/4	2	1/4	N/A	55762	\$21.80	55762-TiALN	\$28.27
3/8	2-5/8	1/4	1 3/4	55763	\$31.27	55763-TiALN	\$41.97
1/2	2-5/8	1/4	1 5/8	55764	\$45.96	55764-TiALN	\$59.76
5/8	2-3/4	3/8	1 5/8	55765	\$67.93	55765-TiALN	\$86.69
3/4	2-3/4	3/8	1-1/2	55766	\$96.27	55766-TiALN	\$119.08
1	3	1/2	1-1/2	55767	\$160.07	55767-TiALN	\$188.81
1-1/4	3-1/4	3/4	1-1/2	55768	\$254.62	55768-TiALN	\$316.64

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## CARBIDE

A	B	C	D	100° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55770	\$14.71	55770-TiALN	\$17.97
3/16	2	3/16	N/A	55771	\$15.64	55771-TiALN	\$19.73
1/4	2	1/4	N/A	55772	\$21.80	55772-TiALN	\$28.27
3/8	2-5/8	1/4	1 3/4	55773	\$31.27	55773-TiALN	\$41.97
1/2	2-5/8	1/4	1 5/8	55774	\$45.96	55774-TiALN	\$59.76
5/8	2-3/4	3/8	1 5/8	55775	\$67.93	55775-TiALN	\$86.69
3/4	2-3/4	3/8	1-1/2	55776	\$96.27	55776-TiALN	\$119.08
1	3	1/2	1-1/2	55777	\$160.07	55777-TiALN	\$188.81
1-1/4	3-1/4	3/4	1-1/2	55778	\$254.62	55778-TiALN	\$316.64

KEO 4-Flute Center Countersinks are versatile tools designed for countersinking holes for centers or for enlarging existing holes.



## HSS COBALT

A	B	C	D	60° Countersink Angle							
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price	CO	Price	CO-TiN	Price
1/2	3-7/8	1/2	2-1/4	40126	\$32.71	40126-TiN	\$39.25	55250	\$37.62	55250-TiN	\$45.14
5/8	4	1/2	2-1/4	40586	\$36.73	40586-TiN	\$44.06	55251	\$42.23	55251-TiN	\$50.67
3/4	4-1/8	1/2	2-1/4	40346	\$48.98	40346-TiN	\$58.78	55252	\$56.33	55252-TiN	\$67.60
7/8	4-1/4	1/2	2-1/4	40786	\$58.02	40786-TiN	\$69.61	55253	\$66.72	55253-TiN	\$80.05
1	4-3/8	1/2	2-1/4	41006	\$67.93	41006-TiN	\$81.52	55254	\$78.13	55254-TiN	\$93.74

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## HSS COBALT

A	B	C	D	82° Countersink Angle							
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price	CO	Price	CO-TiN	Price
1/2	3-7/8	1/2	2-1/4	40128	\$32.71	40128-TiN	\$39.25	55255	\$37.62	55255-TiN	\$45.14
5/8	4	1/2	2-1/4	40588	\$36.73	40588-TiN	\$44.06	55256	\$42.23	55256-TiN	\$50.67
3/4	4-1/8	1/2	2-1/4	40348	\$48.98	40348-TiN	\$58.78	55257	\$56.33	55257-TiN	\$67.60
7/8	4-1/4	1/2	2-1/4	40788	\$58.02	40788-TiN	\$69.61	55258	\$66.72	55258-TiN	\$80.05
1	4-3/8	1/2	2-1/4	41008	\$67.93	41008-TiN	\$81.52	55259	\$78.13	55259-TiN	\$93.74

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## HSS COBALT

A	B	C	D	90° Countersink Angle							
Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price	CO	Price	CO-TiN	Price
1/2	3-7/8	1/2	2-1/4	40129	\$32.71	40129-TiN	\$39.25	55260	\$37.62	55260-TiN	\$45.14
5/8	4	1/2	2-1/4	40589	\$36.73	40589-TiN	\$44.06	55261	\$42.23	55261-TiN	\$50.67
3/4	4-1/8	1/2	2-1/4	40349	\$48.98	40349-TiN	\$58.78	55262	\$56.33	55262-TiN	\$67.60
7/8	4-1/4	1/2	2-1/4	40789	\$58.02	40789-TiN	\$69.61	55263	\$66.72	55263-TiN	\$80.05
1	4-3/8	1/2	2-1/4	41009	\$67.93	41009-TiN	\$81.52	55264	\$78.13	55264-TiN	\$93.74

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

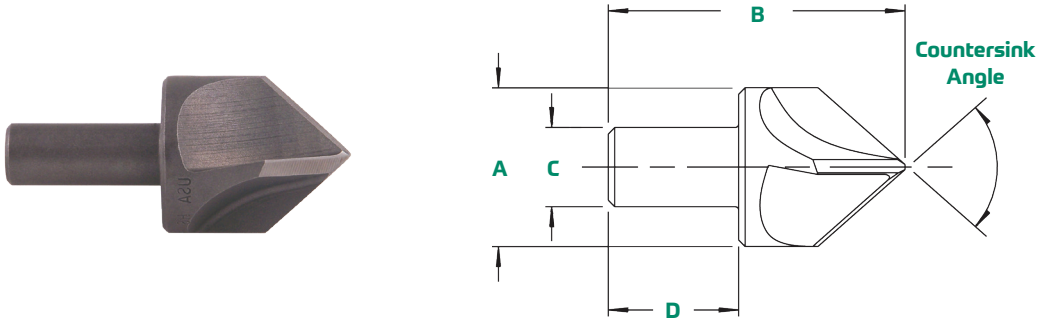
D

COUNTERSINKS & COUNTERBORES



# 4-FLUTE CENTER REAMERS

KEO 4-Flute Center Reamers are versatile tools designed for countersinking holes for centers or for enlarging existing holes



## HSS COBALT

A	B	C	D
Body Dia.	OAL	Shank Dia.	Shank Length
1-1/4	3	1/2	1-1/4
1-1/2	3-1/4	3/4	1-1/4
1-3/4	3-1/2	3/4	1-1/4
2	3-3/4	3/4	1-1/4

### 60° Countersink Angle

Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price	CO	Price	CO-TiN	Price
1-1/4	3	1/2	1-1/4	51146	\$84.22	51146-TiN	\$101.08	55370	\$96.86	55370-TiN	\$116.24
1-1/2	3-1/4	3/4	1-1/4	51126	\$115.06	51126-TiN	\$138.07	55371	\$132.32	55371-TiN	\$158.77
1-3/4	3-1/2	3/4	1-1/4	51346	\$145.65	51346-TiN	\$174.79	55372	\$167.51	55372-TiN	\$201.00
2	3-3/4	3/4	1-1/4	52006	\$203.86	52006-TiN	\$244.64	55373	\$234.44	55373-TiN	\$281.33

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## HSS COBALT

A	B	C	D
Body Dia.	OAL	Shank Dia.	Shank Length
1-1/4	2-3/4	1/2	1-1/4
1-1/2	2-7/8	3/4	1-1/4
1-3/4	3	3/4	1-1/4
2	3-1/4	3/4	1-1/4

### 82° Countersink Angle

Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price	CO	Price	CO-TiN	Price
1-1/4	2-3/4	1/2	1-1/4	51148	\$84.22	51148-TiN	\$101.08	55374	\$96.86	55374-TiN	\$116.24
1-1/2	2-7/8	3/4	1-1/4	51128	\$115.06	51128-TiN	\$138.07	55375	\$132.32	55375-TiN	\$158.77
1-3/4	3	3/4	1-1/4	51348	\$145.65	51348-TiN	\$174.79	55376	\$167.51	55376-TiN	\$201.00
2	3-1/4	3/4	1-1/4	52008	\$203.86	52008-TiN	\$244.64	55377	\$234.44	55377-TiN	\$281.33

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## HSS COBALT

A	B	C	D
Body Dia.	OAL	Shank Dia.	Shank Length
1-1/4	2-3/4	1/2	1-1/4
1-1/2	2-7/8	3/4	1-1/4
1-3/4	3	3/4	1-1/4
2	3-1/4	3/4	1-1/4

### 90° Countersink Angle

Body Dia.	OAL	Shank Dia.	Shank Length	HSS	Price	HSS-TiN	Price	CO	Price	CO-TiN	Price
1-1/4	2-3/4	1/2	1-1/4	51149	\$84.22	51149-TiN	\$101.08	55378	\$96.86	55378-TiN	\$116.24
1-1/2	2-7/8	3/4	1-1/4	51129	\$115.06	51129-TiN	\$138.07	55379	\$132.32	55379-TiN	\$158.77
1-3/4	3	3/4	1-1/4	51349	\$145.65	51349-TiN	\$174.79	55380	\$167.51	55380-TiN	\$201.00
2	3-1/4	3/4	1-1/4	52009	\$203.86	52009-TiN	\$244.64	55381	\$234.44	55381-TiN	\$281.33

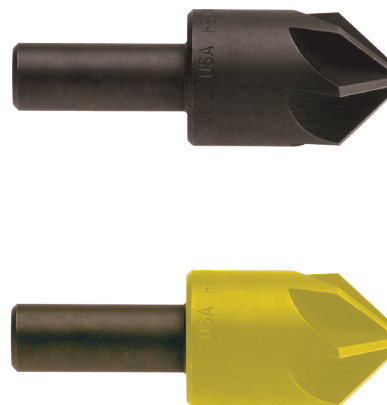
All dimensions in inches. Many tools are available with additional coatings. Please call for quote.



## HSS

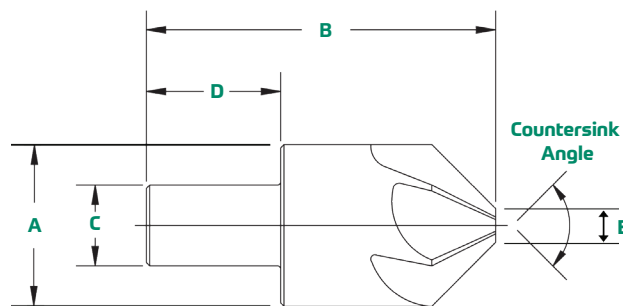
					60° Countersink Angle			
A	B	C	D	E	HSS	Price	HSS-TiN	Price
Body Dia.	OAL	Shank Dia.	Shank Length	Nose Dia.				
1/8	1-1/4	1/8	N/A	3/64	55000	\$7.67	55000-TiN	\$8.67
3/16	1-3/8	3/16	N/A	1/16	55001	\$8.37	55001-TiN	\$9.83
1/4	1-1/2	1/4	N/A	5/64	55002	\$8.52	55002-TiN	\$10.46
5/16	1-3/4	1/4	7/8	3/32	55003	\$10.08	55003-TiN	\$12.54
3/8	1-3/4	1/4	7/8	1/8	55004	\$10.52	55004-TiN	\$12.97
1/2	2	1/4	1	5/32	55005	\$12.93	55005-TiN	\$16.86
1/2	2	3/8	1	5/32	55006	\$12.93	55006-TiN	\$16.86
5/8	2-1/4	1/4	1	13/64	55007	\$18.75	55007-TiN	\$25.27
5/8	2-1/4	3/8	1	13/64	55008	\$18.75	55008-TiN	\$25.27
3/4	2-5/8	1/2	1-1/4	1/4	55009	\$25.71	55009-TiN	\$33.20
7/8	2-3/4	1/2	1-1/4	9/32	55010	\$36.38	55010-TiN	\$46.64
1	2-3/4	1/2	1-1/4	21/64	55011	\$40.47	55011-TiN	\$53.51
1-1/4	3	1/2	1-1/4	13/32	55012	\$62.08	55012-TiN	\$81.65
1-1/2	3-1/4	3/4	1-1/4	1/2	55013	\$88.96	55013-TiN	\$113.41
1-3/4	3-1/2	3/4	1-1/4	37/64	55014	\$118.33	55014-TiN	\$157.43
2	3-3/4	3/4	1-1/4	21/32	55015	\$150.46	55015-TiN	\$189.56
2-1/2	5	1	1-1/2	53/64	55016	\$390.03	55016-TiN	\$458.89
3	5-1/4	1	1-1/2	1	55017	\$537.57	55017-TiN	\$692.83

KEO 6-Flute line of countersinks are companions to our Single Flute Countersinks and our 3- and 4-Flute Center Reamer line. As a rule, the more edges per revolution, the greater amount of material that may be removed. We have designed the 6-Flute tools with staggered cutting edges. See **page 72** for set information.



## HSS

					82° Countersink Angle			
A	B	C	D	E	HSS	Price	HSS-TiN	Price
Body Dia.	OAL	Shank Dia.	Shank Length	Nose Dia.				
1/8	1-1/4	1/8	N/A	.025	55020	\$7.67	55020-TiN	\$8.67
3/16	1-3/8	3/16	N/A	1/32	55021	\$8.37	55021-TiN	\$9.83
1/4	1-1/2	1/4	N/A	3/64	55022	\$8.52	55022-TiN	\$10.46
5/16	1-3/4	1/4	7/8	1/16	55023	\$10.08	55023-TiN	\$12.54
3/8	1-3/4	1/4	7/8	5/64	55024	\$10.52	55024-TiN	\$12.97
1/2	2	1/4	1	7/64	55025	\$12.93	55025-TiN	\$16.86
1/2	2	3/8	1	7/64	55026	\$12.93	55026-TiN	\$16.86
5/8	2-1/4	1/4	1	1/8	55027	\$18.75	55027-TiN	\$25.27
5/8	2-1/4	3/8	1	1/8	55028	\$18.75	55028-TiN	\$25.27
3/4	2-5/8	1/2	1-1/4	5/32	55029	\$25.71	55029-TiN	\$33.20
7/8	2-3/4	1/2	1-1/4	11/64	55030	\$36.38	55030-TiN	\$46.64
1	2-3/4	1/2	1-1/4	13/64	55031	\$40.47	55031-TiN	\$53.51
1-1/4	2-3/4	1/2	1-1/4	1/4	55032	\$62.08	55032-TiN	\$81.65
1-1/2	2-7/8	3/4	1-1/4	5/16	55033	\$88.96	55033-TiN	\$113.41
1-3/4	3	3/4	1-1/4	23/64	55034	\$118.33	55034-TiN	\$157.43
2	3-1/4	3/4	1-1/4	13/32	55035	\$150.46	55035-TiN	\$189.56
2-1/2	5	1	1-1/2	1/2	55036	\$390.03	55036-TiN	\$458.89
3	5-1/4	1	1-1/2	19/32	55037	\$537.57	55037-TiN	\$692.83



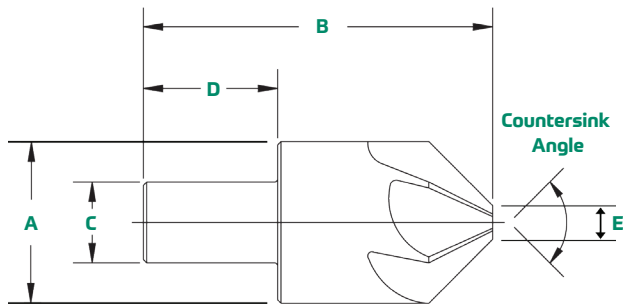
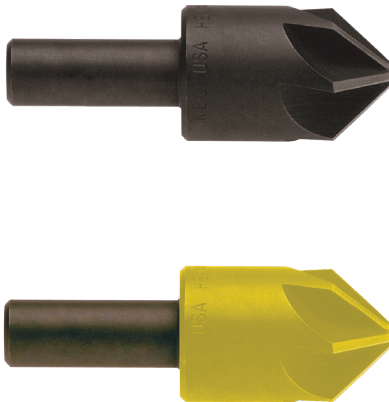
All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

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# 6-FLUTE HSS COUNTERSINKS (CONT.)

KEO 6-Flute line of countersinks are companions to our Single Flute Countersinks and our 3- and 4-Flute Center Reamer line. As a rule, the more edges per revolution, the greater amount of material that may be removed. We have designed the 6-Flute tools with staggered cutting edges. See **page 72** for set information.



