TOOL-FLO

BALL NOSE

End Mills

BALLNOSE

Ball Nose End Mills

RIGID-LOCK
SERRATED LOCKING SYSTEM

Rigid-Lock Ball Nose Cutter Nomenclature Chart

TBN S C – 100 – 94 WT 750

end mill style

TBNS

- Finishing style ballnose end mill for precision milling applications
- Inserts are CNC ground to tolerance of +/- .0005 effective in the cutter
- Run at high speeds to reduce machining time by as much as 50%

TBDS

- Flat bottom/Back draft style for parts where square shoulders are required
- Inserts are CNC ground to tolerance of +/- .0005 effective in the cutter
- Run at high speeds to reduce machining time by as much as 50%

shank material

- C ■ Carbide Cored
- Z ■ Solid Carbide
- H ■ Heavy Metal
- S ■ Steel

coolant port

*not available in carbide shanks

shank diameter

overall length

shank type

- WT ■ Tapered
- WS ■ Straight

insert diameter

TOOL-FLO GUARANTEE

All above endmills feature our patented RIGID-LOCK serrated locking system. Precision ground serrations provide increased stability in the pocket and allow for increased speeds/feeds while preventing insert movement in the pocket. No insert movement means longer insert life as well as longer cutter body life. **Tool-Flo Mfg will replace any cutter body that experiences pocket wear***

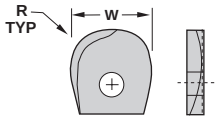
*excludes insert screw wear, or tools that have been crashed.

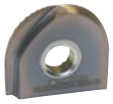
BALLNOSE

TBNR-N

Neutral-Rake Finishing Inserts

For cutter bodies see pg. 38, 39





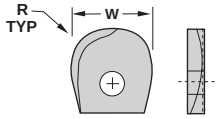
Insert Description	EDP Code	Dia	R	Uncoated C26S	TiN Coated GP26	AlTiN Coated ZS26S	AlTiN Coated ZS26	AlTiN Coated AC3	PCD Coated DX200	CBN Tipped* CB200
TBNR-250-N	TBNR250N	.250	.125	●		●	●	●	●	
TBNR-312-N	TBNR312N	.312	.156	●		●	●	●	●	
TBNR-375-N	TBNR375N	.375	.187	●		●	●	●	●	●
TBNR-500-N	TBNR500N	.500	.250	●		●	●	●	●	●
TBNR-625-N	TBNR625N	.625	.312	●		●	●	●	●	
TBNR-750-N	TBNR750N	.750	.375	●		●	●	●	●	●
TBNR-1000-N	TBNR1000N	1.000	.500	●		●	●	●	●	●
TBNR-1250-N	TBNR1250N	1.250	.625	●		●	●	●	●	

*CBN tipped inserts must run in machine with head tilted at 5° minimum

TBNR-P

Positive-Rake Finishing Inserts

For cutter bodies see pg. 38, 39



Insert Description	EDP Code	Dia	R	C26S	GP26	ZS26S	ZS26	AC3	DX200	CB200
TBNR-250-P	TBNR250P	.250	.125	●	●		●	●		
TBNR-312-P	TBNR312P	.312	.156	●	●		●	●		
TBNR-375-P	TBNR375P	.375	.187	●	●		●	●	●	
TBNR-500-P	TBNR500P	.500	.250	●	●		●	●	●	
TBNR-625-P	TBNR625P	.625	.312	●	●		●	●		
TBNR-750-P	TBNR750P	.750	.375	●	●		●	●	●	
TBNR-875-P	TBNR875P	.875	.437	●	●		●	●		
TBNR-1000-P	TBNR1000P	1.000	.500	●	●		●	●	●	
TBNR-1125-P*	TBNR1125P	1.125	.562		●		●	●		
TBNR-1250-P	TBNR1250P	1.250	.625		●		●	●		
TBNR-1500-P	TBNR1500P	1.500	.750		●		●	●		
TBNR-1625-P	TBNR1625P	1.625	.812		●		●	●	●	
TBNR-1750-P	TBNR1750P	1.750	.875		●		●	●		
TBNR-2000-P	TBNR2000P	2.000	1.000		●		●	●		
TBNR-2500-P	TBNR2500P	2.500	1.250		●		●	●		

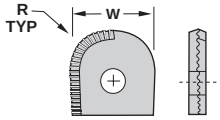
*Use in cutter for TBNR-1000P

TBXR-N

Neutral-Rake Roughing Inserts

Special Design for Roughing!

