

# TBNK BALL NOSE END MILLS

For Copy Milling & Profiling



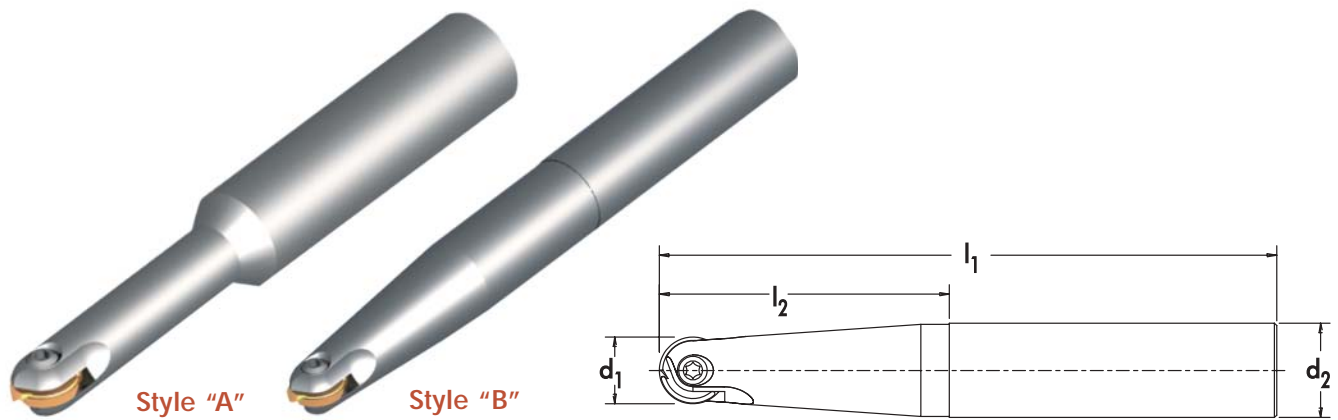
**NEW**

**ADVANCED HELICAL  
GROUND INSERT**

Features the  
innovative  
HG geometry  
for outstanding  
cutting performance



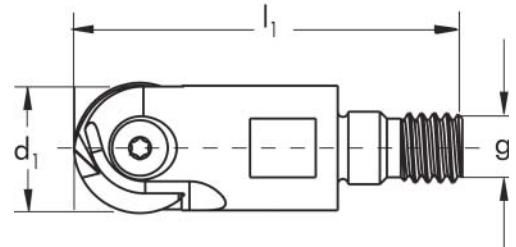
# TBNK BALL NOSE END MILLS



DESIGNATION	DIMENSIONS					INSERT	SPARE PARTS	
	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Style		Insert Screw	Wrench
TBNK-0312-55T	.312	.500	5.50	1.90	B	XCEG-2.51	KBN-08	214.80.866
TBNK-0375-35	.375	.500	3.56	1.34	A	XCCG-31.5 XCE_-31.5	KBN-10	214.99.010
TBNK-0375-58T	.375	.500	5.87	1.37	B			
TBNK-0500-35	.500	.500	3.56	1.25	A	XCCG-41.5-HG XCE_-41.5	KBN-15	214.80.824
TBNK-0500-51	.500	.500	5.12	1.25	A			
TBNK-0500-58	.500	.500	5.87	1.81	A			
TBNK-0500-62T	.500	.625	6.28	2.31	B			
TBNK-0625-55	.625	.625	5.50	1.37	A	XCCG-52-HG XCE_-52	KBN-15L	214.80.824
TBNK-0625-62	.625	.625	6.28	2.00	A			
TBNK-0625-68T	.625	.750	6.87	2.56	B			
TBNK-0750-45	.750	.750	4.50	1.75	A	XCCG-62-HG XCE_-62	KBN-20	214.80.994
TBNK-0750-62	.750	.750	6.28	1.75	A			
TBNK-0750-68	.750	.750	6.87	2.37	A			
TBNK-0750-75T	.750	1.000	7.50	3.00	B			
TBNK-0750-82	.750	0.750	8.25	2.37	A			
TBNK-0750-94T	.750	1.000	9.43	3.00	B			
TBNK-1000-62	1.000	1.000	6.28	1.75	A	XCCG-82.5-HG XCE_-82.5	KBN-25	214.99.025
TBNK-1000-75	1.000	1.000	7.50	2.75	A			
TBNK-1000-82T	1.000	1.250	8.25	3.87	B			
TBNK-1000-90	1.000	1.000	9.06	3.12	A			
TBNK-1000-94T	1.000	1.200	9.43	3.87	B			
TBNK-1250-68	1.250	1.250	6.87	2.18	A	XCCG-103-HG XCE_-103	KBN-25L	214.99.025
TBNK-1250-82	1.250	1.250	8.25	3.12	A			
TBNK-1250-94T	1.250	1.500	9.43	4.75	B			