D

COUNTERSINKS & COUNTERBORES

## HSS

### 90° Countersink Angle

A	B	C	D	E				
Body Dia.	OAL	Shank Dia.	Shank Length	Nose Dia.	HSS	Price	HSS-TiN	Price
1/8	1-1/4	1/8	N/A	0.025	55040	\$7.67	55040-TiN	\$8.67
3/16	1-3/8	3/16	N/A	1/32	55041	\$8.37	55041-TiN	\$9.83
1/4	1-1/2	1/4	N/A	3/64	55042	\$8.52	55042-TiN	\$10.46
5/16	1-3/4	1/4	7/8	1/16	55043	\$10.08	55043-TiN	\$12.54
3/8	1-3/4	1/4	7/8	5/64	55044	\$10.52	55044-TiN	\$12.97
1/2	2	1/4	1	7/64	55045	\$12.93	55045-TiN	\$16.86
1/2	2	3/8	1	7/64	55046	\$12.93	55046-TiN	\$16.86
5/8	2-1/4	1/4	1	1/8	55047	\$18.75	55047-TiN	\$25.27
5/8	2-1/4	3/8	1	1/8	55048	\$18.75	55048-TiN	\$25.27
3/4	2-5/8	1/2	1-1/4	5/32	55049	\$25.71	55049-TiN	\$33.20
7/8	2-3/4	1/2	1-1/4	11/64	55050	\$36.38	55050-TiN	\$46.64
1	2-3/4	1/2	1-1/4	13/64	55051	\$40.47	55051-TiN	\$53.51
1-1/4	2-3/4	1/2	1-1/4	1/4	55052	\$62.08	55052-TiN	\$81.65
1-1/2	2-7/8	3/4	1-1/4	5/16	55053	\$88.96	55053-TiN	\$113.41
1-3/4	3	3/4	1-1/4	23/64	55054	\$118.33	55054-TiN	\$157.43
2	3-1/4	3/4	1-1/4	13/32	55055	\$150.46	55055-TiN	\$189.56
2-1/2	5	1	1-1/2	1/2	55056	\$390.03	55056-TiN	\$458.89
3	5-1/4	1	1-1/2	19/32	55057	\$537.57	55057-TiN	\$692.83

## HSS

### 100° Countersink Angle

A	B	C	D	E				
Body Dia.	OAL	Shank Dia.	Shank Length	Nose Dia.	HSS	Price	HSS-TiN	Price
1/8	1-1/4	1/8	N/A	0.025	55060	\$7.67	55060-TiN	\$8.67
3/16	1-3/8	3/16	N/A	1/32	55061	\$8.37	55061-TiN	\$9.83
1/4	1-1/2	1/4	N/A	3/64	55062	\$8.52	55062-TiN	\$10.46
5/16	1-3/4	1/4	7/8	1/16	55063	\$10.08	55063-TiN	\$12.54
3/8	1-3/4	1/4	7/8	5/64	55064	\$10.52	55064-TiN	\$12.97
1/2	2	1/4	1	7/64	55065	\$12.93	55065-TiN	\$16.86
1/2	2	3/8	1	7/64	55066	\$12.93	55066-TiN	\$16.86
5/8	2-1/4	1/4	1	1/8	55067	\$18.75	55067-TiN	\$25.27
5/8	2-1/4	3/8	1	1/8	55068	\$18.75	55068-TiN	\$25.27
3/4	2-5/8	1/2	1-1/4	5/32	55069	\$25.71	55069-TiN	\$33.20
7/8	2-3/4	1/2	1-1/4	11/64	55070	\$36.38	55070-TiN	\$46.64
1	2-3/4	1/2	1-1/4	13/64	55071	\$40.47	55071-TiN	\$53.51
1-1/4	2-3/4	1/2	1-1/4	1/4	55072	\$62.08	55072-TiN	\$81.65
1-1/2	2-7/8	3/4	1-1/4	5/16	55073	\$88.96	55073-TiN	\$113.41
1-3/4	3	3/4	1-1/4	23/64	55074	\$118.33	55074-TiN	\$157.43
2	3-1/4	3/4	1-1/4	13/32	55075	\$150.46	55075-TiN	\$189.56
2-1/2	5	1	1-1/2	1/2	55076	\$390.03	55076-TiN	\$458.89
3	5-1/4	1	1-1/2	19/32	55077	\$537.57	55077-TiN	\$692.83

All dimensions in inches. Many tools are available with additional coatings.

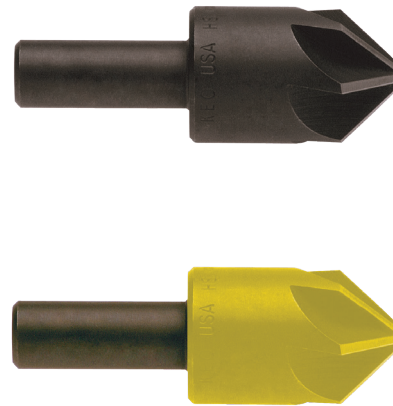
Please call for quote.

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## HSS

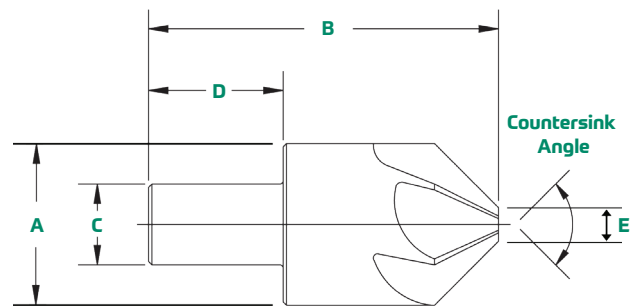
					110° Countersink Angle			
A	B	C	D	E	HSS	Price	HSS-TiN	Price
Body Dia.	OAL	Shank Dia.	Shank Length	Nose Dia.				
1/8	1-1/4	1/8	N/A	0.020	55080	\$7.67	55080-TiN	\$8.67
3/16	1-3/8	3/16	N/A	1/32	55081	\$8.37	55081-TiN	\$9.83
1/4	1-1/2	1/4	N/A	3/64	55082	\$8.52	55082-TiN	\$10.46
5/16	1-3/4	1/4	7/8	3/64	55083	\$10.08	55083-TiN	\$12.54
3/8	1-3/4	1/4	7/8	1/16	55084	\$10.52	55084-TiN	\$12.97
1/2	2	1/4	1	5/64	55085	\$12.93	55085-TiN	\$16.86
1/2	2	3/8	1	5/64	55086	\$12.93	55086-TiN	\$16.86
5/8	2-1/4	1/4	1	7/64	55087	\$18.75	55087-TiN	\$25.27
5/8	2-1/4	3/8	1	7/64	55088	\$18.75	55088-TiN	\$25.27
3/4	2-5/8	1/2	1-1/4	1/8	55089	\$25.71	55089-TiN	\$33.20
7/8	2-3/4	1/2	1-1/4	9/64	55090	\$36.38	55090-TiN	\$46.64
1	2-3/4	1/2	1-1/4	11/64	55091	\$40.47	55091-TiN	\$53.51
1-1/4	2-3/4	1/2	1-1/4	7/32	55092	\$62.08	55092-TiN	\$81.65
1-1/2	2-7/8	3/4	1-1/4	1/4	55093	\$88.96	55093-TiN	\$113.41
1-3/4	3	3/4	1-1/4	19/64	55094	\$118.33	55094-TiN	\$157.43
2	3-1/4	3/4	1-1/4	11/32	55095	\$150.46	55095-TiN	\$189.56
2-1/2	5	1	1-1/2	7/16	55096	\$390.03	55096-TiN	\$458.89
3	5-1/4	1	1-1/2	33/64	55097	\$537.57	55097-TiN	\$692.83

KEO 6-Flute line of countersinks are companions to our Single Flute Countersinks and our 3- and 4-Flute Center Reamer line. As a rule, the more edges per revolution, the greater amount of material that may be removed. We have designed the 6-Flute tools with staggered cutting edges. See **page 72** for set information.



## HSS

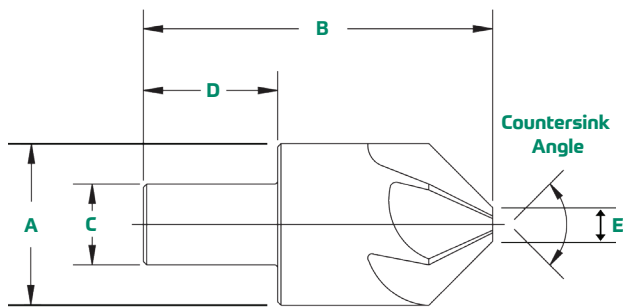
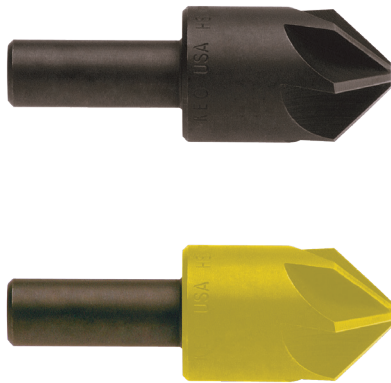
					120° Countersink Angle			
A	B	C	D	E	HSS	Price	HSS-TiN	Price
Body Dia.	OAL	Shank Dia.	Shank Length	Nose Dia.				
1/8	1-1/4	1/8	N/A	0.020	55100	\$7.67	55100-TiN	\$8.67
3/16	1-3/8	3/16	N/A	1/32	55101	\$8.37	55101-TiN	\$9.83
1/4	1-1/2	1/4	N/A	3/64	55102	\$8.52	55102-TiN	\$10.46
5/16	1-3/4	1/4	7/8	3/64	55103	\$10.08	55103-TiN	\$12.54
3/8	1-3/4	1/4	7/8	1/16	55104	\$10.52	55104-TiN	\$12.97
1/2	2	1/4	1	5/64	55105	\$12.93	55105-TiN	\$16.86
1/2	2	3/8	1	5/64	55106	\$12.93	55106-TiN	\$16.86
5/8	2-1/4	1/4	1	7/64	55107	\$18.75	55107-TiN	\$25.27
5/8	2-1/4	3/8	1	7/64	55108	\$18.75	55108-TiN	\$25.27
3/4	2-5/8	1/2	1-1/4	1/8	55109	\$25.71	55109-TiN	\$33.20
7/8	2-3/4	1/2	1-1/4	9/64	55110	\$36.38	55110-TiN	\$46.64
1	2-3/4	1/2	1-1/4	11/64	55111	\$40.47	55111-TiN	\$53.51
1-1/4	2-3/4	1/2	1-1/4	7/32	55112	\$62.08	55112-TiN	\$81.65
1-1/2	2-7/8	3/4	1-1/4	1/4	55113	\$88.96	55113-TiN	\$113.41
1-3/4	3	3/4	1-1/4	19/64	55114	\$118.33	55114-TiN	\$157.43
2	3-1/4	3/4	1-1/4	11/32	55115	\$150.46	55115-TiN	\$189.56
2-1/2	5	1	1-1/2	7/16	55116	\$390.03	55116-TiN	\$458.89
3	5-1/4	1	1-1/2	33/64	55117	\$537.57	55117-TiN	\$692.83



All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

# 6-FLUTE COBALT COUNTERSINKS

KEO 6-Flute line of countersinks are companions to our Single Flute Countersinks and our 3 and 4-Flute Center Reamer line. As a rule, the more edges per revolution, the greater amount of material that may be removed. We have designed the 6-Flute tools with staggered cutting edges. See **page 72** for set information.



## COBALT

					60° Countersink Angle			
A	B	C	D	E	CO	Price	CO-TiN	Price
Body Dia.	OAL	Shank Dia.	Shank Length	Nose Dia.				
1/8	1-1/4	1/8	N/A	3/64	55500	\$8.83	55500-TiN	\$9.97
3/16	1-3/8	3/16	N/A	1/16	55501	\$9.64	55501-TiN	\$11.31
1/4	1-1/2	1/4	N/A	5/64	55502	\$9.80	55502-TiN	\$12.02
5/16	1-3/4	1/4	7/8	3/32	55503	\$11.60	55503-TiN	\$14.41
3/8	1-3/4	1/4	7/8	1/8	55504	\$12.08	55504-TiN	\$14.90
1/2	2	1/4	1	5/32	55505	\$14.86	55505-TiN	\$19.39
1/2	2	3/8	1	5/32	55506	\$14.86	55506-TiN	\$19.39
5/8	2-1/4	1/4	1	13/64	55507	\$21.57	55507-TiN	\$29.06
5/8	2-1/4	3/8	1	13/64	55508	\$21.57	55508-TiN	\$29.06
3/4	2-5/8	1/2	1-1/4	1/4	55509	\$29.56	55509-TiN	\$38.17
7/8	2-3/4	1/2	1-1/4	9/32	55510	\$41.82	55510-TiN	\$53.63
1	2-3/4	1/2	1-1/4	21/64	55511	\$46.54	55511-TiN	\$61.54
1-1/4	2-3/4	1/2	1-1/4	13/32	55512	\$71.40	55512-TiN	\$93.90
1-1/2	2-7/8	3/4	1-1/4	1/2	55513	\$102.31	55513-TiN	\$130.42
1-3/4	3	3/4	1-1/4	37/64	55514	\$136.07	55514-TiN	\$181.04
2	3-1/4	3/4	1-1/4	21/32	55515	\$173.03	55515-TiN	\$217.99
2-1/2	5	1	1-1/2	53/64	55516	\$448.54	55516-TiN	\$527.73
3	5-1/4	1	1-1/2	1	55517	\$618.21	55517-TiN	\$796.75

## COBALT

					82° Countersink Angle			
A	B	C	D	E	CO	Price	CO-TiN	Price
Body Dia.	OAL	Shank Dia.	Shank Length	Nose Dia.				
1/8	1-1/4	1/8	N/A	0.025	55520	\$8.83	55520-TiN	\$9.97
3/16	1-3/8	3/16	N/A	1/32	55521	\$9.64	55521-TiN	\$11.31
1/4	1-1/2	1/4	N/A	3/64	55522	\$9.80	55522-TiN	\$12.02
5/16	1-3/4	1/4	7/8	1/16	55523	\$11.60	55523-TiN	\$14.41
3/8	1-3/4	1/4	7/8	5/64	55524	\$12.08	55524-TiN	\$14.90
1/2	2	1/4	1	7/64	55525	\$14.86	55525-TiN	\$19.39
1/2	2	3/8	1	7/64	55526	\$14.86	55526-TiN	\$19.39
5/8	2-1/4	1/4	1	1/8	55527	\$21.57	55527-TiN	\$29.06
5/8	2-1/4	3/8	1	1/8	55528	\$21.57	55528-TiN	\$29.06
3/4	2-5/8	1/2	1-1/4	5/32	55529	\$29.56	55529-TiN	\$38.17
7/8	2-3/4	1/2	1-1/4	11/64	55530	\$41.82	55530-TiN	\$53.63
1	2-3/4	1/2	1-1/4	13/64	55531	\$46.54	55531-TiN	\$61.54
1-1/4	2-3/4	1/2	1-1/4	1/4	55532	\$71.40	55532-TiN	\$93.90
1-1/2	2-7/8	3/4	1-1/4	5/16	55533	\$102.31	55533-TiN	\$130.42
1-3/4	3	3/4	1-1/4	23/64	55534	\$136.07	55534-TiN	\$181.04
2	3-1/4	3/4	1-1/4	13/32	55535	\$173.03	55535-TiN	\$217.99
2-1/2	5	1	1-1/2	1/2	55536	\$448.54	55536-TiN	\$527.73
3	5-1/4	1	1-1/2	19/32	55537	\$618.21	55537-TiN	\$796.75

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

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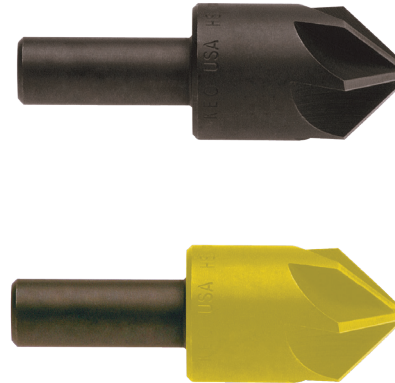
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COUNTERSINKS & COUNTERBORES

## COBALT

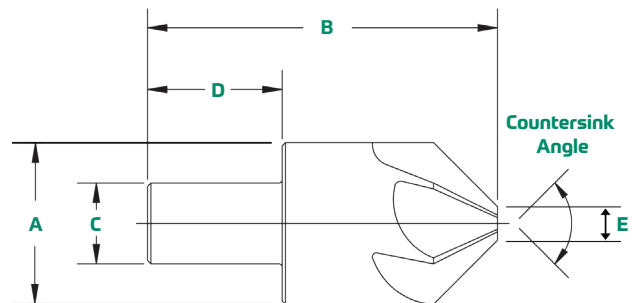
					90° Countersink Angle			
A	B	C	D	E	CO	Price	CO-TiN	Price
Body Dia.	OAL	Shank Dia.	Shank Length	Neck Dia.				
1/8	1-1/4	1/8	N/A	0.025	55540	\$8.83	55540-TiN	\$9.97
3/16	1-3/8	3/16	N/A	1/32	55541	\$9.64	55541-TiN	\$11.31
1/4	1-1/2	1/4	N/A	3/64	55542	\$9.80	55542-TiN	\$12.02
5/16	1-3/4	1/4	7/8	1/16	55543	\$11.60	55543-TiN	\$14.41
3/8	1-3/4	1/4	7/8	5/64	55544	\$12.08	55544-TiN	\$14.90
1/2	2	1/4	1	7/64	55545	\$14.86	55545-TiN	\$19.39
1/2	2	3/8	1	7/64	55546	\$14.86	55546-TiN	\$19.39
5/8	2-1/4	1/4	1	1/8	55547	\$21.57	55547-TiN	\$29.06
5/8	2-1/4	3/8	1	1/8	55548	\$21.57	55548-TiN	\$29.06
3/4	2-5/8	1/2	1-1/4	5/32	55549	\$29.56	55549-TiN	\$38.17
7/8	2-3/4	1/2	1-1/4	11/64	55550	\$41.82	55550-TiN	\$53.63
1	2-3/4	1/2	1-1/4	13/64	55551	\$46.54	55551-TiN	\$61.54
1-1/4	2-3/4	1/2	1-1/4	1/4	55552	\$71.40	55552-TiN	\$93.90
1-1/2	2-7/8	3/4	1-1/4	5/16	55553	\$102.31	55553-TiN	\$130.42
1-3/4	3	3/4	1-1/4	23/64	55554	\$136.07	55554-TiN	\$181.04
2	3-1/4	3/4	1-1/4	13/32	55555	\$173.03	55555-TiN	\$217.99
2-1/2	5	1	1-1/2	1/2	55556	\$448.54	55556-TiN	\$527.73
3	5-1/4	1	1-1/2	19/32	55557	\$618.21	55557-TiN	\$796.75

KEO 6-Flute line of countersinks are companions to our Single Flute Countersinks and our 3 and 4-Flute Center Reamer line. As a rule, the more edges per revolution, the greater amount of material that may be removed. We have designed the 6-Flute tools with staggered cutting edges. See **page 72** for set information.