For cutter bodies see pg. 38, 39



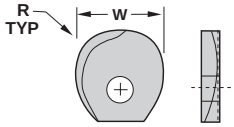
Insert Description	EDP Code	Dia	R	C26S	GP26	ZS26S	ZS26	AC3	DX200	CB200
TBXR-500-N	TBXR500N	.500	.250		●		●	●	●	
TBXR-625-N	TBXR625N	.625	.312		●		●	●		
TBXR-750-N	TBXR750N	.750	.375		●		●	●	●	
TBXR-875-N	TBXR875N	.875	.437		●		●	●		
TBXR-1000-N	TBXR1000N	1.000	.500		●		●	●	●	
TBXR-1250-N	TBXR1250N	1.250	.625		●		●	●		
TBXR-1500-N	TBXR1500N	1.500	.750		●		●	●		

SPHEROID STYLE

TBRR-P

Positive-Rake Finishing Inserts

For cutter bodies see pg. 38, 39



Insert Description	EDP Code	Dia	R	C26S	GP26	ZS26S	ZS26	AC3	DX200	CB200
TBRR-250-P	TBRR250P	.250	.125		●		●	●		
TBRR-312-P	TBRR312P	.312	.156		●		●	●		
TBRR-375-P	TBRR375P	.375	.187		●		●	●	●	
TBRR-500-P	TBRR500P	.500	.250		●		●	●	●	
TBRR-625-P	TBRR625P	.625	.312		●		●	●		
TBRR-750-P	TBRR750P	.750	.375	●	●		●	●	●	
TBRR-875-P	TBRR875P	.875	.437		●		●	●		
TBRR-1000-P	TBRR1000P	1.000	.500	●	●		●	●	●	
TBRR-1125-P*	TBRR1125P	1.125	.562		●		●	●		
TBRR-1250-P	TBRR1250P	1.250	.625		●		●	●		
TBRR-1500-P	TBRR1500P	1.500	.750		●		●	●		

*Use in cutter for TBRR-1000P

In an effort to improve our stock standard grade offering, there are periodic changes. Please see current price list for up -to- date grade offering.

● High performance choice in optimal conditions.
▲ Recommended grade under general conditions.

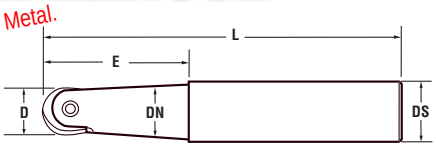
Cast Iron						●		
Non-Ferrous		▲				●		
Stainless/High Temp						●		
Steel						●		
Hardened Material						▲		
Composite						▲		

BALL NOSE

TBNS-WT

Available in Steel, Carbide Cored & Heavy Metal.

Tapered neck holders (Inch) w/coolant port



Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
3/4”	TBNSC-100-75WT750	TBNSC10075WT750	.750	3.000	7.500	1.000	3° Taper	TBNR/RR-750	STBN-6	K4
3/4”	TBNSC-100-94WT750	TBNSC10094WT750	.750	3.000	9.437	1.000	3° Taper	TBNR/RR-750	STBN-6	K4
1”	TBNSC-125-82WT1000	TBNSC12582WT1000	1.000	3.875	8.250	1.250	3° Taper	TBNR/RR-1000	STBN-7	K5
1”	TBNSC-125-94WT1000	TBNSC12594WT1000	1.000	3.875	9.437	1.250	3° Taper	TBNR/RR-1000	STBN-7	K5
1-1/4”	TBNSC-150-94WT1250	TBNSC15094WT1250	1.250	4.750	9.437	1.500	3° Taper	TBNR/RR-1250	STBN-8	K6

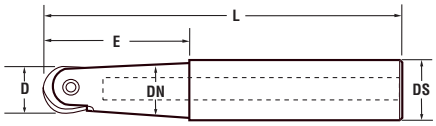
Tapered neck holders (Inch) without coolant port

Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
1/4”	TBNS-375-40WT250	TBNS37540WT250	.250	1.375	4.000	.375	3° Taper	TBNR/RR-250	STBN-1A	K2
5/16”	TBNS-500-50WT312	TBNS50050WT312	.312	1.906	5.000	.500	3° Taper	TBNR/RR-312	STBN-2	K3
3/8”	TBNS-500-50WT375	TBNS50050WT375	.375	1.375	5.000	.500	3° Taper	TBNR/RR-375	STBN-3	K3
1/2”	TBNS-625-60WT500	TBNS62560WT500	.500	2.312	6.000	.625	3° Taper	TBNR/RR-500	STBN-4	K3
5/8”	TBNS-750-68WT625	TBNS75068WT625	.625	2.562	6.875	.750	3° Taper	TBNR/RR-625	STBN-5	K3
3/4”	TBNS-100-75WT750	TBNS10075WT750	.750	3.000	7.500	1.000	3° Taper	TBNR/RR-750	STBN-6	K4
3/4”	TBNS-100-94WT750	TBNS10094WT750	.750	3.000	9.437	1.000	3° Taper	TBNR/RR-750	STBN-6	K4
1”	TBNS-125-82WT1000	TBNS12582WT1000	1.000	3.875	8.250	1.250	3° Taper	TBNR/RR-1000	STBN-7	K5
1”	TBNS-125-94WT1000	TBNS12594WT1000	1.000	3.875	9.437	1.250	3° Taper	TBNR/RR-1000	STBN-7	K5
1-1/4”	TBNS-150-94WT1250	TBNS15094WT1250	1.250	4.750	9.437	1.500	3° Taper	TBNR/RR-1250	STBN-8	K6