REMEMBER TO USE COPASLIP® ANTI-SEIZE COMPOUND ON ALL INSERT SCREWS.

# TBNK SCREW-ON BALL NOSE CUTTERS



DESIGNATION	DIMENSIONS			INSERT	SPARE PARTS	
	d <sub>1</sub>	g	l <sub>1</sub>		Insert Screw	Wrench
TBNK-0375-TS	.375	M6	1.25	XCCG-31.5-HG XCE_-31.5	KBN-10	214.99.010
TBNK-0500-TS	.500	M6	1.25	XCCG-41.5-HG XCE_-41.5	KBN-15	214.80.824
TBNK-0625-TS	.625	M8	1.50	XCCG-52 XCE_-52	KBN-15L	214.80.824
TBNK-0750-TS	.750	M10	1.50	XCCG-62-HG XCE_-62	KBN-20	214.80.994
TBNK-1000-TS	1.000	M12	1.50	XCCG-82.5-HG XCE_-82.5	KBN-25	214.99.025

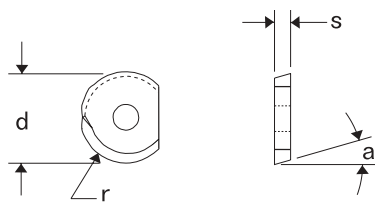
REMEMBER TO USE COPASLIP® ANTI-SEIZE COMPOUND ON ALL INSERT SCREWS.

## TBNK CUTTER FEATURES

- Positive cutting edge geometry for superior surface finishes, especially on inclined surfaces
- Inserts are precision ground to ensure precise milling
- Two cutter styles offer extended reach or extra rigid taper, and are available in diameters from 5/16" to 1 1/4"
- Screw-on mills, ranging in diameters from 3/8" to 1", allow for adaptation to modular screw-on systems
- Tools are designed to perform in conventional copy milling applications, as well as on advanced modern machining centres
- Leading edge technology produces superior finishes
- Eliminates solid carbide regrinds leading to cost effective machining
- High speed milling for reduced cycle times



# TBNK BALL NOSE INSERTS

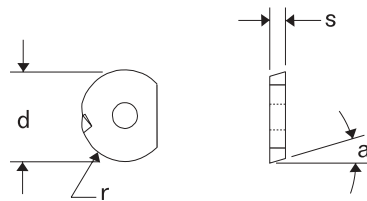


## XCCG- ... -HG

COATED

DESIGNATION	d	s	r	a	SLX	MPX	MPS
XCCG-31.5-HG	.375	.098	3/16	7°		●	●
XCCG-41.5-HG	.500	.098	1/4	7°		●	●
XCCG-52-HG	.625	.118	5/16	7°		●	●
XCCG-62-HG	.750	.118	3/8	7°		●	●
XCCG-82.5-HG	1.000	.157	1/2	7°		●	○
XCCG-103-HG	1.250	.197	5/8	7°		●	○