## COBALT

					100° Countersink Angle			
A	B	C	D	E	CO	Price	CO-TiN	Price
Body Dia.	OAL	Shank Dia.	Shank Length	Neck Dia.				
1/8	1-1/4	1/8	N/A	0.025	55560	\$8.83	55560-TiN	\$9.97
3/16	1-3/8	3/16	N/A	1/32	55561	\$9.64	55561-TiN	\$11.31
1/4	1-1/2	1/4	N/A	3/64	55562	\$9.80	55562-TiN	\$12.02
5/16	1-3/4	1/4	7/8	1/16	55563	\$11.60	55563-TiN	\$14.41
3/8	1-3/4	1/4	7/8	5/64	55564	\$12.08	55564-TiN	\$14.90
1/2	2	1/4	1	7/64	55565	\$14.86	55565-TiN	\$19.39
1/2	2	3/8	1	7/64	55566	\$14.86	55566-TiN	\$19.39
5/8	2-1/4	1/4	1	1/8	55567	\$21.57	55567-TiN	\$29.06
5/8	2-1/4	3/8	1	1/8	55568	\$21.57	55568-TiN	\$29.06
3/4	2-5/8	1/2	1-1/4	5/32	55569	\$29.56	55569-TiN	\$38.17
7/8	2-3/4	1/2	1-1/4	11/64	55570	\$41.82	55570-TiN	\$53.63
1	2-3/4	1/2	1-1/4	13/64	55571	\$46.54	55571-TiN	\$61.54
1-1/4	2-3/4	1/2	1-1/4	1/4	55572	\$71.40	55572-TiN	\$93.90
1-1/2	2-7/8	3/4	1-1/4	5/16	55573	\$102.31	55573-TiN	\$130.42
1-3/4	3	3/4	1-1/4	23/64	55574	\$136.07	55574-TiN	\$181.04
2	3-1/4	3/4	1-1/4	13/32	55575	\$173.03	55575-TiN	\$217.99
2-1/2	5	1	1-1/2	1/2	55576	\$448.54	55576-TiN	\$527.73
3	5-1/4	1	1-1/2	19/32	55577	\$618.21	55577-TiN	\$796.75



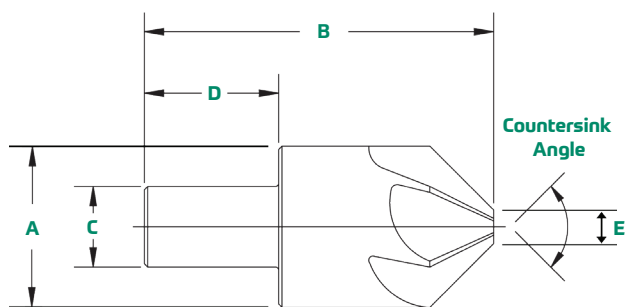
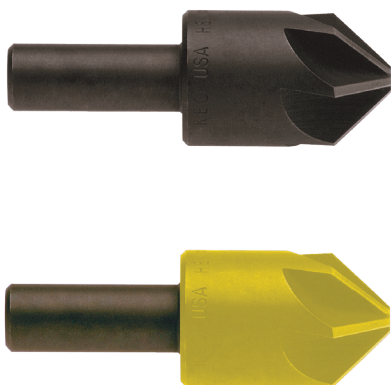
All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

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# 6-FLUTE COBALT COUNTERSINKS (CONT.)

KEO 6-Flute line of countersinks are companions to our Single Flute Countersinks and our 3 and 4-Flute Center Reamer line. As a rule, the more edges per revolution, the greater amount of material that may be removed. We have designed the 6-Flute tools with staggered cutting edges.

See **page 72** for set information.



## COBALT

					110° Countersink Angle			
A	B	C	D	E	CO	Price	CO-TiN	Price
Body Dia.	OAL	Shank Dia.	Shank Length	Neck Dia.				
1/8	1-1/4	1/8	N/A	0.020	55580	\$8.83	55580-TiN	\$9.97
3/16	1-3/8	3/16	N/A	1/32	55581	\$9.64	55581-TiN	\$11.31
1/4	1-1/2	1/4	N/A	3/64	55582	\$9.80	55582-TiN	\$12.02
5/16	1-3/4	1/4	7/8	3/64	55583	\$11.60	55583-TiN	\$14.41
3/8	1-3/4	1/4	7/8	1/16	55584	\$12.08	55584-TiN	\$14.90
1/2	2	1/4	1	5/64	55585	\$14.86	55585-TiN	\$19.39
1/2	2	3/8	1	5/64	55586	\$14.86	55586-TiN	\$19.39
5/8	2-1/4	1/4	1	7/64	55587	\$21.57	55587-TiN	\$29.06
5/8	2-1/4	3/8	1	7/64	55588	\$21.57	55588-TiN	\$29.06
3/4	2-5/8	1/2	1-1/4	1/8	55589	\$29.56	55589-TiN	\$38.17
7/8	2-3/4	1/2	1-1/4	9/64	55590	\$41.82	55590-TiN	\$53.63
1	2-3/4	1/2	1-1/4	11/64	55591	\$46.54	55591-TiN	\$61.54
1-1/4	2-3/4	1/2	1-1/4	7/32	55592	\$71.40	55592-TiN	\$93.90
1-1/2	2-7/8	3/4	1-1/4	1/4	55593	\$102.31	55593-TiN	\$130.42
1-3/4	3	3/4	1-1/4	19/64	55594	\$136.07	55594-TiN	\$181.04
2	3-1/4	3/4	1-1/4	11/32	55595	\$173.03	55595-TiN	\$217.99
2-1/2	5	1	1-1/2	7/16	55596	\$448.54	55596-TiN	\$527.73
3	5-1/4	1	1-1/2	33/64	55597	\$618.21	55597-TiN	\$796.75

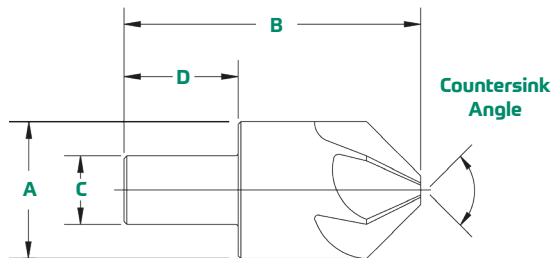
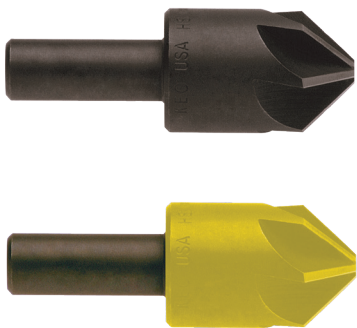
## COBALT

					120° Countersink Angle			
A	B	C	D	E	CO	Price	CO-TiN	Price
Body Dia.	OAL	Shank Dia.	Shank Length	Neck Dia.				
1/8	1-1/4	1/8	N/A	0.020	55600	\$8.83	55600-TiN	\$9.97
3/16	1-3/8	3/16	N/A	1/32	55601	\$9.64	55601-TiN	\$11.31
1/4	1-1/2	1/4	N/A	3/64	55602	\$9.80	55602-TiN	\$12.02
5/16	1-3/4	1/4	7/8	3/64	55603	\$11.60	55603-TiN	\$14.41
3/8	1-3/4	1/4	7/8	1/16	55604	\$12.08	55604-TiN	\$14.90
1/2	2	1/4	1	5/64	55605	\$14.86	55605-TiN	\$19.39
1/2	2	3/8	1	5/64	55606	\$14.86	55606-TiN	\$19.39
5/8	2-1/4	1/4	1	7/64	55607	\$21.57	55607-TiN	\$29.06
5/8	2-1/4	3/8	1	7/64	55608	\$21.57	55608-TiN	\$29.06
3/4	2-5/8	1/2	1-1/4	1/8	55609	\$29.56	55609-TiN	\$38.17
7/8	2-3/4	1/2	1-1/4	9/64	55610	\$41.82	55610-TiN	\$53.63
1	2-3/4	1/2	1-1/4	11/64	55611	\$46.54	55611-TiN	\$61.54
1-1/4	2-3/4	1/2	1-1/4	7/32	55612	\$71.40	55612-TiN	\$93.90
1-1/2	2-7/8	3/4	1-1/4	1/4	55613	\$102.31	55613-TiN	\$130.42
1-3/4	3	3/4	1-1/4	19/64	55614	\$136.07	55614-TiN	\$181.04
2	3-1/4	3/4	1-1/4	11/32	55615	\$173.03	55615-TiN	\$217.99
2-1/2	5	1	1-1/2	7/16	55616	\$448.54	55616-TiN	\$527.73
3	5-1/4	1	1-1/2	33/64	55617	\$618.21	55617-TiN	\$796.75

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

D

COUNTERSINKS & COUNTERBORES



## CARBIDE

A	B	C	D	60° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55780	\$15.15	55780-TiALN	\$18.51
3/16	2	3/16	N/A	55781	\$16.11	55781-TiALN	\$20.32
1/4	2	1/4	N/A	55782	\$22.46	55782-TiALN	\$29.12
3/8	2-3/4	1/4	7/8	55783	\$32.21	55783-TiALN	\$43.23
1/2	2-3/4	1/4	1	55784	\$47.33	55784-TiALN	\$61.55
5/8	2-7/8	3/8	1	55785	\$69.97	55785-TiALN	\$89.29
3/4	3	3/8	1-1/4	55786	\$99.16	55786-TiALN	\$122.65
1	3-1/4	1/2	1-1/4	55787	\$164.87	55787-TiALN	\$194.45
1-1/4	3-3/4	3/4	1-1/4	55788	\$262.26	55788-TiALN	\$326.14
1-1/2	3-3/4	3/4	1-1/4	55789	\$394.95	55789-TiALN	\$478.89

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## CARBIDE

A	B	C	D	82° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55791	\$15.15	55791-TiALN	\$18.51
3/16	2	3/16	N/A	55792	\$16.11	55792-TiALN	\$20.32
1/4	2	1/4	N/A	55793	\$22.46	55793-TiALN	\$29.12
3/8	2-5/8	1/4	7/8	55794	\$32.21	55794-TiALN	\$43.23
1/2	2-5/8	1/4	1	55795	\$47.33	55795-TiALN	\$61.55
5/8	2-3/4	3/8	1	55796	\$69.97	55796-TiALN	\$89.29
3/4	2-3/4	3/8	1-1/4	55797	\$99.16	55797-TiALN	\$122.65
1	3	1/2	1-1/4	55798	\$164.87	55798-TiALN	\$194.45
1-1/4	3-1/4	3/4	1-1/4	55799	\$262.26	55799-TiALN	\$326.14
1-1/2	3-1/4	3/4	1-1/4	55800	\$394.95	55800-TiALN	\$478.89

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## CARBIDE

A	B	C	D	90° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55802	\$15.15	55802-TiALN	\$18.51
3/16	2	3/16	N/A	55803	\$16.11	55803-TiALN	\$20.32
1/4	2	1/4	N/A	55804	\$22.46	55804-TiALN	\$29.12
3/8	2-5/8	1/4	7/8	55805	\$32.21	55805-TiALN	\$43.23
1/2	2-5/8	1/4	1	55806	\$47.33	55806-TiALN	\$61.55
5/8	2-3/4	3/8	1	55807	\$69.97	55807-TiALN	\$89.29
3/4	2-3/4	3/8	1-1/4	55808	\$99.16	55808-TiALN	\$122.65
1	3	1/2	1-1/4	55809	\$164.87	55809-TiALN	\$194.45
1-1/4	3-1/4	3/4	1-1/4	55810	\$262.26	55810-TiALN	\$326.14
1-1/2	3-1/4	3/4	1-1/4	55811	\$394.95	55811-TiALN	\$478.89

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

## CARBIDE

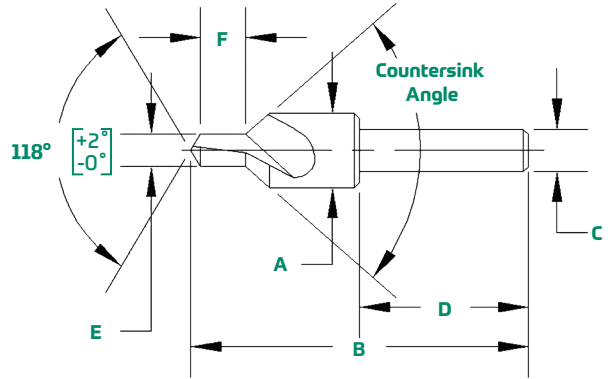
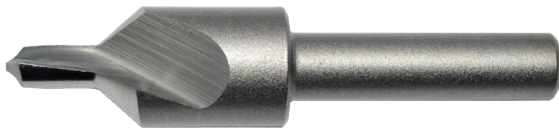
A	B	C	D	100° Countersink Angle			
Body Dia.	OAL	Shank Dia.	Shank Length	CAR	Price	CAR-TiALN	Price
1/8	1-1/2	1/8	N/A	55813	\$15.15	55813-TiALN	\$18.51
3/16	2	3/16	N/A	55814	\$16.11	55814-TiALN	\$20.32
1/4	2	1/4	N/A	55815	\$22.46	55815-TiALN	\$29.12
3/8	2-5/8	1/4	7/8	55816	\$32.21	55816-TiALN	\$43.23
1/2	2-5/8	1/4	1	55817	\$47.33	55817-TiALN	\$61.55
5/8	2-3/4	3/8	1	55818	\$69.97	55818-TiALN	\$89.29
3/4	2-3/4	3/8	1-1/4	55819	\$99.16	55819-TiALN	\$122.65
1	3	1/2	1-1/4	55820	\$164.87	55820-TiALN	\$194.45
1-1/4	3-1/4	3/4	1-1/4	55821	\$262.26	55821-TiALN	\$326.14
1-1/2	3-1/4	3/4	1-1/4	55822	\$394.95	55822-TiALN	\$478.89

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

# D

# COUNTERSINKS & COUNTERBORES





Machine Screw

	A	B	C	D	E	F	82° Countersink Angle	
Screw Size	Body Ø	OAL	Shank Dia.	Shank Length	Drill Dia. [+ .005/- .0]	Drill Length	Flat Head Screws Machine Screw	Price
#5	5/16	1-3/4	1/4	7/8	.127	11/32	13605	\$14.80
#6	5/16	1-3/4	1/4	7/8	.140	11/32	13606	\$14.90
#8	3/8	1-3/4	1/4	7/8	.166	15/32	13608	\$17.68
#10	7/16	2	1/4	1	.192	15/32	13610	\$17.88
#12	7/16	2	1/4	1	.220	1/2	13612	\$20.63
1/4"	1/2	2	1/4	1	.252	17/32	13625	\$23.55
5/16"	5/8	2-1/4	3/8	1	.315	21/32	13631	\$26.48
3/8"	3/4	2 5/8	1/2	1-1/4	.378	25/32	13637	\$32.40

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

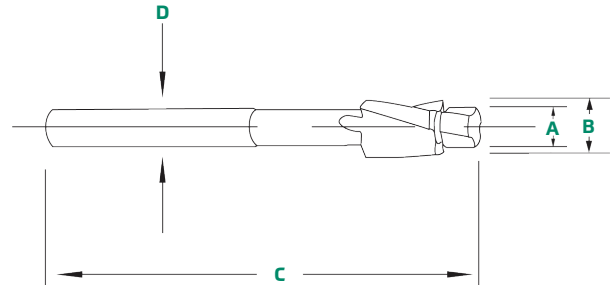
Self Tapping Screw

	A	B	C	D	E	F	82° Countersink Angle	
Screw Size	Body Ø	OAL	Shank Dia.	Shank Length	Drill Dia. [+ .005/- .0]	Drill Length	Flat Head Screws Self-tapping Screw	Price
#6	5/16	1-3/4	1/4	7/8	.99	5/16	13706	\$14.90
#8	3/8	1-3/4	1/4	7/8	.116	23/64	13708	\$17.68
#10	7/16	2	1/4	1	.135	27/64	13710	\$17.88
#12	7/16	2	1/4	1	.157	29/64	13712	\$20.63
1/4"	1/2	2	1/4	1	.184	33/64	13725	\$23.55

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.