TBNC-WT

Carbide Cored Shank

Tapered neck holders (Inch) without coolant port

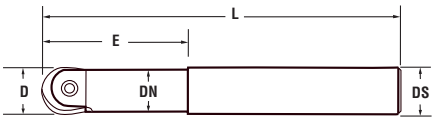


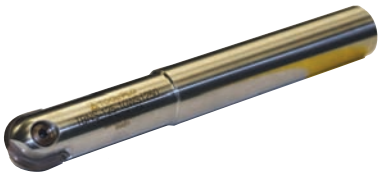
Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
5/8”	TBNC-750-68WT625	TBNC75068WT625	.625	2.562	6.875	.750	3° Taper	TBNR/RR-625	STBN-5	K3
3/4”	TBNC-100-75WT750	TBNC10075WT750	.750	3.000	7.500	1.000	3° Taper	TBNR/RR-750	STBN-6	K4
3/4”	TBNC-100-94WT750	TBNC10094WT750	.750	3.000	9.437	1.000	3° Taper	TBNR/RR-750	STBN-6	K4
1”	TBNC-125-82WT1000	TBNC12582WT1000	1.000	3.875	8.250	1.250	3° Taper	TBNR/RR-1000	STBN-7	K5
1”	TBNC-125-94WT1000	TBNC12594WT1000	1.000	3.875	9.437	1.250	3° Taper	TBNR/RR-1000	STBN-7	K5
1-1/4”	TBNC-150-94WT1250	TBNC15094WT1250	1.250	4.750	9.437	1.500	3° Taper	TBNR/RR-1250	STBN-8	K6

TBNS-WS

Available in Steel, Carbide Cored & Heavy Metal.

Straight neck holders (Inch) w/coolant port





Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
3/4”	TBNSC-750-45WS750	TBNSC75045WS750	.750	1.750	6.750	.750	.690	TBNR/RR-750	STBN-6	K4
3/4”	TBNSC-750-67WS750	TBNSC75067WS750	.750	2.375	6.750	.750	.690	TBNR/RR-750	STBN-6	K4
1”	TBNSC-100-62WS1000	TBNSC10062WS1000	1.000	1.750	6.281	1.000	.906	TBNR/RR-1000	STBN-7	K5
1”	TBNSC-100-75WS1000	TBNSC10075WS1000	1.000	2.750	7.500	1.000	.906	TBNR/RR-1000	STBN-7	K5
1-1/4”	TBNSC-125-10WS1250	TBNSC12510WS1250	1.250	3.850	10.000	1.250	1.142	TBNR/RR-1250	STBN-8	K6

Straight neck holders (Inch) without coolant port

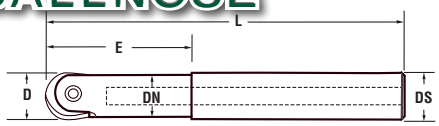
Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
1/4”	TBNS-375-40WS250	TBNS37540WS250	.250	.750	4.000	.375	.225	TBNR/RR-250	STBN-1A	K2
5/16”	TBNS-375-40WS312	TBNS37540WS312	.312	.750	4.000	.375	.281	TBNR/RR-312	STBN-2	K3
3/8”	TBNS-500-35WS375	TBNS50035WS375	.375	1.344	3.562	.500	.355	TBNR/RR-375	STBN-3	K3
1/2”	TBNS-500-35WS500	TBNS50035WS500	.500	1.250	3.562	.500	.470	TBNR/RR-500	STBN-4	K3
1/2”	TBNS-500-50WS500	TBNS50050WS500	.500	1.250	5.000	.500	.470	TBNR/RR-500	STBN-4	K3
5/8”	TBNS-625-55WS625	TBNS62555WS625	.625	1.375	5.500	.625	.551	TBNR/RR-625	STBN-5	K3
5/8”	TBNS-625-62WS625	TBNS62562WS625	.625	2.000	6.281	.625	.551	TBNR/RR-625	STBN-5	K3
3/4”	TBNS-750-45WS750	TBNS75045WS750	.750	1.750	4.500	.750	.690	TBNR/RR-750	STBN-6	K4
3/4”	TBNS-750-62WS750	TBNS75062WS750	.750	1.750	6.281	.750	.690	TBNR/RR-750	STBN-6	K4
3/4”	TBNS-750-67WS750	TBNS75067WS750	.750	2.375	6.750	.750	.690	TBNR/RR-750	STBN-6	K4
3/4”	TBNS-750-82WS750	TBNS75082WS750	.750	2.375	8.250	.750	.690	TBNR/RR-750	STBN-6	K4
7/8”	TBNS-100-62WS875	TBNS10062WS875	.875	1.750	6.281	1.000	.794	TBNR/RR-875	STBN-7	K5
1”	TBNS-100-62WS1000	TBNS10062WS1000	1.000	1.750	6.281	1.000	.906	TBNR/RR-1000	STBN-7	K5
1”	TBNS-100-75WS1000	TBNS10075WS1000	1.000	2.750	7.500	1.000	.906	TBNR/RR-1000	STBN-7	K5
1”	TBNS-100-90WS1000	TBNS10090WS1000	1.000	3.125	9.062	1.000	.906	TBNR/RR-1000	STBN-7	K5
1-1/4”	TBNS-125-10WS1250	TBNS12510WS1250	1.250	3.875	10.000	1.250	1.125	TBNR/RR-1250	STBN-8	K6
1-1/2”	TBNS-150-12WS1500	TBNS15012WS1500	1.500	4.000	12.000	1.500	1.375	TBNR/RR-1500	STBN-8	K6
1-5/8”	TBNS-162-12WS1625	TBNS16212WS1625	1.625	4.000	12.000	1.625	1.375	TBNR/RR-1625	STBN-9	K7
1-3/4”	TBNS-175-14WS1750	TBNS17514WS1750	1.750	5.000	14.000	1.750	1.500	TBNR/RR-1750	STBN-9	K7
2”	TBNS-200-16WS2000	TBNS20016WS2000	2.000	6.000	16.000	2.000	1.625	TBNR/RR-2000	STBN-10	K8
2-1/2”	TBNS-250-16WS2500	TBNS25016WS2500	2.500	6.000	16.000	2.500	2.125	TBNR/RR-2500	STBN-10	K8