"○" denotes available upon request

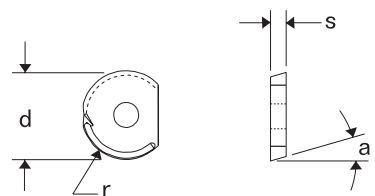


## XCEA- ...

COATED

DESIGNATION	d	s	r	a	SLX	MPX	MPS
XCEA-31.5	.375	.098	3/16	7°	●		●
XCEA-41.5	.500	.098	1/4	7°	●		●
XCEA-52	.625	.118	5/16	7°	●		●
XCEA-62	.750	.118	3/8	7°	●		●
XCEA-82.5	1.000	.157	1/2	7°	●		○
XCEA-103	1.250	.197	5/8	7°	●		○

"○" denotes available upon request



## XCEG- ...

COATED

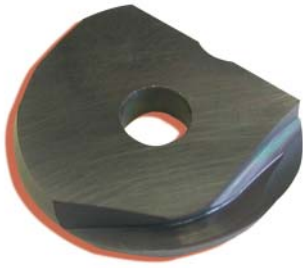
DESIGNATION	d	s	r	a	SLX	MPX	MPS
XCEG-2.51	.312	.078	5/32	7°	●		●
XCEG-31.5	.375	.098	3/16	7°	●		●
XCEG-41.5	.500	.098	1/4	7°	●		●
XCEG-52	.625	.118	5/16	7°	●		●
XCEG-62	.750	.118	3/8	7°	●		●
XCEG-82.5	1.000	.157	1/2	7°	●		○
XCEG-103	1.250	.197	5/8	7°	●		○

"○" denotes available upon request

# GEOMETRIES AND GRADES

## GEOMETRIES

### XCCG-HG



- Innovative precision ground helical chipbreaker
- Advanced high-positive cutting rake
- Achieve higher speeds & feeds
- Produces less deflection
- Better insert tolerance
- Improves surface finishes
- Better chip control
- Creates less pressure
- Increased wear resistance from coating, which also reduces insert chipping
- Suited for soft, gummy materials, i.e.; aluminum, brass, low carbon steels and stainless
- First choice geometry for light roughing to precision finishing applications

### XCEA



- Precision ground non-chipbreaker
- For finishing in high carbon, die and mold steels
- Strongest cutting edge design

### XCEG



- Precision ground with positive chipbreaker
- For soft gummy materials, i.e. aluminum, brass, low carbon steels and stainless
- Light roughing to semi-finishing
- Economical alternative to the helical ground chipbreaker

## GRADES

### MPX

- PVD AlTiN Coating (black) on a micro grain C3 substrate
- Suitable for dies, molds, and other fabricating tools that operate at high temperature
- Performs well in difficult to machine materials, i.e. titanium, nickel alloys, as well as steel alloys and cast iron
- Excels in high speed and dry machining applications where coolant is restricted, and machining of hardened steel
- Ideal for high speed, high temperature cutting applications
- Excellent malleability which makes inserts less susceptible to chipping
- Increased production with longer tool life
- High aluminum content in coating produces higher hardness and a smoother surface finish

### MPS

- PVD TiAlN coating (bronze) on a micro grain C3 substrate
- Provides extended toughness beyond working parameters of MPX
- Better suited for difficult to machine and hardened materials, i.e stainless steel
- Ideal for a variety of high temperature cutting applications in various materials
- Can be used in all machining operations where edge heat/temperature is generated
- Exceptional high temperature oxidation resistance

### SLX

- PVD AlTiN Coating (black) on a medium grain C5 substrate
- Good choice for machining all mold, die, and tool steels
- Tougher substrate is able to operate in harsher machining environments and can withstand more shock and vibration than MPX
- Can be used in light roughing to finishing operations

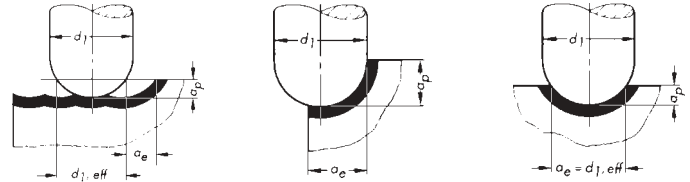
# TECHNICAL DATA

TABLE A: CUTTING DATA FOR TBNK BALL NOSE MILLING CUTTERS

Material Application	Grade	SFPM	FEED (IPR)
Carbon, Alloy and Tool Steels	SLX	350-600	.006"-.016"
Cast Steel	SLX	400-700	.006"-.020"
Steels, Irons and Graphite	MPX	600-1200	.005"-.020"
Stainless Steels and Refractory Alloys	MPX MPS	400-800	.003"-.010"
Aluminum, Titanium and Copper Alloys	MPX	500-1000	.010"-.020"