# COUNTERBORE KEO



COBALT

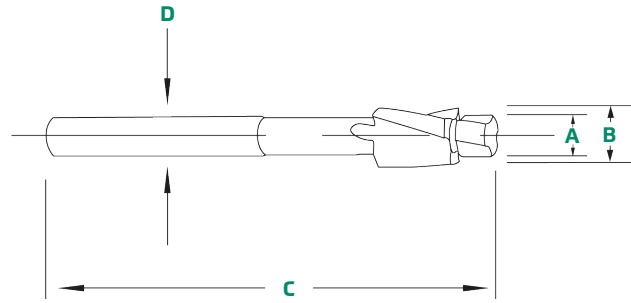
	A	B	C	D				
Size/ Application	Pilot Dia.	C'bore Dia.	OAL	Shank Dia	Screw Size	Assembly Criteria	CO	Price
#4 Nominal	0.112	0.186	3	5/32	#4	Close Fit	55200	\$40.20
#4 +1/64 O/S	0.127	0.202	3	5/32	#4	1/64" Clearance	55201	\$40.20
#4 +1/32 O/S	0.143	0.217	3	5/32	#4	1/32" Clearance	55202	\$40.20
#5 Nominal	0.125	0.205	3	3/16	#5	Close Fit	55203	\$42.88
#5 +1/64 O/S	0.140	0.221	3	3/16	#5	1/64" Clearance	55204	\$42.88
#5 +1/32 O/S	0.156	0.237	3	3/16	#5	1/32" Clearance	55205	\$42.88
#6 Nominal	0.138	0.228	3	7/32	#6	Close Fit	55206	\$47.29
#6 +1/64 O/S	0.153	0.244	3	7/32	#6	1/64" Clearance	55207	\$47.29
#6 +1/32 O/S	0.169	0.260	3	7/32	#6	1/32" Clearance	55208	\$47.29
#8 Nominal	0.164	0.272	3	1/4	#8	Close Fit	55209	\$48.51
#8 +1/64 O/S	0.179	0.288	3	1/4	#8	1/64" Clearance	55210	\$48.51
#8 +1/32 O/S	0.195	0.304	3	1/4	#8	1/32" Clearance	55211	\$48.51
#10 Nominal	0.190	0.314	4.5	9/32	#10	Close Fit	55212	\$51.06
#10 +1/64 O/S	0.205	0.330	4.5	9/32	#10	1/64" Clearance	55213	\$51.06
#10 +1/32 O/S	0.221	0.346	4.5	9/32	#10	1/32" Clearance	55214	\$51.06
1/4" Nominal	0.250	0.382	4.5	5/16	1/4	Close Fit	55215	\$51.63
1/4" +1/64 O/S	0.265	0.398	4.5	5/16	1/4	1/64" Clearance	55216	\$51.63
1/4" +1/32 O/S	0.281	0.414	4.5	5/16	1/4	1/32" Clearance	55217	\$51.63
5/16" Nominal	0.312	0.475	4.5	3/8	5/16	Close Fit	55218	\$54.45
5/16" +1/64 O/S	0.328	0.491	4.5	3/8	5/16	1/64" Clearance	55219	\$54.45
5/16" +1/32 O/S	0.343	0.507	4.5	3/8	5/16	1/32" Clearance	55220	\$54.45
3/8" Nominal	0.375	0.572	5	1/2	3/8	Close Fit	55221	\$61.68
3/8" +1/64 O/S	0.390	0.588	5	1/2	3/8	1/64" Clearance	55222	\$61.68
3/8" +1/32 O/S	0.406	0.604	5	1/2	3/8	1/32" Clearance	55223	\$61.68
7/16" Nominal	0.437	0.663	5	1/2	7/16	Close Fit	55224	\$73.73
7/16" +1/64 O/S	0.452	0.679	5	1/2	7/16	1/64" Clearance	55225	\$73.73
7/16" +1/32 O/S	0.468	0.695	5	1/2	7/16	1/32" Clearance	55226	\$73.73
1/2" Nominal	0.500	0.757	6	1/2	1/2	Close Fit	55227	\$81.52
1/2" +1/64 O/S	0.515	0.773	6	1/2	1/2	1/64" Clearance	55228	\$81.52
1/2" +1/32 O/S	0.531	0.789	6	1/2	1/2	1/32" Clearance	55229	\$81.52
5/8" Nominal	0.625	0.945	6	5/8	5/8	Close Fit	55230	\$120.73
5/8" +1/64 O/S	0.641	0.961	6	5/8	5/8	1/64" Clearance	55231	\$120.73
5/8" +1/32 O/S	0.656	0.977	6	5/8	5/8	1/32" Clearance	55232	\$120.73
3/4" Nominal	0.766	1.187	7	3/4	3/4	Close Fit	55233	\$173.39
3/4" +1/32 O/S	0.781	1.203	7	3/4	3/4	1/32" Clearance	55234	\$173.39
7/8" Nominal	0.891	1.375	7	7/8	7/8	Close Fit	55235	\$264.46
7/8" +1/32 O/S	0.906	1.391	7	7/8	7/8	1/32" Clearance	55236	\$264.46
1" Nominal	1.016	1.562	7	1	1	Close Fit	55237	\$364.29
1" +1/32 O/S	1.032	1.588	7	1	1	1/32" Clearance	55238	\$364.29

- Integral Pilot, Straight Shank, CNC Precision Ground, Cobalt HSS
- Micro-smooth CNC precision ground for precision smooth counterboring
- Cobalt
- High performance cutting action due to secondary relief behind cutting edge margin
- Optimized helix for chip evacuation - chips flow away from cut without wrapping around tool

All dimensions in inches. Many tools are available with additional coatings. Please call for quote. See page 72 for set information.



# COUNTERBORE KEORE



D

COUNTERSINKS & COUNTERBORES

COBALT

Application	COBALT				METRIC	
	Pilot Dia. (e8)	C'bore Dia. (z9)	OAL (js18)	Shank Dia (h9)	CO	Price
M3 - Before Thread	2.5	6	71	5	56200	\$39.78
M3 - Fine	3.2	6	71	5	56201	\$39.78
M3 - Medium	3.4	6	71	5	56202	\$39.78
M3.5 - Before Thread	2.9	6.5	71	5	56203	\$44.56
M3.5 - Fine	3.7	6.5	71	5	56204	\$44.56
M3.5 - Medium	3.9	6.5	71	5	56205	\$44.56
M4 - Before Thread	3.3	8	71	5	56206	\$47.00
M4 - Fine	4.3	8	71	5	56207	\$47.00
M4 - Medium	4.5	8	71	5	56208	\$47.00
M5 - Before Thread	4.2	10	80	8	56209	\$49.95
M5 - Fine	5.3	10	80	8	56210	\$49.95
M5 - Medium	5.5	10	80	8	56211	\$49.95
M6 - Before Thread	5	11	80	8	56212	\$51.90
M6 - Fine	6.4	11	80	8	56213	\$51.90
M6 - Medium	6.6	11	80	8	56214	\$ 51.90
M8 - Before Thread	6.8	15	100	12.5	56215	\$55.70
M8 - Fine	8.4	15	100	12.5	56216	\$55.70
M8 - Medium	9	15	100	12.5	56217	\$55.70
M10 - Before Thread	8.5	18	100	12.5	56218	\$63.81
M10 - Fine	10.5	18	100	12.5	56219	\$63.81
M10 - Medium	11	18	100	12.5	56220	\$63.81
M12 - Before Thread	10.2	20	100	12.5	56221	\$76.25
M12 - Fine	13	20	100	12.5	56222	\$76.25
M12 - Medium	14	20	100	12.5	56223	\$76.25

- Integral Pilot, Straight Shank, CNC Precision Ground, Cobalt HSS
- Micro-smooth CNC precision ground for precision smooth counterboring
- Cobalt
- High performance cutting action due to secondary relief behind cutting edge margin
- Optimized helix for chip evacuation - chips flow away from cut without wrapping around tool

All dimensions in millimeters. Many tools are available with additional coatings. Please call for quote. See page 73 for set information.

**Milling Cutters**

**55**

Woodruff Keyseat Cutters	56-60
Carbide Woodruff Keyseat Cutters	61
Metric Woodruff Keyseat Cutters	62
Narrow Width Keyseat Cutters	63,64
Small Solid Carbide Keyseat Cutters	65
Dovetail Cutters	66,67
T-Slot Milling Cutters	68

# MILLING CUTTERS

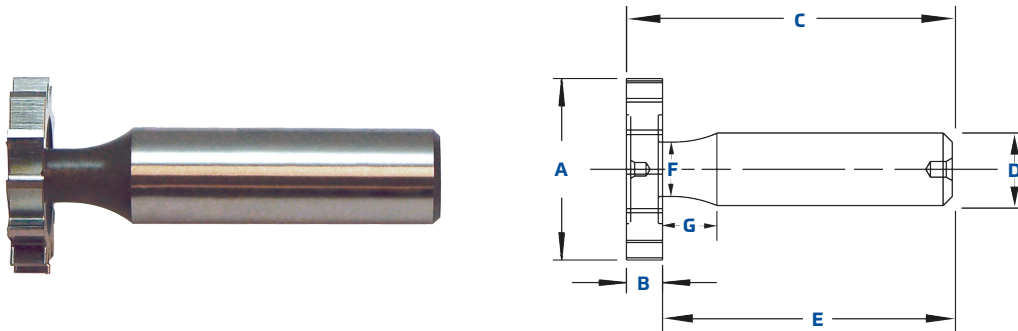


MILLING CUTTERS



# WOODRUFF KEYSEAT CUTTERS SHANK TYPE

KEO Woodruff Keyseat Cutters are extremely versatile profile milling cutters. Although originally designed to mill standard woodruff keyseat, they now satisfy a variety of applications from milling slots to milling threads. For set information see **page 73**.



**HSS**

American Standard#	A		B		C		D		E		F		G		# of Teeth		Straight Tooth	Price	Staggered Tooth	Price
	Cutter Dia.	Cutter Width	OAL	Shank Dia.	Shank Length	Neck Dia.	Neck Length	Straight	Staggered											
202	1/4	1/16	2-1/16	1/2	2	.110	3/8	8	6	62010	\$27.11	62015	\$35.38							
202 1/2	5/16	1/16	2-1/16	1/2	2	.110	3/8	8	6	62020	\$27.11	62025	\$35.38							
302 1/2	5/16	3/32	2-3/32	1/2	2	.110	3/8	8	6	63020	\$27.11	63025	\$35.38							
203	3/8	1/16	2-1/16	1/2	2	.110	3/8	8	6	62030	\$27.11	62035	\$35.38							
303	3/8	3/32	2-3/32	1/2	2	.110	3/8	8	6	63030	\$27.11	63035	\$35.38							
403	3/8	1/8	2-1/8	1/2	2	.130	3/8	8	6	64030	\$27.11	64035	\$35.38							
204	1/2	1/16	2-1/16	1/2	2	.130	3/8	10	8	62040	\$27.11	62045	\$35.38							
304	1/2	3/32	2-3/32	1/2	2	.160	3/8	10	8	63040	\$27.11	63045	\$35.38							
404	1/2	1/8	2-1/8	1/2	2	.191	3/8	10	8	64040	\$27.11	64045	\$35.38							
305	5/8	3/32	2-3/32	1/2	2	.191	3/8	10	8	63050	\$27.38	63055	\$35.63							
405	5/8	1/8	2-1/8	1/2	2	.223	3/8	10	8	64050	\$27.38	64055	\$35.63							
505	5/8	5/32	2-5/32	1/2	2	.253	3/8	10	8	65050	\$27.38	65055	\$35.63							
605	5/8	3/16	2-3/16	1/2	2	.253	3/8	10	8	66050	\$27.38	66055	\$35.63							
406	3/4	1/8	2-1/8	1/2	2	.223	3/8	10	8	64060	\$28.69	64065	\$36.77							
506	3/4	5/32	2-5/32	1/2	2	.253	3/8	10	8	65060	\$28.69	65065	\$36.77							
606	3/4	3/16	2-3/16	1/2	2	.279	3/8	10	8	66060	\$28.69	66065	\$36.77							
806	3/4	1/4	2-1/4	1/2	2	.279	3/8	10	8	68060	\$28.69	68065	\$36.77							

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

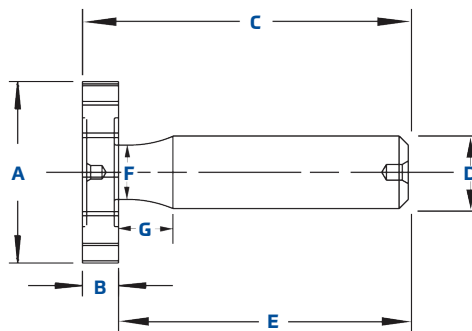
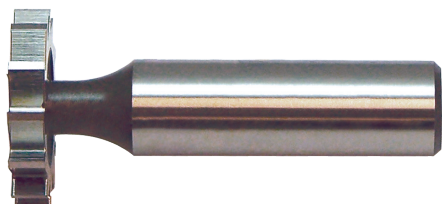
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Cutter Diameter	
1/4" up to and including 3/4"	+0.010" +0.015"
7/8" up to and including 1-1/8"	+0.012" +0.017"
1-1/4" up to and including 1-1/2"	+0.015" +0.020"
Shank Diameter	
	-0.0001" -0.0005"

Width	
1/16" up to and including 5/32"	+0.0000" -0.0005"
3/16" up to and including 7/32"	-0.0002" -0.0007"
1/4"	-0.0003" -0.0008"
5/16"	-0.0004" -0.0009"
3/8"	-0.0005" -0.0010"

# WOODRUFF KEYSEAT CUTTERS SHANK TYPE (CONT.)

KEO Woodruff Keyseat Cutters are extremely versatile profile milling cutters. Although originally designed to mill standard woodruff keyseat, they now satisfy a variety of applications from milling slots to milling threads. For set information see **page 73**.



**HSS**

American Standard#	Cutter Dia.	Cutter Width	OAL	Shank Dia.	Shank Length	Neck Dia.	Neck Length	# of Teeth		Straight Tooth	Price	Staggered Tooth	Price
								Straight	Staggered				
507	7/8	5/32	2-5/32	1/2	2	.247	3/8	12	10	65070	\$31.30	65075	\$40.26
607	7/8	3/16	2-3/16	1/2	2	.279	3/8	12	10	66070	\$31.30	66075	\$40.26
707	7/8	7/32	2-7/32	1/2	2	.279	3/8	12	10	67070	\$31.87	67075	\$40.26
807	7/8	1/4	2-1/4	1/2	2	.342	3/8	12	10	68070	\$31.87	68075	\$40.26
608	1	3/16	2-3/16	1/2	2	.279	3/8	12	10	66080	\$34.27	66085	\$45.02
708	1	7/32	2-7/32	1/2	2	.342	3/8	12	10	67080	\$34.58	67085	\$45.33
808	1	1/4	2-1/4	1/2	2	.342	3/8	12	10	68080	\$34.58	68085	\$45.33
1008	1	5/16	2-5/16	1/2	2	.401	3/8	12	10	60080	\$35.54	60085	\$45.98
1208	1	3/8	2-3/8	1/2	2	.401	3/8	12	10	62080	\$35.54	62085	\$45.98
609	1-1/8	3/16	2-3/16	1/2	2	.312	3/8	12	10	66090	\$38.52	66095	\$52.15
709	1-1/8	7/32	2-7/32	1/2	2	.312	3/8	12	10	67090	\$38.52	67095	\$52.15
809	1-1/8	1/4	2-1/4	1/2	2	.375	3/8	12	10	68090	\$39.25	68095	\$52.15
1009	1-1/8	5/16	2-5/16	1/2	2	.435	3/8	12	10	60090	\$41.16	60095	\$53.08
610	1-1/4	3/16	2-3/16	1/2	2	.312	3/8	14	12	66100	\$42.99	66105	\$54.23
710	1-1/4	7/32	2-7/32	1/2	2	.375	3/8	14	12	67100	\$42.99	67105	\$54.23
810	1-1/4	1/4	2-1/4	1/2	2	.375	3/8	14	12	68100	\$44.41	68105	\$57.27
1010	1-1/4	5/16	2-5/16	1/2	2	.435	3/8	14	12	60010	\$46.20	60015	\$58.70
1210	1-1/4	3/8	2-3/8	1/2	2	.467	3/8	14	12	62100	\$46.20	62105	\$58.70
811	1-3/8	1/4	2-1/4	1/2	2	.401	3/8	14	12	68110	\$49.78	68115	\$63.77
1011	1-3/8	5/16	2-5/16	1/2	2	.467	3/8	14	12	60110	\$49.78	60115	\$63.77
1211	1-3/8	3/8	2-3/8	1/2	2	.467	3/8	14	12	62110	\$50.68	62115	\$64.64
812	1-1/2	1/4	2-1/4	1/2	2	.435	3/8	16	14	68120	\$51.53	68125	\$68.19
1012	1-1/2	5/16	2-5/16	1/2	2	.467	3/8	16	14	60120	\$53.33	60125	\$68.19
1212	1-1/2	3/8	2-3/8	1/2	2	.467	3/8	16	14	62120	\$55.10	62125	\$71.82

All dimensions in inches. Many tools are available with additional coatings. Please call for quote.

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Cutter Diameter	
1/4" up to and including 3/4"	+0.010" +0.015"
7/8" up to and including 1-1/8"	+0.012" +0.017"
1-1/4" up to and including 1-1/2"	+0.015" +0.020"
Shank Diameter	
-0.0001"	-0.0005"

Width	
1/16" up to and including 5/32"	+0.0000" -0.0005"
3/16" up to and including 7/32"	-0.0002" -0.0007"
1/4"	-0.0003" -0.0008"
5/16"	-0.0004" -0.0009"
3/8"	-0.0005" -0.0010"



# WOODRUFF KEYSEAT CUTTERS SHANK TYPE (CONT.)

KEO Woodruff Keyseat Cutters are extremely versatile profile milling cutters. Although originally designed to mill standard woodruff keyseat, they now satisfy a variety of applications from milling slots to milling threads. For set information see **page 73**.