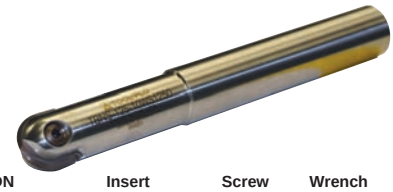
BALLNOSE

TBNC-WS

Carbide Cored Shank

Straight neck holders (Inch) without coolant port

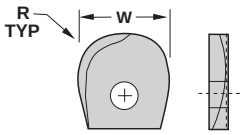


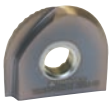


Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
1/2”	TBNC-500-35WS500	TBNC50035WS500	.500	1.250	3.562	.500	.470	TBNR/RR-500	STBN-4	K3
1/2”	TBNC-500-50WS500	TBNC50050WS500	.500	1.250	5.000	.500	.470	TBNR/RR-500	STBN-4	K3
5/8”	TBNC-625-55WS625	TBNC62555WS625	.625	1.375	5.500	.625	.551	TBNR/RR-625	STBN-5	K3
5/8”	TBNC-625-62WS625	TBNC62562WS625	.625	2.000	6.281	.625	.551	TBNR/RR-625	STBN-5	K3
3/4”	TBNC-750-45WS750	TBNC75045WS750	.750	1.750	4.500	.750	.709	TBNR/RR-750	STBN-6	K4
3/4”	TBNC-750-62WS750	TBNC75062WS750	.750	1.750	6.281	.750	.709	TBNR/RR-750	STBN-6	K4
3/4”	TBNC-750-67WS750	TBNC75067WS750	.750	2.375	6.750	.750	.709	TBNR/RR-750	STBN-6	K4
3/4”	TBNC-750-82WS750	TBNC75082WS750	.750	2.375	8.250	.750	.709	TBNR/RR-750	STBN-6	K4
7/8”	TBNC-100-62WS875	TBNC10062WS875	.875	2.375	6.281	1.000	.810	TBNR/RR-875	STBN-7	K5
1”	TBNC-100-62WS1000	TBNC10062WS1000	1.000	1.750	6.281	1.000	.906	TBNR/RR-1000	STBN-7	K5
1”	TBNC-100-75WS1000	TBNC10075WS1000	1.000	2.750	7.500	1.000	.906	TBNR/RR-1000	STBN-7	K5
1”	TBNC-100-90WS1000	TBNC10090WS1000	1.000	3.125	9.062	1.000	.906	TBNR/RR-1000	STBN-7	K5
1-1/4”	TBNC-125-10WS1250	TBNC12510WS1250	1.250	3.875	10.000	1.250	1.125	TBNR/RR-1250	STBN-8	K6
1-1/2”	TBNC-150-12WS1500	TBNC15012WS1500	1.500	4.000	12.000	1.500	1.375	TBNR/RR-1500	STBN-8	K6
1-5/8”	TBNC-162-12WS1625	TBNC16212WS1625	1.625	4.000	12.000	1.625	1.375	TBNR/RR-1625	STBN-9	K7
1-3/4”	TBNC-175-14WS1750	TBNC17514WS1750	1.750	5.000	14.000	1.750	1.500	TBNR/RR-1750	STBN-9	K7
2”	TBNC-200-16WS2000	TBNC20016WS2000	2.000	6.000	16.000	2.000	1.625	TBNR/RR-2000	STBN-10	K8
2-1/2”	TBNC-250-16WS2500	TBNC25016WS2500	2.500	6.000	16.000	2.500	2.125	TBNR/RR-2500	STBN-10	K8