TABLE B: EFFECTIVE CUTTING DIAMETERS

Depth of cut $a_p$	Effective cutter diameter $d_{1,eff}$ for cutter nominal diameter $d_1$						
	.312	.375	.500	.625	.750	1.000	1.250
.010"	.110	.121	.140	.157	.172	.199	.223
.020"	.153	.169	.196	.220	.242	.280	.314
.035"	.197	.218	.255	.287	.316	.368	.412
.050"	.229	.255	.300	.339	.374	.436	.490
.075"	.267	.300	.357	.406	.450	.527	.594
.100"	.292	.332	.400	.458	.510	.600	.678
.125"	.306	.354	.433	.500	.559	.661	.750
.156"	.312	.370	.464	.541	.609	.726	.827
.188"	---	.375	.484	.573	.650	.781	.893
.250"	---	---	.500	.612	.707	.886	1.000
.312"	---	---	---	.625	.734	.927	1.082
.375"	---	---	---	---	.750	.968	1.146
.500"	---	---	---	---	---	1.000	1.225
.625"	---	---	---	---	---	---	1.250



## CUTTING DATA COMPENSATION

1. Select the diameter of the tool to be used
2. Determine the Depth of Cut ( $a_p$ ) to be used
3. Refer to Table B to determine the Effective Cutting Diameter  $d_{1,eff}$
4. Refer to Table A to determine the Surface Footage (SFPM) and Feed per Revolution (IPR)
5. Calculate the  $RPM = (SFPM \times 3.82) / d_{1,eff}$
6. Refer to Table C to determine the Feed Rate Adjustment Factor  
 $IPR_{ADJ} = IPR \times \text{Feed Rate Adjustment Factor}$
7. Calculate the IPM (Inches per Minute)  
 $IPM = RPM \times IPR_{ADJ}$

TABLE C: FEED RATE ADJUSTMENT FACTOR

Depth of cut $a_p$	For cutter nominal diameter $d_1$						
	.312	.375	.500	.625	.750	1.000	1.250
.010"	2.80	3.10	3.60	4.00	4.40	5.00	5.60
.020"	2.04	2.22	2.56	2.86	3.13	3.57	4.00
.035"	1.71	1.85	2.11	2.36	2.57	2.92	3.28
.050"	1.37	1.47	1.66	1.85	2.00	2.27	2.56
.075"	1.18	1.25	1.41	1.54	1.66	1.89	2.13
.100"	1.08	1.14	1.25	1.37	1.47	1.66	1.85
.125"	1.02	1.06	1.15	1.25	1.33	1.52	1.67
.156"	1.00	1.01	1.08	1.15	1.23	1.37	1.52
.188"	---	1.00	1.03	1.09	1.15	1.28	1.41
.250"	---	---	1.00	1.02	1.06	1.15	1.25
.312"	---	---	---	1.00	1.01	1.08	1.15
.375"	---	---	---	---	1.00	1.03	1.09
.500"	---	---	---	---	---	1.00	1.02
.625"	---	---	---	---	---	---	1.00

## TECHNICAL CONSIDERATIONS

- Always ensure that insert pockets are clean and free of debris or burrs
- Utilize holders that are stable and in good condition
- Clean and recoat screw with anti-seize lubricant during each index; replace screw after every 10 inserts
- For optimum results, replace holders after 100 inserts
- Hold the insert in place during the locking process; check for interference or damage
- Do not use a pipe or other extension to tighten the locking screw
- Generally speaking, drivers supplied with the tools provide proper torque
- If a torque wrench is available, follow the recommended torque specifications

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