## HSS-LH\*

	A	B	C	D	E	F	G	# of Teeth		
American Standard#	Cutter Dia.	Cutter Width	OAL	Shank Dia.	Shank Length	Neck Dia.	Neck Length	Straight	Straight Tooth	Price
202	1/4	1/16	2-1/16	1/2	2	.110	3/8	8	93928	\$32.93
202 1/2	5/16	1/16	2-1/16	1/2	2	.110	3/8	8	93934	\$37.71
302 1/2	5/16	3/32	2-3/32	1/2	2	.110	3/8	8	93940	\$38.11
203	3/8	1/16	2-1/16	1/2	2	.110	3/8	8	93946	\$33.92
303	3/8	3/32	2-3/32	1/2	2	.110	3/8	8	93952	\$33.96
403	3/8	1/8	2-1/8	1/2	2	.130	3/8	8	93958	\$34.24
204	1/2	1/16	2-1/16	1/2	2	.130	3/8	10	93964	\$44.18
304	1/2	3/32	2-3/32	1/2	2	.160	3/8	10	93970	\$44.63
404	1/2	1/8	2-1/8	1/2	2	.191	3/8	10	93982	\$44.64
305	5/8	3/32	2-3/32	1/2	2	.191	3/8	10	93976	\$46.30
405	5/8	1/8	2-1/8	1/2	2	.223	3/8	10	93988	\$46.72
505	5/8	5/32	2-5/32	1/2	2	.253	3/8	10	94000	\$46.87
605	5/8	3/16	2-3/16	1/2	2	.253	3/8	10	94006	\$48.27
406	3/4	1/8	2-1/8	1/2	2	.223	3/8	10	93994	\$49.87
506	3/4	5/32	2-5/32	1/2	2	.253	3/8	10	94012	\$49.72
606	3/4	3/16	2-3/16	1/2	2	.279	3/8	10	94030	\$37.34
806	3/4	1/4	2-1/4	1/2	2	.279	3/8	10	94018	\$38.62
507	7/8	5/32	2-5/32	1/2	2	.247	3/8	12	94024	\$55.37
607	7/8	3/16	2-3/16	1/2	2	.279	3/8	12	94036	\$55.32
707	7/8	7/32	2-7/32	1/2	2	.279	3/8	12	94042	\$56.84
807	7/8	1/4	2-1/4	1/2	2	.342	3/8	12	94072	\$55.92
608	1	3/16	2-3/16	1/2	2	.279	3/8	12	94048	\$58.81
708	1	7/32	2-7/32	1/2	2	.342	3/8	12	94054	\$60.34
808	1	1/4	2-1/4	1/2	2	.342	3/8	12	94078	\$51.56
1008	1	5/16	2-5/16	1/2	2	.401	3/8	12	94126	\$61.01
1208	1	3/8	2-3/8	1/2	2	.401	3/8	12	94060	\$61.55
609	1-1/8	3/16	2-3/16	1/2	2	.312	3/8	12	94066	\$65.40
709	1-1/8	7/32	2-7/32	1/2	2	.312	3/8	12	94084	\$64.42
809	1-1/8	1/4	2-1/4	1/2	2	.375	3/8	12	94090	\$66.33
1009	1-1/8	5/16	2-5/16	1/2	2	.435	3/8	12	94132	\$66.87
610	1-1/4	3/16	2-3/16	1/2	2	.312	3/8	14	94096	\$68.96
710	1-1/4	7/32	2-7/32	1/2	2	.375	3/8	14	94102	\$70.37
810	1-1/4	1/4	2-1/4	1/2	2	.375	3/8	14	94108	\$70.98
1010	1-1/4	5/16	2-5/16	1/2	2	.435	3/8	14	94138	\$72.40
1210	1-1/4	3/8	2-3/8	1/2	2	.467	3/8	14	94156	\$72.41
811	1-3/8	1/4	2-1/4	1/2	2	.401	3/8	14	94114	\$80.42
1011	1-3/8	5/16	2-5/16	1/2	2	.467	3/8	14	94144	\$80.51
1211	1-3/8	3/8	2-3/8	1/2	2	.467	3/8	14	94162	\$81.66
812	1-1/2	1/4	2-1/4	1/2	2	.435	3/8	16	94120	\$87.26
1012	1-1/2	5/16	2-5/16	1/2	2	.467	3/8	16	94150	\$88.06
1212	1-1/2	3/8	2-3/8	1/2	2	.467	3/8	16	94168	\$89.21

\*See page 56 for drawing image and threshold tables  
 All dimensions in inches. Many tools are available with additional coatings.  
 Please call for quote.



MILLING CUTTERS

# WOODRUFF KEYSEAT CUTTERS SHANK TYPE (CONT.)

KEO Woodruff Keyseat Cutters are extremely versatile profile milling cutters. Although originally designed to mill standard woodruff keyseat, they now satisfy a variety of applications from milling slots to milling threads. For set information see **page 73**.

## COBALT\*

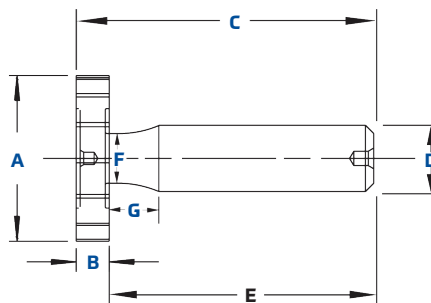
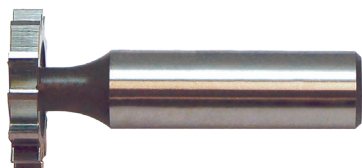
American Standard#	A		B		C		D		E		F		G		# of Teeth		Straight Tooth	Price	Staggered Tooth	Price
	Cutter Dia.	Cutter Width	OAL	Shank Dia.	Shank Length	Neck Dia.	Neck Length	Straight	Staggered											
202	1/4	1/16	2-1/16	1/2	2	.110	3/8	8	6	93932	\$32.94	93933	\$40.95							
202 1/2	5/16	1/16	2-1/16	1/2	2	.110	3/8	8	6	93938	\$32.94	93939	\$40.95							
302 1/2	5/16	3/32	2-3/32	1/2	2	.110	3/8	8	6	93944	\$32.94	93945	\$40.95							
203	3/8	1/16	2-1/16	1/2	2	.110	3/8	8	6	93950	\$32.94	93951	\$40.95							
303	3/8	3/32	2-3/32	1/2	2	.110	3/8	8	6	93956	\$32.94	93957	\$40.95							
403	3/8	1/8	2-1/8	1/2	2	.130	3/8	8	6	93962	\$32.94	93963	\$40.95							
204	1/2	1/16	2-1/16	1/2	2	.130	3/8	10	8	93968	\$32.94	93969	\$40.95							
304	1/2	3/32	2-3/32	1/2	2	.160	3/8	10	8	93974	\$32.94	93975	\$40.95							
404	1/2	1/8	2-1/8	1/2	2	.191	3/8	10	8	93986	\$32.94	93987	\$41.25							
305	5/8	3/32	2-3/32	1/2	2	.191	3/8	10	8	93980	\$33.28	93981	\$41.25							
405	5/8	1/8	2-1/8	1/2	2	.223	3/8	10	8	93992	\$33.28	93993	\$41.25							
505	5/8	5/32	2-5/32	1/2	2	.253	3/8	10	8	94004	\$33.28	94005	\$41.25							
605	5/8	3/16	2-3/16	1/2	2	.253	3/8	10	8	94010	\$33.28	94011	\$41.25							
406	3/4	1/8	2-1/8	1/2	2	.223	3/8	10	8	93998	\$34.87	93999	\$42.65							
506	3/4	5/32	2-5/32	1/2	2	.253	3/8	10	8	94016	\$34.87	94017	\$42.65							
606	3/4	3/16	2-3/16	1/2	2	.279	3/8	10	8	94034	\$34.87	94035	\$42.65							
806	3/4	1/4	2-1/4	1/2	2	.279	3/8	10	8	94022	\$34.87	94023	\$42.65							
507	7/8	5/32	2-5/32	1/2	2	.247	3/8	12	10	94028	\$38.04	94029	\$46.68							
607	7/8	3/16	2-3/16	1/2	2	.279	3/8	12	10	94040	\$38.04	94041	\$46.68							
707	7/8	7/32	2-7/32	1/2	2	.279	3/8	12	10	94046	\$38.75	94047	\$46.81							
807	7/8	1/4	2-1/4	1/2	2	.342	3/8	12	10	94076	\$38.75	94077	\$42.77							
608	1	3/16	2-3/16	1/2	2	.279	3/8	12	10	94052	\$41.65	94053	\$52.04							
708	1	7/32	2-7/32	1/2	2	.342	3/8	12	10	94058	\$42.04	94059	\$52.42							
808	1	1/4	2-1/4	1/2	2	.342	3/8	12	10	94082	\$42.04	94083	\$52.42							
1008	1	5/16	2-5/16	1/2	2	.401	3/8	12	10	94130	\$43.19	94131	\$53.28							
1208	1	3/8	2-3/8	1/2	2	.401	3/8	12	10	94064	\$43.19	94065	\$53.28							
609	1-1/8	3/16	2-3/16	1/2	2	.312	3/8	12	10	94070	\$46.81	94071	\$60.04							
709	1-1/8	7/32	2-7/32	1/2	2	.312	3/8	12	10	94088	\$46.81	94089	\$60.04							
809	1-1/8	1/4	2-1/4	1/2	2	.375	3/8	12	10	94094	\$47.70	94095	\$60.21							
1009	1-1/8	5/16	2-5/16	1/2	2	.435	3/8	12	10	94136	\$50.03	94137	\$61.54							
610	1-1/4	3/16	2-3/16	1/2	2	.312	3/8	14	12	94100	\$52.25	94101	\$63.08							
710	1-1/4	7/32	2-7/32	1/2	2	.375	3/8	14	12	94106	\$52.25	94107	\$63.08							
810	1-1/4	1/4	2-1/4	1/2	2	.375	3/8	14	12	94112	\$53.98	94113	\$66.39							
1010	1-1/4	5/16	2-5/16	1/2	2	.435	3/8	14	12	94142	\$56.15	94143	\$68.18							
1210	1-1/4	3/8	2-3/8	1/2	2	.467	3/8	14	12	94160	\$56.15	94161	\$68.18							
811	1-3/8	1/4	2-1/4	1/2	2	.401	3/8	14	12	94118	\$60.52	94119	\$74.01							
1011	1-3/8	5/16	2-5/16	1/2	2	.467	3/8	14	12	94148	\$60.52	94149	\$74.01							
1211	1-3/8	3/8	2-3/8	1/2	2	.467	3/8	14	12	94166	\$61.59	94167	\$75.05							
812	1-1/2	1/4	2-1/4	1/2	2	.435	3/8	16	14	94124	\$62.64	94125	\$78.77							
1012	1-1/2	5/16	2-5/16	1/2	2	.467	3/8	16	14	94154	\$64.82	94155	\$79.14							
1212	1-1/2	3/8	2-3/8	1/2	2	.467	3/8	16	14	94172	\$66.97	94173	\$83.13							

\*See page 56 for drawing image and threshold tables  
All dimensions in inches. Many tools are available with additional coatings.  
Please call for quote.

Continues on next page



# WOODRUFF KEYSEAT CUTTERS SHANK TYPE



MILLING CUTTERS

## Carbide Tipped

	A	B	C	D	E	F	G					
American Standard#	Cutter Dia.	Cutter Width	OAL	Shank Dia.	Shank Length	Neck Dia.	Neck Length	# of Teeth	Straight Tooth	Price	Stagger Tooth	Price
204	1/2	1/16	2-1/16	1/2	2	.135	3/8	6	93971	\$98.42	93972	\$115.22
304	1/2	3/32	2-3/32	1/2	2	.160	3/8	6	93977	\$98.42	93978	\$115.22
404	1/2	1/8	2-1/8	1/2	2	.191	3/8	6	93983	\$98.42	93984	\$115.22
305	5/8	3/32	2-3/32	1/2	2	.191	3/8	6	93989	\$101.99	93990	\$119.16
405	5/8	1/8	2-1/8	1/2	2	.223	3/8	6	93995	\$101.99	93996	\$119.16
505	5/8	5/32	2-5/32	1/2	2	.253	3/8	6	94001	\$101.99	94002	\$119.16
605	5/8	3/16	2-3/16	1/2	2	.253	3/8	6	94007	\$101.99	94008	\$119.16
406	3/4	1/8	2-1/8	1/2	2	.217	3/8	6	94013	\$106.46	94014	\$124.70
506	3/4	5/32	2-5/32	1/2	2	.247	3/8	6	94019	\$106.46	94020	\$124.70
606	3/4	3/16	2-3/16	1/2	2	.279	3/8	6	94025	\$106.46	94026	\$124.70
806	3/4	1/4	2-1/4	1/2	2	.279	3/8	6	94031	\$106.46	94032	\$124.70
507	7/8	5/32	2-5/32	1/2	2	.247	3/8	6	94037	\$128.19	94038	\$149.98
607	7/8	3/16	2-3/16	1/2	2	.279	3/8	6	94043	\$128.19	94044	\$149.98
707	7/8	7/32	2-7/32	1/2	2	.279	3/8	6	94049	\$128.19	94050	\$149.98
807	7/8	1/4	2-1/4	1/2	2	.342	3/8	6	94055	\$128.19	94056	\$149.98
608	1	3/16	2-3/16	1/2	2	.279	3/8	8	94061	\$144.64	94062	\$169.10
708	1	7/32	2-7/32	1/2	2	.279	3/8	8	94067	\$144.64	94068	\$169.10
808	1	1/4	2-1/4	1/2	2	.342	3/8	8	94073	\$144.64	94074	\$169.10
1008	1	5/16	2-5/16	1/2	2	.401	3/8	8	94079	\$144.64	94080	\$169.10
1208	1	3/8	2-3/8	1/2	2	.401	3/8	8	94085	\$144.64	94086	\$169.10
609	1-1/8	3/16	2-3/16	1/2	2	.312	3/8	8	94091	\$151.83	94092	\$176.70
709	1-1/8	7/32	2-7/32	1/2	2	.312	3/8	8	94097	\$151.83	94098	\$176.70
809	1-1/8	1/4	2-1/4	1/2	2	.373	3/8	8	94103	\$151.83	94104	\$176.70
1009	1-1/8	5/16	2-5/16	1/2	2	.435	3/8	8	94109	\$151.83	94110	\$176.70
610	1-1/4	3/16	2-3/16	1/2	2	.373	3/8	8	94115	\$159.44	94116	\$186.58
710	1-1/4	7/32	2-7/32	1/2	2	.373	3/8	8	94121	\$159.44	94122	\$186.58
810	1-1/4	1/4	2-1/4	1/2	2	.373	3/8	8	94127	\$159.44	94128	\$186.58
1010	1-1/4	5/16	2-5/16	1/2	2	.435	3/8	8	94133	\$159.44	94134	\$186.58
1210	1-1/4	3/8	2-3/8	1/2	2	.467	3/8	8	94139	\$159.44	94140	\$186.58
811	1-3/8	1/4	2-1/4	1/2	2	.401	3/8	8	94145	\$167.46	94146	\$196.04
1011	1-3/8	5/16	2-5/16	1/2	2	.467	3/8	8	94151	\$167.46	94152	\$196.04
1211	1-3/8	3/8	2-3/8	1/2	2	.467	3/8	8	94157	\$167.46	94158	\$196.04
812	1-1/2	1/4	2-1/4	1/2	2	.435	3/8	8	94163	\$175.69	94164	\$205.48
1012	1-1/2	5/16	2-5/16	1/2	2	.467	3/8	8	94169	\$175.69	94170	\$205.48
1212	1-1/2	3/8	2-3/8	1/2	2	.467	3/8	8	94174	\$175.69	94175	\$205.48

All dimensions in inches. Many tools are available with additional coatings.

Please call for quote.

\*See page 56 for drawing image and threshold tables

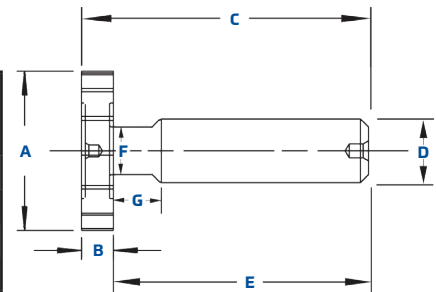


	A	B	C	D	E	F	G	Carbide Head		
American Standard#	Cutter Dia.	Cutter Width	OAL	Shank Dia.	Shank Length	Neck Dia.	Neck Length	# of Teeth	Straight Tooth	Price
204	1/2	1/16	2-1/16	1/2	2	.218	3/8	10	61000	\$110.01
304	1/2	3/32	2-3/32	1/2	2	.218	3/8	10	61001	\$110.01
404	1/2	1/8	2-1/8	1/2	2	.218	3/8	10	61002	\$110.01
305	5/8	3/32	2-3/32	1/2	2	.250	3/8	10	61003	\$116.21
405	5/8	1/8	2-1/8	1/2	2	.250	3/8	10	61004	\$116.21
505	5/8	5/32	2-5/32	1/2	2	.281	3/8	10	61005	\$116.21
605	5/8	3/16	2-3/16	1/2	2	.281	3/8	10	61006	\$116.21
406	3/4	1/8	2-1/8	1/2	2	.250	3/8	10	61007	\$127.05
506	3/4	5/32	2-5/32	1/2	2	.250	3/8	10	61008	\$127.05
606	3/4	3/16	2-3/16	1/2	2	.281	3/8	10	61009	\$127.05
806	3/4	1/4	2-1/4	1/2	2	.281	3/8	10	61010	\$127.05
507	7/8	5/32	2-5/32	1/2	2	.281	3/8	12	61011	\$148.60
607	7/8	3/16	2-3/16	1/2	2	.281	3/8	12	61012	\$148.60
707	7/8	7/32	2-7/32	1/2	2	.312	3/8	12	61013	\$148.60
807	7/8	1/4	2-1/4	1/2	2	.312	3/8	12	61014	\$148.60
608	1	3/16	2-3/16	1/2	2	.312	3/8	12	61015	\$164.25
708	1	7/32	2-7/32	1/2	2	.312	3/8	12	61016	\$164.25
808	1	1/4	2-1/4	1/2	2	.312	3/8	12	61017	\$164.25
1008	1	5/16	2-5/16	1/2	2	.343	3/8	12	61018	\$164.25
1208	1	3/8	2-3/8	1/2	2	.343	3/8	12	61019	\$164.25



All dimensions in inches.  
 Many tools are available with additional coatings.  
 Please call for quote.