TBNR-M-N

Neutral Rake - Finishing Insert (METRIC)





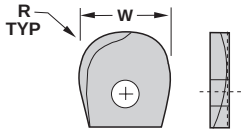
Cutter: TBNSC/TBNS/TBNC

Insert Description	EDP Code	Dia	R	Uncoated C26S	Uncoated GP26	TiN Coated ZS26S	TiN Coated ZS26	AlTiN Coated AC3	PCD Coated DX200	CBN Tipped* CB200
TBNR-10M-N	TBNR10MN	10,0	5,0	●		●	●			
TBNR-12M-N	TBNR12MN	12,0	6,0	●		●	●	●		
TBNR-16M-N	TBNR16MN	16,0	8,0	●		●	●			
TBNR-20M-N	TBNR20MN	20,0	10,0	●		●	●	●		
TBNR-25M-N	TBNR25MN	25,0	12,5	●		●	●	●		
TBNR-30M-N	TBNR30MN	30,0	15,0	●		●	●			
TBNR-32M-N	TBNR32MN	32,0	16,0	●		●	●			

*CBN tipped inserts must run in machine with head tilted at 5° minimum

TBNR-M-P

Positive Rake - Finishing Insert (METRIC)



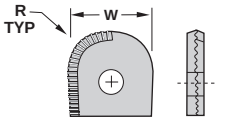
Cutter: TBNSC/TBNS/TBNC

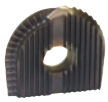
Insert Description	EDP Code	Dia	R	C26S	GP26	ZS26S	ZS26	AC3	DX200	CB200
TBNR-8M-P	TBNR8MP	8,0	4,0	●	●		●	●		
TBNR-10M-P	TBNR10MP	10,0	5,0	●	●		●	●		
TBNR-12M-P	TBNR12MP	12,0	6,0	●	●		●	●	●	
TBNR-16M-P	TBNR16MP	16,0	8,0	●	●		●	●		
TBNR-20M-P	TBNR20MP	20,0	10,0	●	●		●	●	●	
TBNR-25M-P	TBNR25MP	25,0	12,5	●	●		●	●	●	
TBNR-30M-P	TBNR30MP	30,0	15,0	●	●		●	●		
TBNR-32M-P	TBNR32MP	32,0	16,0	●	●		●	●		
TBNR-40M-P	TBNR40MP	40,0	20,0		●		●	●	●	
TBNR-50M-P	TBNR50MP	50,0	25,0		●		●	●	●	
TBNR-65M-P	TBNR65MP	65,0	32,5		●		●	●		

TBXR-M-N

Special Design for Roughing!

Neutral Rake - Roughing Insert (METRIC)





Cutter: TBNSC/TBNS/TBNC

Insert Description	EDP Code	Dia	R	C26S	GP26	ZS26S	ZS26	AC3	DX200	CB200
TBXR-16M-P	TBNR16MP	16,0	8,0	●	●		●	●		
TBXR-20M-P	TBNR20MP	20,0	10,0	●	●		●	●	●	
TBXR-25M-P	TBNR25MP	25,0	12,5	●	●		●	●	●	
TBXR-30M-P	TBNR30MP	30,0	15,0	●	●		●	●		
TBXR-32M-P	TBNR32MP	32,0	16,0	●	●		●	●		
TBXR-40M-P	TBNR40MP	40,0	20,0		●		●	●	●	

In an effort to improve our stock standard grade offering, there are periodic changes. Please see current price list for up -to- date grade offering.

● High performance choice in optimal conditions.
▲ Recommended grade under general conditions.

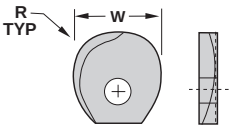
	C26S	GP26	ZS26S	ZS26	AC3	DX200	CB200
Cast Iron					●		
Non-Ferrous		▲			●		
Stainless/High Temp					●		
Steel					●		
Hardened Material					▲		
Composite							

SPHEROID STYLE

TBRR-M-P

Positive-Rake Finishing Insert - METRIC

Cutter: TBNSC/TBNS/TBNC



Insert Description	EDP Code	Dia	R	Uncoated C26S	TiN Coated GP26	AlTiN Coated ZS26S	AlTiN Coated ZS26	AlTiN Coated AC3	PCD Coated DX200	CBN Tipped* CB200
TBRR-8M-P	TBRR8MP	8,0	4,0		●		●	●		
TBRR-10M-P	TBRR10MP	10,0	5,0		●		●	●		
TBRR-12M-P	TBRR12MP	12,0	6,0		●		●	●	●	
TBRR-16M-P	TBRR16MP	16,0	8,0		●		●	●		
TBRR-20M-P	TBRR20MP	20,0	10,0		●		●	●	●	
TBRR-25M-P	TBRR25MP	25,0	12,5		●		●	●	●	
TBRR-30M-P	TBRR30MP	30,0	15,0		●		●	●		
TBRR-32M-P	TBRR32MP	32,0	16,0		●		●	●		

In an effort to improve our stock standard grade offering, there are periodic changes. Please see current price list for up -to- date grade offering.

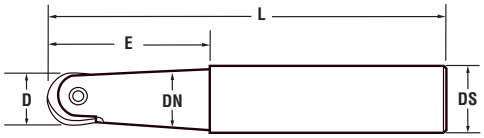
● High performance choice in optimal conditions.
▲ Recommended grade under general conditions.

	C26S	GP26	ZS26S	ZS26	AC3	DX200	CB200
Cast Iron					●		
Non-Ferrous		▲			●		
Stainless/High Temp					●		
Steel					●		
Hardened Material					▲		●
Composite					▲	●	

TBNS-WT

Tapered Neck Holder (METRIC) w/coolant port

Available in Steel, Carbide Cored & Heavy Metal.



Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
16mm	TBNSC-20M-175WT16	TBNSC20M175WT16	16,0	60,0	175,0	20,0	3° Taper	TBNR/RR-16M	STBN-5	K3
20mm	TBNSC-25M-200WT20	TBNSC25M200WT20	20,0	80,0	200,0	25,0	3° Taper	TBNR/RR-20M	STBN-6	K4
25mm	TBNSC-32M-225WT25	TBNSC32M225WT25	25,0	100,0	225,0	32,0	3° Taper	TBNR/RR-25M	STBN-7	K5
30mm	TBNSC-40M-225WT30	TBNSC40M225WT30	30,0	120,0	225,0	40,0	3° Taper	TBNR/RR-30M	STBN-8	K6
32mm	TBNSC-40M-225WT32	TBNSC40M225WT32	32,0	120,0	225,0	40,0	3° Taper	TBNR/RR-32M	STBN-8	K6

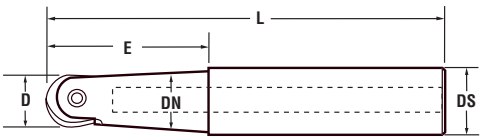
Tapered Neck Holder (METRIC) without coolant port

Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
8mm	TBNS-10M-125WT8	TBNS10M125WT8	8,0	35,0	125,0	10,0	3° Taper	TBNR/RR-8M	STBN-2	K3
10mm	TBNS-12M-125WT10	TBNS12M125WT10	10,0	35,0	125,0	12,0	3° Taper	TBNR/RR-10M	STBN-3	K3
12mm	TBNS-16M-160WT12	TBNS16M160WT12	12,0	60,0	160,0	16,0	3° Taper	TBNR/RR-12M	STBN-4	K3
16mm	TBNS-20M-180WT16	TBNS20M180WT16	16,0	60,0	180,0	20,0	3° Taper	TBNR/RR-16M	STBN-5	K3
20mm	TBNS-25M-190WT20	TBNS25M190WT20	20,0	80,0	190,0	25,0	3° Taper	TBNR/RR-20M	STBN-6	K4
20mm	TBNS-25M-230WT20	TBNS25M230WT20	20,0	80,0	230,0	25,0	3° Taper	TBNR/RR-20M	STBN-6	K4
25mm	TBNS-32M-210WT25	TBNS32M210WT25	25,0	100,0	210,0	32,0	3° Taper	TBNR/RR-25M	STBN-7	K5
25mm	TBNS-32M-240WT25	TBNS32M240WT25	25,0	100,0	240,0	32,0	3° Taper	TBNR/RR-25M	STBN-7	K5
30mm	TBNS-40M-250WT30	TBNS40M250WT30	30,0	120,0	250,0	40,0	3° Taper	TBNR/RR-30M	STBN-8	K6
32mm	TBNS-40M-250WT32	TBNS40M250WT32	32,0	120,0	250,0	40,0	3° Taper	TBNR/RR-32M	STBN-8	K6

TBNC-WT

Tapered Neck Holder (METRIC) without coolant port

Carbide Cored Shank

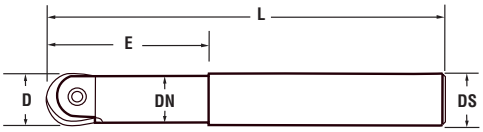


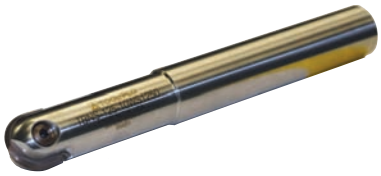
Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
16mm	TBNC-20M-180WT16	TBNC20M180WT16	16,0	60,0	180,0	20,0	3° Taper	TBNR/RR-16M	STBN-5	K3
20mm	TBNC-25M-190WT20	TBNC25M190WT20	20,0	80,0	190,0	25,0	3° Taper	TBNR/RR-20M	STBN-6	K4
20mm	TBNC-25M-230WT20	TBNC25M230WT20	20,0	80,0	230,0	25,0	3° Taper	TBNR/RR-20M	STBN-6	K4
25mm	TBNC-32M-210WT25	TBNC32M210WT25	25,0	100,0	210,0	32,0	3° Taper	TBNR/RR-25M	STBN-7	K5
25mm	TBNC-32M-240WT25	TBNC32M240WT25	25,0	100,0	240,0	32,0	3° Taper	TBNR/RR-25M	STBN-7	K5
30mm	TBNC-40M-250WT30	TBNC40M250WT30	30,0	120,0	250,0	40,0	3° Taper	TBNR/RR-30M	STBN-8	K6
32mm	TBNC-40M-250WT32	TBNC40M250WT32	32,0	120,0	250,0	40,0	3° Taper	TBNR/RR-32M	STBN-8	K6