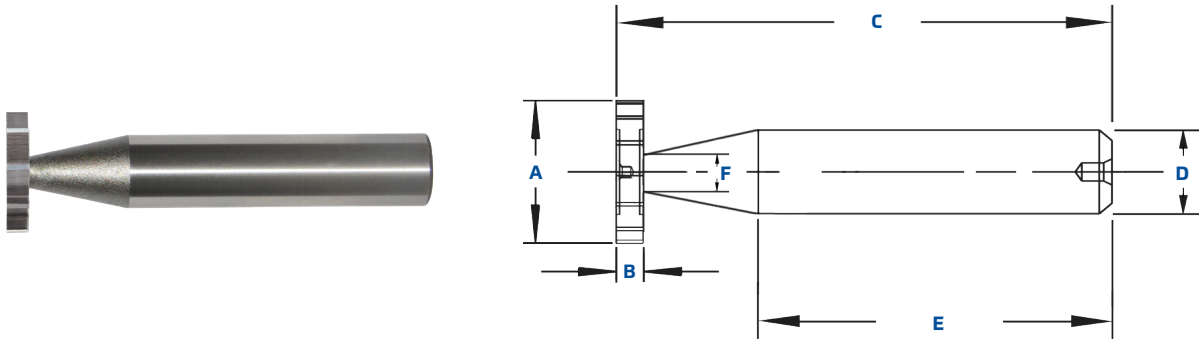
	A	B	C	D	E	F	G	Solid Carbide		
American Standard#	Cutter Dia.	Cutter Width	OAL	Shank Dia.	Shank Length	Neck Dia.	Neck Length	# of Teeth	Straight Tooth	Price
609	1-1/8	3/16	2-3/16	1/2	2	.343	3/8	12	61020	\$178.31
709	1-1/8	7/32	2-7/32	1/2	2	.343	3/8	12	61021	\$178.31
809	1-1/8	1/4	2-1/4	1/2	2	.375	3/8	12	61022	\$178.31
1009	1-1/8	5/16	2-5/16	1/2	2	.375	3/8	12	61023	\$178.31
610	1-1/4	3/16	2-3/16	1/2	2	.343	3/8	14	61024	\$190.82
710	1-1/4	7/32	2-7/32	1/2	2	.343	3/8	14	61025	\$190.82
810	1-1/4	1/4	2-1/4	1/2	2	.375	3/8	14	61026	\$190.82
1010	1-1/4	5/16	2-5/16	1/2	2	.437	3/8	14	61027	\$190.82
1210	1-1/4	3/8	2-3/8	1/2	2	.468	3/8	14	61028	\$190.82
811	1-3/8	1/4	2-1/4	1/2	2	.401	3/8	14	61029	\$248.61
1011	1-3/8	5/16	2-5/16	1/2	2	.468	3/8	14	61030	\$248.61
1211	1-3/8	3/8	2-3/8	1/2	2	.468	3/8	14	61031	\$248.61
812	1-1/2	1/4	2-1/4	1/2	2	.435	3/8	14	61032	\$286.86
1012	1-1/2	5/16	2-5/16	1/2	2	.468	3/8	14	61033	\$286.86
1212	1-1/2	3/8	2-3/8	1/2	2	.468	3/8	14	61034	\$286.86



All dimensions in inches.  
 Many tools are available with additional coatings.  
 Please call for quote.



# METRIC WOODRUFF KEYSEAT CUTTERS HSS SHANK TYPE



## HSS

A	B	C	D	E	F	# of Teeth		HSS Shank Type *DIN850-Form A,B			
						Straight	Staggered	Straight	Price	Staggered	Price
Cutter Dia. [h12]	Cutter Width [e8]	OAL [js18]	Shank Dia. [h8]	Shank Length [+2/0]	Neck Dia. [±0.2]						
4.5	1	50	6	36	1.8	6	4	68200	\$32.37	68201	\$42.24
7.5	1.5	50	6	36	2.8	8	6	68210	\$32.37	68211	\$42.24
7.5	2	50	6	36	3.2	8	6	68220	\$32.37	68221	\$42.24
10.5	2	50	6	36	4.0	8	6	68230	\$32.37	68231	\$42.24
10.5	2.5	50	6	36	4.0	8	6	68240	\$32.37	68241	\$42.24
10.5	3	50	6	36	4.2	8	6	68250	\$32.37	68251	\$42.24
13.5	3	56	10	40	4.6	10	8	68260	\$32.37	68261	\$42.24
13.5	4	56	10	40	4.6	10	8	68270	\$32.37	68271	\$42.24
16.5	3	56	10	40	4.6	10	8	68280	\$32.69	68281	\$42.54
16.5	4	56	10	40	4.6	10	8	68290	\$32.69	68291	\$42.54
16.5	5	56	10	40	5.0	10	8	68300	\$32.69	68301	\$42.54
19.5	4	63	10	40	5.6	10	8	68310	\$37.69	68311	\$48.29
19.5	5	63	10	40	6.0	10	8	68320	\$37.69	68321	\$48.29
19.5	6	63	10	40	6.5	10	8	68330	\$37.69	68331	\$48.29
22.5	5	63	10	40	6.0	12	10	68340	\$41.11	68341	\$52.87
22.5	6	63	10	40	6.0	12	10	68350	\$41.86	68351	\$52.87
22.5	8	63	10	40	6.5	12	10	68360	\$41.86	68361	\$52.87
25.5	6	63	10	40	7.5	12	10	68370	\$45.43	68371	\$59.52
28.5	6	71	10	40	8.5	12	10	68380	\$51.54	68381	\$68.50
28.5	8	71	10	40	8.5	12	10	68390	\$54.05	68391	\$69.71
28.5	10	71	12	45	9.3	12	10	68400	\$54.05	68401	\$69.71
32.5	7	71	12	45	8.5	14	12	68410	\$63.62	68411	\$82.04
32.5	8	71	12	45	8.5	14	12	68420	\$66.19	68421	\$84.10
32.5	10	71	12	45	9.3	14	12	68430	\$66.19	68431	\$84.10
45.5	10	71	12	45	11.8	18	16	68440	\$152.85	68441	\$199.20

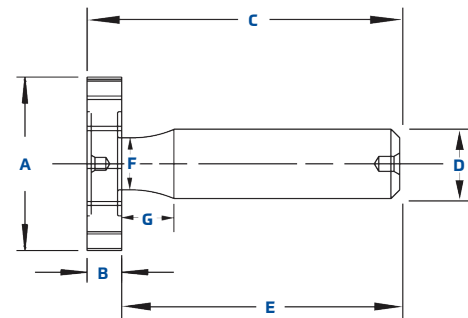
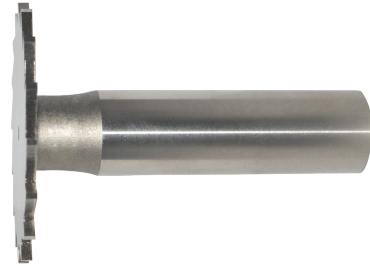
All dimensions in millimeters. Many tools are available with additional coatings. Please call for quote.

\*DIN 850 - Form A: Straight Shank, Straight Teeth  
 \*DIN 850 - Form B: Straight Shank, Staggered Teeth

# NARROW WIDTH KEYSEAT CUTTERS SHANK TYPE

A	B	C	D	E	F	G	Narrow Width			
Cutter Dia.	Cutter Width	OAL	Shank Dia.	Shank Length	Neck Dia.	Neck Length	Teeth (RH)	Product #	Price	
1/4	1/64	2-1/64	1/2	2	.110	3/8	Str.-8	68981	\$71.47	
1/4	0.020	2.020	1/2	2	.110	3/8	Str.-8	68978	\$51.41	
1/4	1/32	2-1/32	1/2	2	.110	3/8	Str.-8	68982	\$37.93	
1/4	3/64	2-3/64	1/2	2	.110	3/8	Str.-8	68983	\$51.41	
5/16	1/64	2-1/64	1/2	2	.110	3/8	Str.-8	68984	\$71.96	
5/16	0.020	2.020	1/2	2	.110	3/8	Str.-8	68979	\$51.89	
5/16	1/32	2-1/32	1/2	2	.110	3/8	Str.-8	68985	\$38.21	
5/16	3/64	2-3/64	1/2	2	.110	3/8	Str.-8	68986	\$51.89	
3/8	1/64	2-1/64	1/2	2	.110	3/8	Str.-8	68987	\$70.76	
3/8	0.020	2.020	1/2	2	.110	3/8	Str.-8	68980	\$51.36	
3/8	1/32	2-1/32	1/2	2	.110	3/8	Str.-8	68988	\$37.60	
3/8	3/64	2-3/64	1/2	2	.110	3/8	Str.-8	68989	\$51.36	
1/2	1/64	2-1/64	1/2	2	.130	3/8	Str.-10	68990	\$71.94	
1/2	0.020	2.020	1/2	2	.130	3/8	Str.-10	68991	\$64.81	
1/2	1/32	2-1/32	1/2	2	.130	3/8	Str.-10	69000	\$34.79	
1/2	3/64	2-3/64	1/2	2	.130	3/8	Str.-10	69001	\$64.81	
5/8	0.020	2.020	1/2	2	.191	3/8	Str.-10	69009	\$65.43	
5/8	1/32	2-1/32	1/2	2	.191	3/8	Str.-10	69010	\$35.12	
5/8	3/64	2-3/64	1/2	2	.191	3/8	Str.-10	69011	\$65.43	
5/8	1/16	2-1/16	1/2	2	.191	3/8	Str.-10	69020	\$35.12	
5/8	5/64	2-5/64	1/2	2	.191	3/8	Str.-10	69021	\$65.43	
3/4	1/32	2-1/32	1/2	2	.223	3/8	Str.-10	69030	\$36.81	
3/4	3/64	2-3/64	1/2	2	.223	3/8	Str.-10	69031	\$69.31	
3/4	1/16	2-1/16	1/2	2	.223	3/8	Str.-10	69040	\$36.81	
3/4	5/64	2-5/64	1/2	2	.223	3/8	Str.-10	69041	\$69.31	
3/4	3/32	2-3/32	1/2	2	.223	3/8	Str.-10	69050	\$36.81	
3/4	7/64	2-7/64	1/2	2	.223	3/8	Str.-10	69051	\$69.31	
7/8	1/32	2-1/32	1/2	2	.247	3/8	Str.-12	69060	\$40.62	
7/8	3/64	2-3/64	1/2	2	.247	3/8	Str.-12	69061	\$77.44	
7/8	1/16	2-1/16	1/2	2	.247	3/8	Str.-12	69070	\$40.62	
7/8	5/64	2-5/64	1/2	2	.247	3/8	Str.-12	69071	\$77.44	
7/8	3/32	2-3/32	1/2	2	.247	3/8	Str.-12	69080	\$40.62	
7/8	7/64	2-7/64	1/2	2	.247	3/8	Str.-12	69081	\$77.44	
7/8	1/8	2-1/8	1/2	2	.247	3/8	Str.-12	69090	\$40.62	
7/8	9/64	2-9/64	1/2	2	.247	3/8	Str.-12	69091	\$77.44	
1	1/32	2-1/32	1/2	2	.279	3/8	Str.-12	69098	\$86.04	
1	3/64	2-3/64	1/2	2	.279	3/8	Str.-12	69099	\$85.63	
1	1/16	2-1/16	1/2	2	.279	3/8	Str.-12	69100	\$44.40	
1	5/64	2-5/64	1/2	2	.279	3/8	Str.-12	69101	\$85.63	
1	3/32	2-3/32	1/2	2	.279	3/8	Str.-12	69110	\$44.40	
1	7/64	2-7/64	1/2	2	.279	3/8	Str.-12	69111	\$85.63	
1	1/8	2-1/8	1/2	2	.279	3/8	Str.-12	69120	\$44.40	
1	9/64	2-9/64	1/2	2	.279	3/8	Str.-12	69121	\$85.63	
1	5/32	2-5/32	1/2	2	.279	3/8	Str.-12	69130	\$44.40	
1	11/64	2-11/64	1/2	2	.279	3/8	Str.-12	69131	\$85.63	

KEO Narrow Width Keyseat Cutters provide many standard width and diameter combinations to accommodate a variety of milling requirements.



Tolerance		
Cutter Diameter		
1/4" up to and including 3/4"	+0.010"	+0.015"
7/8" up to and including 1-1/8"	+0.012"	+0.017"
1-1/4" up to and including 1-1/2"	+0.015"	+0.020"
Shank Diameter		
-0.0001"	-0.0005"	
Width		
+0.0005"	-0.0005"	

All dimensions in inches.  
 Many tools are available with additional coatings.  
 Please call for quote.  
 Continues on next page.



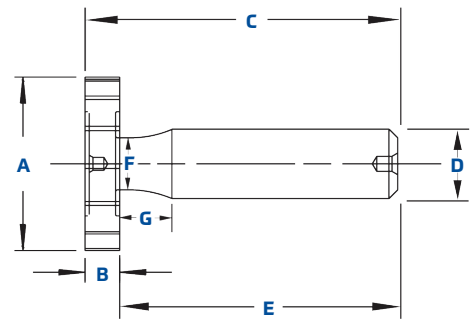
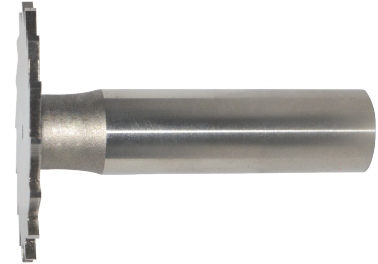
# NARROW WIDTH KEYSEAT CUTTERS SHANK TYPE (CONT.)

M

MILLING CUTTERS

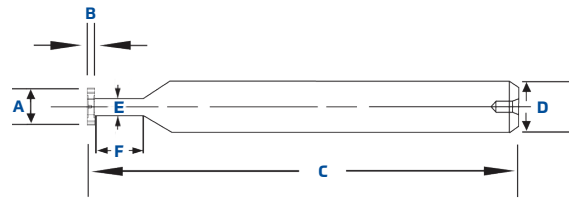
A	B	C	D	E	F	G	Narrow Width			
Cutter Dia.	Cutter Width	OAL	Shank Dia.	Shank Length	Neck Dia.	Neck Length	Teeth (RH)	Product #	Price	
1 1/8	3/64	2 3/64	1/2	2	.312	3/8	Str.-12	69139	\$93.13	
1 1/8	1/16	2 1/16	1/2	2	.312	3/8	Str.-12	69140	\$52.84	
1-1/8	5/64	2-5/64	1/2	2	.312	3/8	Str.-12	69141	\$93.13	
1-1/8	3/32	2-3/32	1/2	2	.312	3/8	Str.-12	69150	\$52.84	
1-1/8	7/64	2-7/64	1/2	2	.312	3/8	Str.-12	69151	\$93.13	
1-1/8	1/8	2-1/8	1/2	2	.312	3/8	Str.-12	69160	\$52.84	
1-1/8	9/64	2-9/64	1/2	2	.312	3/8	Str.-12	69161	\$93.13	
1-1/8	5/32	2-5/32	1/2	2	.312	3/8	Str.-12	69170	\$52.84	
1-1/8	11/64	2-11/64	1/2	2	.312	3/8	Str.-12	69171	\$93.13	
1-1/4	3/64	2-3/64	1/2	2	.312	3/8	Str.-14	69179	\$100.14	
1-1/4	1/16	2-1/16	1/2	2	.312	3/8	Str.-14	69180	\$59.30	
1-1/4	5/64	2-5/64	1/2	2	.312	3/8	Str.-14	69181	\$100.14	
1-1/4	3/32	2-3/32	1/2	2	.312	3/8	Str.-14	69190	\$59.30	
1-1/4	7/64	2-7/64	1/2	2	.312	3/8	Str.-14	69191	\$100.14	
1-1/4	1/8	2-1/8	1/2	2	.312	3/8	Str.-14	69200	\$59.30	
1-1/4	9/64	2-9/64	1/2	2	.312	3/8	Str.-14	69201	\$100.14	
1-1/4	5/32	2-5/32	1/2	2	.312	3/8	Str.-14	69210	\$59.30	
1-1/4	11/64	2-11/64	1/2	2	.312	3/8	Str.-14	69211	\$100.14	
1-3/8	3/64	2-3/64	1/2	2	.401	3/8	Str.-14	69219	\$109.95	
1-3/8	1/16	2-1/16	1/2	2	.401	3/8	Str.-14	69220	\$64.82	
1-3/8	5/64	2-5/64	1/2	2	.401	3/8	Str.-14	69221	\$109.95	
1-3/8	3/32	2-3/32	1/2	2	.401	3/8	Str.-14	69230	\$64.82	
1-3/8	7/64	2-7/64	1/2	2	.401	3/8	Str.-14	69231	\$109.95	
1-3/8	1/8	2-1/8	1/2	2	.401	3/8	Str.-14	69240	\$64.82	
1-3/8	9/64	2-9/64	1/2	2	.401	3/8	Str.-14	69241	\$109.95	
1-3/8	5/32	2-5/32	1/2	2	.401	3/8	Str.-14	69250	\$64.82	
1-3/8	11/64	2-11/64	1/2	2	.401	3/8	Str.-14	69251	\$109.95	
1-3/8	3/16	2-3/16	1/2	2	.401	3/8	Str.-14	69260	\$64.82	
1-3/8	13/64	2-13/64	1/2	2	.401	3/8	Str.-14	69261	\$109.95	
1-3/8	7/32	2-7/32	1/2	2	.401	3/8	Str.-14	69270	\$64.82	
1-1/2	3/64	2-3/64	1/2	2	.435	3/8	Str.-16	69279	\$116.84	
1-1/2	1/16	2-1/16	1/2	2	.435	3/8	Str.-16	69280	\$71.32	
1-1/2	5/64	2-5/64	1/2	2	.435	3/8	Str.-16	69281	\$116.84	
1-1/2	3/32	2-3/32	1/2	2	.435	3/8	Str.-16	69290	\$71.32	
1-1/2	7/64	2-7/64	1/2	2	.435	3/8	Str.-16	69291	\$116.84	
1-1/2	1/8	2-1/8	1/2	2	.435	3/8	Str.-16	69300	\$71.32	
1-1/2	9/64	2-9/64	1/2	2	.435	3/8	Str.-16	69301	\$116.84	
1-1/2	5/32	2-5/32	1/2	2	.435	3/8	Str.-16	69310	\$67.92	
1-1/2	11/64	2-11/64	1/2	2	.435	3/8	Str.-16	69311	\$111.25	
1-1/2	3/16	2-3/16	1/2	2	.435	3/8	Str.-16	69320	\$67.92	
1-1/2	13/64	2-13/64	1/2	2	.435	3/8	Str.-16	69321	\$111.25	
1-1/2	7/32	2-7/32	1/2	2	.435	3/8	Str.-16	69330	\$67.92	
1-1/2	15/64	2-15/64	1/2	2	.435	3/8	Str.-16	69331	\$111.25	

KEO Narrow Width Keyseat Cutters provide many standard width and diameter combinations to accommodate a variety of milling requirements.