TBNS-WS

Straight Neck Holder (METRIC) w/coolant port (RH only)

Available in Steel, Carbide Cored & Heavy Metal.





Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
20mm	TBNSC-20M-175WS20	TBNSC20M175WS20	20,0	45,0	175,0	20,0	18,0	TBNR/RR-20M	STBN-6	K4
25mm	TBNSC-25M-190WS25	TBNSC25M190WS25	25,0	70,0	190,0	25,0	23,0	TBNR/RR-25M	STBN-7	K5
32mm	TBNSC-32M-210WS32	TBNSC32M210WS32	32,0	80,0	210,0	32,0	27,2	TBNR/RR-32M	STBN-8	K6

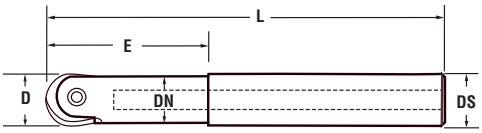
Straight Neck Holder (METRIC) without coolant port (RH only)

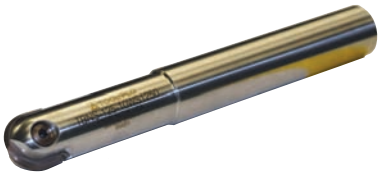
Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
8mm	TBNS-8M-100WS8	TBNS8M100WS8	8,0	19,0	100,0	8,0	7,5	TBNR/RR-8M	STBN-2	K3
10mm	TBNS-10M-100WS10	TBNS10M100WS10	10,0	19,0	100,0	10,0	9,0	TBNR/RR-10M	STBN-3	K3
12mm	TBNS-12M-130WS12	TBNS12M130WS12	12,0	36,0	130,0	12,0	10,5	TBNR/RR-12M	STBN-4	K3
12mm	TBNS-12M-150WS12	TBNS12M150WS12	12,0	46,0	150,0	12,0	10,5	TBNR/RR-12M	STBN-4	K3
16mm	TBNS-16M-140WS16	TBNS16M140WS16	16,0	36,0	140,0	16,0	14,0	TBNR/RR-16M	STBN-5	K3
16mm	TBNS-16M-160WS16	TBNS16M160WS16	16,0	36,0	160,0	16,0	14,0	TBNR/RR-16M	STBN-5	K3
20mm	TBNS-20M-160WS20	TBNS20M160WS20	20,0	45,0	160,0	20,0	18,0	TBNR/RR-20M	STBN-6	K4
20mm	TBNS-20M-175WS20	TBNS20M175WS20	20,0	45,0	175,0	20,0	18,0	TBNR/RR-20M	STBN-6	K4
25mm	TBNS-25M-160WS25	TBNS25M160WS25	25,0	45,0	160,0	25,0	23,0	TBNR/RR-25M	STBN-7	K5
25mm	TBNS-25M-190WS25	TBNS25M190WS25	25,0	70,0	190,0	25,0	23,0	TBNR/RR-25M	STBN-7	K5
30mm	TBNS-30M-175WS30	TBNS30M175WS30	30,0	56,0	175,0	30,0	27,2	TBNR/RR-30M	STBN-8	K6
30mm	TBNS-30M-210WS30	TBNS30M210WS30	30,0	80,0	210,0	30,0	27,2	TBNR/RR-30M	STBN-8	K6
32mm	TBNS-32M-175WS32	TBNS32M175WS32	32,0	56,0	175,0	32,0	27,2	TBNR/RR-32M	STBN-8	K6
32mm	TBNS-32M-210WS32	TBNS32M210WS32	32,0	80,0	210,0	32,0	27,2	TBNR/RR-32M	STBN-8	K6
40mm	TBNS-40M-305WS40	TBNS40M305WS40	40,0	101,0	305,0	32,0	35,0	TBNR/RR-40M	STBN-8	K6
50mm	TBNS-50M-406WS50	TBNS50M406WS50	50,0	152,0	406,0	50,0	41,0	TBNR/RR-50M	STBN-10	K8
65mm	TBNS-65M-406WS65	TBNS65M406WS65	65,0	152,0	406,0	65,0	54,0	TBNR/RR-65M	STBN-10	K8

TBNC-WS

Straight Neck Holder (METRIC) without coolant port (RH only)