Tolerance		
Cutter Diameter		
1/4" up to and including 3/4"	+0.010"	+0.015"
7/8" up to and including 1-1/8"	+0.012"	+0.017"
1-1/4" up to and including 1-1/2"	+0.015"	+0.020"
Shank Diameter		
-0.0001"	-0.0005"	
Width		
+0.0005"	-0.0005"	

All dimensions in inches.  
 Many tools are available with additional coatings.  
 Please call for quote.

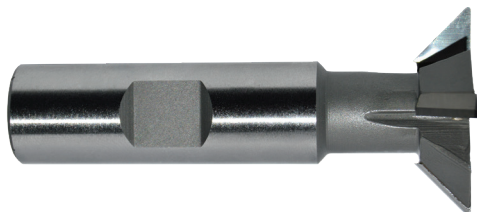


A	B	C	D	E	F	Solid Carbide		
Cutter Dia.	Cutter Width	OAL	Shank Dia.	Neck Dia.	Neck Length	# of Teeth	Product #	Price
1/8	1/64	2	1/4	1/16	5/32	6	61070	\$39.02
1/8	1/32	2	1/4	1/16	5/32	6	61071	\$39.02
1/8	1 mm	2	1/4	1/16	5/32	6	61072	\$39.02
1/8	3/64	2	1/4	1/16	5/32	6	61073	\$39.02
1/8	1/16	2	1/4	1/16	5/32	6	61074	\$39.02
3/16	1/64	2	1/4	3/32	1/4	6	61075	\$38.73
3/16	1/32	2	1/4	3/32	1/4	6	61076	\$38.73
3/16	1 mm	2	1/4	3/32	1/4	6	61077	\$38.73
3/16	3/64	2	1/4	3/32	1/4	6	61078	\$38.73
3/16	1/16	2	1/4	3/32	1/4	6	61079	\$38.73
1/4	1/64	2	1/4	1/8	1/4	8	61080	\$41.94
1/4	1/32	2	1/4	1/8	1/4	8	61081	\$41.94
1/4	1 mm	2	1/4	1/8	1/4	8	61082	\$41.94
1/4	3/64	2	1/4	1/8	1/4	8	61083	\$41.94
1/4	1/16	2	1/4	1/8	1/4	8	61084	\$41.94
5/16	1/64	2	3/8	5/32	1/4	8	61085	\$54.12
5/16	1/32	2	3/8	5/32	1/4	8	61086	\$54.12
5/16	1 mm	2	3/8	5/32	1/4	8	61087	\$54.12
5/16	3/64	2	3/8	5/32	1/4	8	61088	\$54.12
5/16	1/16	2	3/8	5/32	1/4	8	61089	\$54.12
5/16	2 mm	2	3/8	5/32	1/4	8	61090	\$54.12
5/16	3/32	2	3/8	5/32	1/4	8	61091	\$54.12
3/8	1/64	2	3/8	3/16	1/4	8	61092	\$54.64
3/8	1/32	2	3/8	3/16	1/4	8	61093	\$54.64
3/8	1 mm	2	3/8	3/16	1/4	8	61094	\$54.63
3/8	3/64	2	3/8	3/16	1/4	8	61095	\$54.64
3/8	1/16	2	3/8	3/16	1/4	8	61096	\$54.64
3/8	2 mm	2	3/8	3/16	1/4	8	61097	\$54.64
3/8	3/32	2	3/8	3/16	1/4	8	61098	\$54.64
3/8	1/8	2	3/8	3/16	1/4	8	61099	\$54.64

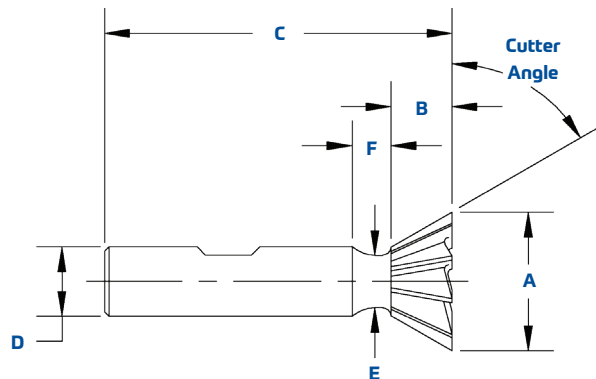
All dimensions in inches (except where millimeter is indicated).  
 Many tools are available with additional coatings.  
 Please call for quote.



Dovetail Cutters are provided with 45° and 60° angles utilizing a right hand cutting action. You may choose from HSS, Cobalt or Carbide Tipped cutters. **Carbide Tipped tools include a .020 radius.**



**Standard Weldon Shank**



**HSS COBALT**

A	B	C	D	E	F	45° HSS & Cobalt				
Cutter Dia.	Cutter Width	OAL	Shank Dia.	Neck Dia.	Neck Length	# of Teeth	HSS	Price	CO	Price
3/8	1/8	2-1/8	3/8	9/64	1/4	6	75034	\$51.23	76034	\$61.33
1/2	1/8	2-1/8	3/8	7/32	5/16	8	75044	\$55.46	76044	\$66.39
3/4	3/16	2-1/8	3/8	5/16	3/8	8	75064	\$64.86	76064	\$77.63
1	1/4	2-1/2	1/2	7/16	1/4	10	75084	\$80.30	76084	\$96.11
1-3/8	3/8	2-7/8	5/8	9/16	9/16	10	75114	\$101.25	76114	\$121.19
1-7/8	1/2	3-1/4	7/8	3/4	11/16	12	75154	\$220.61	76154	\$264.07
2-1/4	11/16	3-3/4	1	13/16	9/16	12	75184	\$262.98	76184	\$314.80
2-1/2	3/4	3-3/4	1	7/8	11/16	12	75204	\$311.09	76204	\$372.36

Cutter Dia.	+ 0.015"	- 0.015"
Shank Dia.	- 0.0001"	- 0.0005"
Overall Length	± 0.060	

All dimensions in inches.  
Many tools are available with additional coatings.  
Please call for quote.

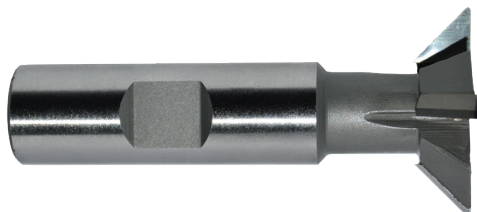
**HSS COBALT**

A	B	C	D	F	G	60° HSS & Cobalt				
Cutter Dia.	Cutter Width	OAL	Shank Dia.	Neck Dia.	Neck Length	# of Teeth	HSS	Price	CO	Price
3/8	3/16	2-1/8	3/8	9/64	1/4	8	75036	\$51.23	76036	\$61.33
1/2	7/32	2-1/8	3/8	7/32	1/4	8	75046	\$55.46	76046	\$66.39
3/4	5/16	2-1/8	3/8	5/16	1/4	8	75066	\$64.86	76066	\$77.63
1	7/16	2-1/2	1/2	7/16	9/32	10	75086	\$80.30	76086	\$96.11
1-3/8	9/16	2-7/8	5/8	9/16	5/16	12	75116	\$101.25	76116	\$121.19
1-7/8	13/16	3-1/4	7/8	13/16	5/16	12	75156	\$220.61	76156	\$264.07
2-1/4	1-1/16	3-3/4	1	29/32	3/8	12	75186	\$262.98	76186	\$314.80
2-1/2	1-1/8	3-3/4	1	15/16	5/16	12	75206	\$311.09	76206	\$372.36

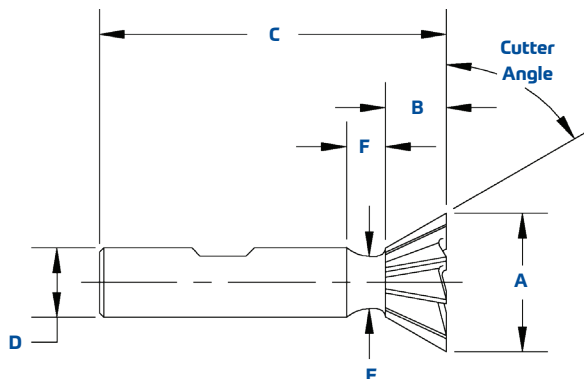
Cutter Dia.	+ 0.015"	- 0.015"
Shank Dia.	- 0.0001"	- 0.0005"
Overall Length	± 0.060	

All dimensions in inches.  
Many tools are available with additional coatings.  
Please call for quote.  
**Continues on next page**

Dovetail Cutters are provided with 45° and 60° angles utilizing a right hand cutting action. You may choose from HSS, Cobalt or Carbide Tipped cutters. **Carbide Tipped tools include a .020 radius.**



Standard Weldon Shank



A	B	C	D	E	F	45° Carbide Tipped		
Cutter Dia.	Cutter Width	OAL	Shank Dia.	Neck Dia.	Neck Length	# of Teeth	Carbide Tipped	Price
1/2	5/32	2-1/8	3/8	3/16	5/16	3	74044	\$110.18
3/4	1/4	2-1/4	3/8	7/32	3/8	3	74064	\$122.71
1	5/16	2-1/2	1/2	3/8	7/16	4	74084	\$135.45
1-1/4	5/16	2-3/4	5/8	1/2	1/2	4	74114	\$150.34
1-1/2	1/2	3-1/4	3/4	1/2	11/16	4	74154	\$189.89
2	5/8	4-1/4	1	3/4	1 1/4	6	74184	\$288.42
2-1/2	3/4	4-3/8	1-1/4	1	1 3/16	6	74204	\$418.89
3	1	4-1/2	1-1/4	1	1 1/8	6	74244	\$486.66

All dimensions in inches.  
Many tools are available with additional coatings.  
Please call for quote.

Cutter Dia.	+ 0.015"	- 0.015"
Shank Dia.	- 0.0001"	- 0.0005"
Overall Length	± 0.060	

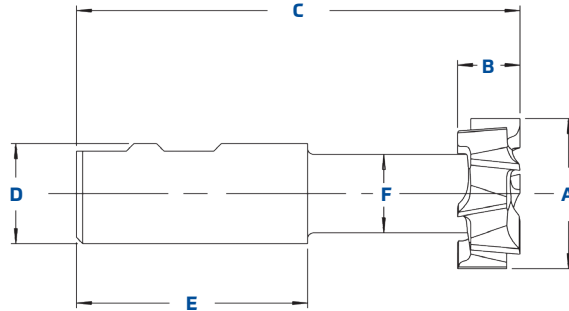
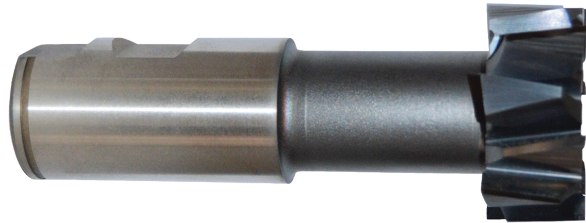
A	B	C	D	F	G	60° Carbide Tipped		
Cutter Dia.	Cutter Width	OAL	Shank Dia.	Neck Dia.	Neck Length	# of Teeth	Carbide Tipped	Price
1/2	7/32	2-1/8	3/8	3/16	1/4	3	74046	\$110.18
3/4	1/4	2-1/4	3/8	5/16	7/16	3	74066	\$122.71
1	3/8	2-1/2	1/2	3/8	5/16	4	74086	\$135.45
1-1/4	1/2	2-3/4	5/8	1/2	5/16	4	74116	\$150.34
1-1/2	5/8	3-1/4	3/4	1/2	9/16	4	74156	\$189.89
2	3/4	4-1/4	1	3/4	1 1/4	6	74186	\$288.42
2-1/2	7/8	4-3/8	1-1/4	1	1 3/16	6	74206	\$418.89
3	1-1/8	4-1/2	1-1/4	1	1 1/8	6	74246	\$486.66

All dimensions in inches.  
Many tools are available with additional coatings.  
Please call for quote.

Cutter Dia.	+ 0.015"	- 0.015"
Shank Dia.	- 0.0001"	- 0.0005"
Overall Length	± 0.060	



KEO T-Slot Milling Cutters have staggered teeth on the circumferential surface and teeth on both sides. The side teeth alternate to provide maximum chip clearance and stability to permit rapid milling of T-slots with minimum risk of breakage.



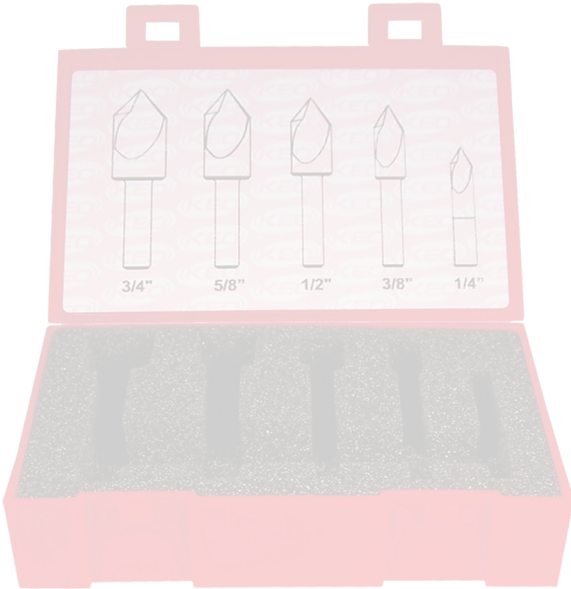
**Standard Weldon Shank**

A	B	C	D	E	F	T-SLOT			
Cutter Dia.	Cutter Width	OAL	Shank Dia.	Shank Length	Neck Dia.	Teeth (RH)	Bolt Size	Product #	Price
9/16	15/64	2-19/32	1/2	1-25/32	17/64	8	1/4	70140	\$89.54
21/32	17/64	2-11/16	1/2	1-25/32	21/64	8	5/16	70560	\$96.30
25/32	21/64	3-1/4	3/4	2-1/32	13/32	8	3/8	70380	\$142.01
31/32	25/64	3-7/16	3/4	2-1/32	17/32	8	1/2	70120	\$161.26
1-1/4	31/64	3-15/16	1	2-9/32	21/32	8	5/8	70580	\$219.04
1-15/32	5/8	4-7/16	1	2-9/32	25/32	8	3/4	70340	\$256.31
1-27/32	53/64	4-13/16	1-1/4	2-9/32	1-1/32	12	1	71000	\$433.72
2-7/32	1-3/32	5-3/8	1-1/4	2-9/32	1-7/32	12	1-1/4	71140	\$572.40
2-21/32	1-11/32	5-29/32	1-1/4	2-9/32	1-17/32	12	1-1/2	71120	\$741.33

All dimensions are in inches  
 Many tools are available with additional coatings.  
 Please call for quote.

Cutter Dia.	+ 0.000"	- 0.010"
Shank Dia.	- 0.0001"	- 0.0005"
Overall Length	±0.060	
Width	+ 0.000	- 0.005
Helix Angle	10°	





# TOOL SETS

**Tool Sets** **69-73**



**Combined Drill & Countersink Set**

This 5-piece set includes one piece each of the following plain type combined drill with a standard 60° included countersink angle.

C'Drills	PKG QTY.	HSS	Price	HSS-TIN	Price	Cobalt	Price	Carbide	Price
#1	1	10000	\$47.08	10000-TIN	\$60.24	10002	\$87.54	10003	\$156.42
#2									
#3									
#4									
#5									



For individual tool information see page 3-4  
 Many tools are available with additional coatings.  
 Please call for quote.

**Jig Bore Combined Drill & Countersink Sets**

Each 5-piece set includes one piece each of the following jig bore type combined drill and countersinks.



Body Dia.	Point Dia.	Product #	Price
3/8	1/16	13000	\$121.95
	3/32		
	1/8		
	5/32		
	3/16		
1/2	1/8	12999	\$143.54
	3/16		
	7/32		
	1/4		
	9/32		

All dimensions are in inches.  
 For individual tool information see page 12

**HSS & Cobalt Single Flute Countersink Sets**

Each 5-piece set includes one piece each of 1/4, 3/8, 1/2, 3/4, and 1" body diameter with a particular included point angle.

PKG Qty.	Countersink Angle	HSS Single Flute	Price	CO Single Flute	Price
1	60°	53026	\$103.92	50056	\$119.52
1	82°	53028	\$103.92	50058	\$119.52
1	90°	53029	\$103.92	50059	\$119.52
1	100°	53020	\$103.92	50050	\$119.52
1	110°	53021	\$103.92	50051	\$119.52
1	120°	53022	\$103.92	50052	\$119.52



For individual tool information see pages 32-35  
 Many tools are available with additional coatings.  
 Please call for quote.

**KEO Countersink & Deburring Tools**

Straight Shank, CNC Precision Cam Ground, Cobalt, Chatter-free Cutting Action.



Countersink Angle	4-Piece	Price	5-Piece	Price	5-Piece Coated	Price
60°	53508	\$72.84	53509	\$124.06	53509-TiN	\$156.80
82°	53518	\$72.84	53519	\$124.06	53519-TiN	\$156.80
90°	53528	\$72.84	53529	\$124.06	53529-TiN	\$156.80
100°	53538	\$72.84	53539	\$124.06	53539-TiN	\$156.80
<b>Head Diameter</b>	5/16, 3/8, 1/2, 5/8		5/16, 3/8, 1/2, 3/4, 1		5/16, 3/8, 1/2, 3/4, 1	

For individual tool information see pages 30,31  
All dimensions in inches

**Carbide Countersink Sets**

Carbide sets include one 1/4, 3/8, 1/2, 5/8 and 3/4" body diameter with a particular included point angle.



PKG Qty.	Countersink Angle	Single-Flute	Price	3-Flute	Price	6-Flute	Price
1	60°	55709	\$350.46	55749	\$357.46	55790	\$368.18
1	60°	55709-TiALN	\$424.91	55749-TiALN	\$433.41	55790-TiALN	\$446.42
1	82°	55719	\$350.46	55759	\$357.46	55801	\$368.18
1	82°	55719-TiALN	\$424.91	55759-TiALN	\$433.41	55801-TiALN	\$446.42
1	90°	55729	\$350.46	55769	\$357.46	55812	\$368.18
1	90°	55729-TiALN	\$424.91	55769-TiALN	\$433.41	55812-TiALN	\$446.42
1	100°	55739	\$350.46	55779	\$357.46	55823	\$368.18
1	100°	55739-TiALN	\$424.91	55779-TiALN	\$433.41	55823-TiALN	\$446.42

For individual tool information see pages 36,42, & 51.

**HSS & Cobalt 3-Flute Center Reamer Sets**

Each 5-piece set includes one piece each of 1/4, 3/8, 1/2, 3/4, and 1" body diameter with a particular included point angle.

PKG Qty.	Countersink Angle	HSS	Price	CO	Price
1	60°	50026	\$114.19	50036	\$131.31
1	82°	50028	\$114.19	50038	\$131.31
1	90°	50029	\$114.19	50039	\$131.31
1	100°	50020	\$114.19	50030	\$131.31
1	110°	50021	\$114.19	50031	\$131.31
1	120°	50022	\$114.19	50032	\$131.31

For individual tool information see pages 38-41  
Many tools are available with additional coatings.  
Please call for quote.



**HSS & Cobalt 6-Flute Countersink Sets**

HSS sets include one piece each of 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, and 1" body diameter with a particular included point angle. Cobalt sets include one piece each of 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, and 1" body diameter with a particular included point angle.

Countersink Angle	HSS 6-Flute	Price	CO 6-Flute	Price
60°	55018	\$162.90	50046	\$187.34
82°	55038	\$162.90	50048	\$187.34
90°	55058	\$162.90	50049	\$187.34
100°	55078	\$162.90	50040	\$187.34
110°	55098	\$162.90	50041	\$187.34
120°	55118	\$162.90	50042	\$187.34

*For detailed information see pages 45-50  
Many tools are available with additional coatings.  
Please call for quote.*



**Precision Cap Screw Counterbores**

Integral Pilot, Straight Shank, CNC Precision Ground, Cobalt HSS.

PKG Qty.	Complete 7-Piece Tool Sets	Assembly Criteria	Product #	Price
1	#6, #8, #10, 1/4", 5/16", 3/8", 1/2" Nominal	Close Fit	55239	\$396.15
1	#6, #8, #10, 1/4", 5/16", 3/8", 1/2" +1/64 O/S	1/64" Clearance	55240	\$396.15
1	#6, #8, #10, 1/4", 5/16", 3/8", 1/2" +1/32 O/S	1/32" Clearance	55241	\$396.15

*For detailed information see page 53  
Many tools are available with additional coatings.  
Please call for quote.*

### Precision Metric Cap Screw Counterbores

Integral Pilot, Straight Shank, CNC Precision Ground, Cobalt HSS.

PKG Qty.	Complete 6-Piece Tool Sets	Application	Product #	Price
1	M3, M4, M5, M6, M8, M10	Before Thread	56224	\$308.13
1	M3, M4, M5, M6, M8, M10	Fine	56225	\$308.13
1	M3, M4, M5, M6, M8, M10	Medium	56226	\$308.13

For detailed information see pages 54  
 Many tools are available with additional coatings.  
 Please call for quote.



### 10-Piece Woodruff Keyseat Cutter Sets

The 10-piece set includes one piece each of the following sizes with straight or staggered teeth.



Teeth	Product #	Price
Straight	60100	\$318.52
Staggered	60105	\$409.33

American Standard Sizes	
403	406
204	606
404	806
305	608
505	808

For detailed information see page 56-60  
 Many tools are available with additional coatings.  
 Please call for quote.

### 41-Piece Woodruff Keyseat Cutter Sets

The 41-piece set includes one piece each of all the American Standard woodruff keyseat cutter sizes with straight or staggered teeth.

Teeth	Product #	Price
Straight	60000	\$1,564.79
Staggered	60005	\$2,010.68

For detailed information see page 56-60  
 Many tools are available with additional coatings.  
 Please call for quote.



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TECHNICAL INFORMATION

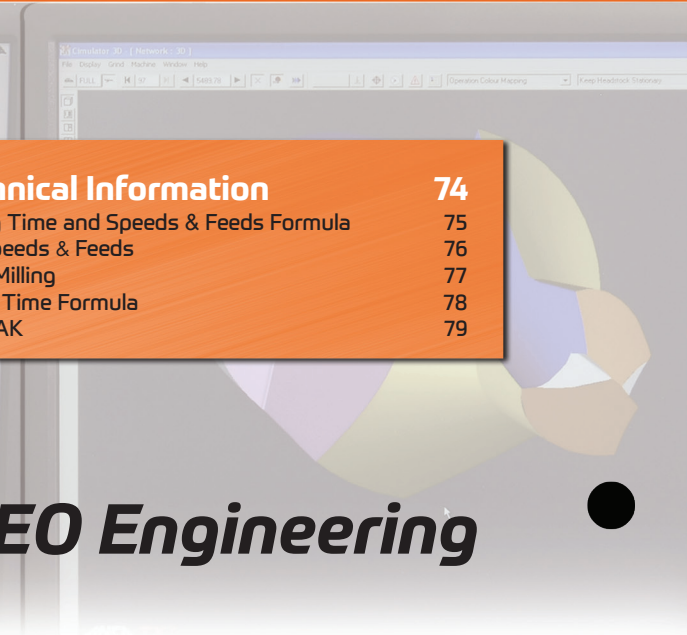
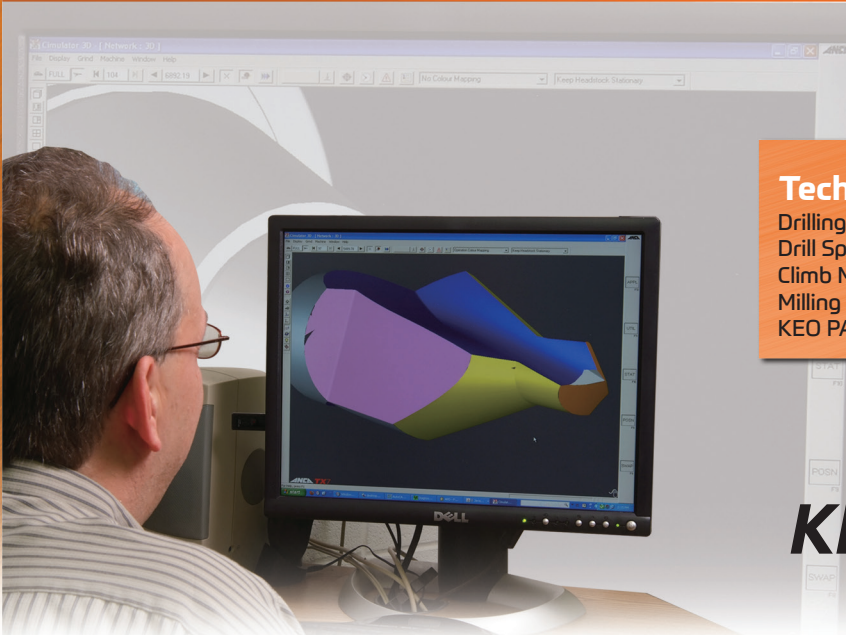


# TECHNICAL INFORMATION

## KEO High Performance CNC Grinding



## KEO Robotics



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## KEO Engineering

## Drilling Time Formula Speeds & Feeds- Formula

Find:	Have:	Formula:
Revolutions per minute (RPM)	SFM	$(\text{SFM} \times 12) \div (\text{Diameter of drill} \times 3.1416)$
Surface feet per minute (SFM)	RPM	$(\text{Diameter of drill} \times \text{RPM} \times 3.1416) \div 12$
Feed rate per RPM (FR)	SFM and FM	$(\text{Diameter of drill} \times \text{FM} \times 3.1416) \div (\text{SFM} \times 12)$
Feed rate per RPM (FR)	RPM and FM	$\text{FM} \div \text{RPM}$
Feed rate per minute (FM)	FR and RPM	$\text{RPM} \times \text{FR}$
SFM	RPM and drill dia.	$.26 \times \text{RPM} \times \text{drill diameter}$
RPM	SFM and drill dia.	$3.8 \times (\text{SFM} \div \text{drill diameter})$

### Drill Speeds

Material	SFM*
Aluminum and Aluminum Alloys	150 - 300
Brass and Bronze (free cutting)	150 - 300
Brass and Bronze (high tensile)	70 - 120
Cast Iron (soft)	80 - 120
Cast Iron (medium)	60 - 90
Cast Iron (hard)	30 - 70
Copper	70 - 100
Magnesium	200 - 400
Nickel Base Alloys	20 - 50
Plastic and Related Materials	100 - 200
Wood	200 - 300

\*Surface feet per minute

### Drill Speeds (Steel)

Material	SFM*
Alloyed - under 200 B.H.	60 - 90
Alloyed - 200 - 300 B.H.	40 - 70
Alloyed - over 300 B.H.	20 - 30
Cast and Forged	40 - 70
Heat Treated - 35 - 40 R.C.	30 - 40
Heat Treated - 40 - 45 R.C.	20 - 30
Heat Treated - over 45 R.C.	10 - 20
Mild - .2 - .3 Carbon	70 - 100
Mild - .4 - .5 Carbon	50 - 80
Stainless - 300 Series	20 - 50
Stainless - 400 Series	30 - 70
Tool - over 1.0 Carbon	40 - 60
Titanium Alloys	20 - 50

\*Surface feet per minute

### Drilling Time Formula

$$\text{Time (Minutes)} = \frac{\text{Travel (in.)}}{\text{RPM} \times \text{Feed (per rev.)}}$$

$$\text{Travel} = \text{Sum of: } \frac{\begin{matrix} \text{Depth of Hole} \\ \text{1/3 Drill Diameter} \\ \text{Approach Clearance} \\ \text{Over Travel (through cavities)} \end{matrix}}{\text{Total Travel (in.)}}$$

### Drill Feeds

Diameter (in.)	Light Feeds	Heavy Feeds
1/8	.0005 - .0010	.0015
3/16	.0010 - .0015	.0020
1/4	.0015 - .0020	.0025
5/16	.0020 - .0025	.0030
7/16	.0025 - .0030	.0035
1/2	.0035 - .0040	.0045
5/8	.0045 - .0050	.0055
3/4	.0055 - .0060	.0065

The above are suggested ranges. Due to many variables in an operation, more optimum speed may be established through trial.



## Drill Speeds And Feeds Information - Carbide

Materials	Drill Speed (SFM)	Drill Diameter (IPR) Inches Inches Per Revolution		
		Up to 1/8"	Up to 1/4"	Up to 1/2"
Aluminum & Aluminum Alloys	300 - 500	.0005 - .002	.002 - .003	.003 - .007
Brass/Bronze	200 - 400	.0005 - .002	.002 - .003	.003 - .007
Cast Iron(S)	125 - 300	.0005 - .002	.002 - .003	.003 - .007
Cast Iron(H)	100 - 200	.0005 - .002	.002 - .003	.003 - .007
Copper	150 - 300	.0005 - .002	.002 - .003	.003 - .007
Ductile Iron	75 - 180	.0005 - .002	.002 - .003	.003 - .007
Fiber	200 - 300	.0005 - .002	.002 - .003	.003 - .007
Graphite	200 - 400	.0005 - .002	.002 - .003	.003 - .007
Magnesium	300 - 500	.0005 - .002	.002 - .003	.003 - .007
Malleable Iron	75 - 180	.0005 - .002	.002 - .003	.003 - .007
Nickel	75 - 180	.0005 - .002	.002 - .003	.003 - .007
Plastic	200 - 500	.0005 - .002	.002 - .003	.003 - .007
Plastic Glass Filled	75 - 180	.0005 - .002	.002 - .003	.003 - .007
Rubber	200 - 300	.0005 - .002	.002 - .003	.003 - .007
Stainless Steel (S)	100 - 300	.0005 - .002	.002 - .003	.003 - .007
Stainless Steel (H)	50 - 100	.0005 - .002	.002 - .003	.003 - .007
Steel Low Carbon	125 - 300	.0005 - .002	.002 - .003	.003 - .007
Steel Med. Carbon	100 - 180	.0005 - .002	.002 - .003	.003 - .007
Titanium	30 - 100	.0005 - .002	.002 - .003	.003 - .007
Tool Steel	50 - 100	.0005 - .002	.002 - .003	.003 - .007
Wood	125 - 300	.0005 - .002	.002 - .003	.003 - .007
Zinc	250 - 300	.0005 - .002	.002 - .003	.003 - .007

**Speed:** Factors affecting optimum Drill speeds depend on: Depth of hole, hardness of material, coolant, drill machine type, hole finish, and hole location.

**Feed:** Factors affecting feed rates are drill diameters, machinability of material, and depth of hole. Small drills, harder materials, and hole depths in excess of 3 - 4 times diameter require adjustment to suggested drill feed rates.

**WARNING: Rotary tools can shatter under improper or severe use. Persons in the vicinity of their use should be instructed to wear safety equipment.**

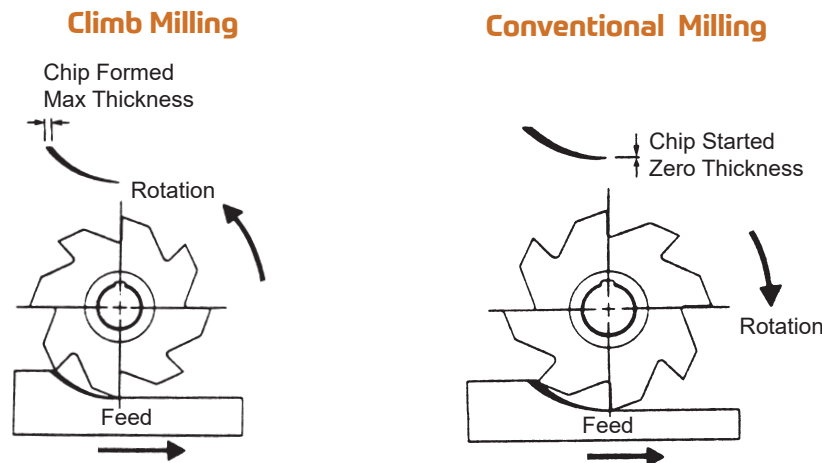
**Speed and Feed figures suggested should be considered starting points only.**



## Climb Milling

In **Conventional Milling**, the cutter revolves opposite to the direction of the table feed. Therefore the width of the chip starts at zero and increases to a maximum at the end of the cut. This can lead to accelerated tool wear under some conditions - Conventional Milling is recommended for hot rolled steel, surface hardened materials and steels with a surface scale. In Climb Milling, the cutter revolves in the same direction as the table feed. The tooth meets the work at the top of the cut, producing the thickest part of the chip first.

In **Horizontal Applications**, the resultant force created by Climb Milling can act as a clamping force, acting toward the machine table. It is important to make sure that the machine tool has no leadscrew backlash. Normally, Climb Milling improves the product surface finish and increases tool life.



## Advantages of Climb Milling

**Longer Tool Life:** Since the chips produced are deposited behind the cutter, tool life can be substantially increased.

**Ease of Fixturing:** Climb Milling exerts a downward clamping force on the workpiece and not an upward force, as in Conventional Milling, which results in simplified fixturing.

**Improved Surface Finish:** Since the chips are not carried by the cutter, less likelihood of marring the machined surface.

**Lower Power Requirements:** A higher rake angle can be utilized, lowering power consumption.

**Better Chip Evacuation:** Easier and faster chip removal since chips are deposited behind the cutter.

## Milling Time Formula

Find:	Have:	Formula:
Speed of Cutter in Surface Feet Per Minute (SFM)	Diameter of Cutter & Revolutions Per Minute (D + RPM)	$SFM = \frac{3.1416 \times D \times RPM}{12}$ or $SFM = D \times .26 \times RPM$
Revolutions Per Minute (RPM)	Surface Feet Per Minute & Diameter of Cutter (SFM + D)	$RPM = \frac{SFM \times 12}{3.1416 \times D}$ $RPM = \frac{SFM \times 3.82}{D}$
Feed in Inches Per Minute (F)	Feed Per Tooth, Number of Teeth & Revolutions Per Minute (f + T + RPM)	$F = f \times T \times RPM$
Feed per Tooth in Inches (FPT) or (f)	Feed in Inches Per Minute, Number of Teeth Revolutions (F + T + RPM)	$f = \frac{F}{T \times RPM}$
Horsepower (HP)	Depth of cut, Width of Cut, Feed in Inches Per Minute & Machinability Constant (d + W + F + C)	$HP = \frac{d \times W \times F}{C}$ $HP = \frac{d \times W \times T \times f \times RPM}{C}$

## Speeds & Feeds

Modern milling cutters capable of operating at higher feeds and speeds, and moving more cubic inches of metal per minute, require greater machine rigidity and more power. Therefore it is important to determine that enough power is available to handle the desired depth and width of cut at the higher feeds and speeds.

- T**= Number of teeth in cutter
- D**= Cutter diameter in inches
- RPM**= Revolutions per minute
- SFM**= Surface feet per minute
- F**= Feed in inches per minute
- f**= Feed per tooth in inches
- W**= Width of cut
- d**= Depth of cut
- HP**= Motor horsepower
- C**= Machinability constant

Machinability constant values for various materials are based on removing one cubic inch of metal per minute per horsepower with 60% power efficiency at the spindle nose and a 25% allowance for cutter dulling.

Material	
Aluminum, Magnesium, Dural	4.0 plus
Brass	2.5
Soft Bronze, Copper	2.0
Cast Iron	1.5
Steel up to 150 Brinell, Malleable Iron	0.75
Steel, 300 Brinell, Hard Bronze	0.6
Steel, 400 Brinell	0.5

# ***KEO-PAK***



## **What is a KEO-PAK?**

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