Carbide Cored Shank





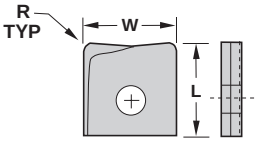
Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
12mm	TBNC-12M-130WS12	TBNC12M130WS12	12,0	36,0	130,0	12,0	10,5	TBNR/RR-12M	STBN-4	K3
12mm	TBNC-12M-150WS12	TBNC12M150WS12	12,0	46,0	150,0	12,0	10,5	TBNR/RR-12M	STBN-4	K3
16mm	TBNC-16M-140WS16	TBNC16M140WS16	16,0	36,0	140,0	16,0	14,0	TBNR/RR-16M	STBN-5	K3
16mm	TBNC-16M-160WS16	TBNC16M160WS16	16,0	36,0	160,0	16,0	14,0	TBNR/RR-16M	STBN-5	K3
20mm	TBNC-20M-160WS20	TBNC20M160WS20	20,0	45,0	160,0	20,0	18,0	TBNR/RR-20M	STBN-6	K4
20mm	TBNC-20M-175WS20	TBNC20M175WS20	20,0	45,0	175,0	20,0	18,0	TBNR/RR-20M	STBN-6	K4
25mm	TBNC-25M-160WS25	TBNC25M160WS25	25,0	45,0	160,0	25,0	23,0	TBNR/RR-25M	STBN-7	K5
25mm	TBNC-25M-190WS25	TBNC25M190WS25	25,0	70,0	190,0	25,0	23,0	TBNR/RR-25M	STBN-7	K5
30mm	TBNC-30M-175WS30	TBNC30M175WS30	30,0	56,0	175,0	30,0	27,2	TBNR/RR-30M	STBN-8	K6
30mm	TBNC-30M-210WS30	TBNC30M210WS30	30,0	80,0	210,0	30,0	27,2	TBNR/RR-30M	STBN-8	K6
32mm	TBNC-32M-175WS32	TBNC32M175WS32	32,0	56,0	175,0	32,0	27,2	TBNR/RR-32M	STBN-8	K6
32mm	TBNC-32M-210WS32	TBNC32M210WS32	32,0	80,0	210,0	32,0	27,2	TBNR/RR-32M	STBN-8	K6

FLAT BOTTOM STYLE

TBFI

Neutral Rake Finishing Insert - INCH

Cutter: TBDS & TBDC



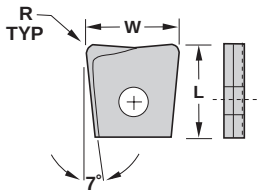
Size	Insert Description	EDP Code	W	R	L	Uncoated C26S	TiN Coated GP26	AlTiN Coated ZS26S	AlTiN Coated ZS26	AlTiN Coated AC3	PCD Coated DX200	CBN Tipped* CB200
1/2”	TBFI-500-02	TBDI50002	.500	.032	.500		●	●	●	●		●
1/2”	TBFI-500-04	TBFI50004	.500	.063	.500		●	●	●	●		●
5/8”	TBFI-625-02	TBFI62502	.625	.032	.580		●	●		●		
5/8”	TBFI-625-04	TBFI62504	.625	.063	.580		●		●	●		
3/4”	TBFI-750-02	TBFI75002	.750	.032	.642		●	●		●		●
3/4”	TBFI-750-04	TBFI75004	.750	.063	.642		●	●		●		●
1”	TBFI-1000-02	TBFI100002	1.000	.032	.867		●		●	●		●
1”	TBFI-1000-04	TBFI100004	1.000	.063	.867		●	●	●	●		●
1”	TBFI-1000-08	TBFI100008	1.000	.125	.867		●	●		●		●

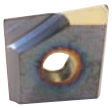
BACK DRAFT STYLE

TBDI

Neutral Rake Finishing Insert - INCH

Cutter: TBDS & TBDC





Size	Insert Description	EDP Code	W	R	L	C26S	GP26	ZS26S	ZS26	AC3	DX200	CB200
1/2”	TBDI-500-02	TBDI50002	.500	.032	.500		●	●	●	●		●
1/2”	TBDI-500-04	TBDI50004	.500	.063	.500		●	●	●	●		●
5/8”	TBDI-625-02	TBDI62502	.625	.032	.580		●	●		●		
5/8”	TBDI-625-04	TBDI62504	.625	.063	.580		●	●		●		
3/4”	TBDI-750-02	TBDI75002	.750	.032	.642		●		●	●		●
3/4”	TBDI-750-04	TBDI75004	.750	.063	.642		●	●	●	●		●
1”	TBDI-1000-02	TBDI100002	1.000	.032	.867		●		●	●		●
1”	TBDI-1000-04	TBDI100004	1.000	.063	.867		●		●	●		●
1”	TBDI-1000-08	TBDI100008	1.000	.125	.867		●		●	●		●

In an effort to improve our stock standard grade offering, there are periodic changes. Please see current price list for up to date grade offering.

● High performance choice in optimal conditions.
▲ Recommended grade under general conditions.

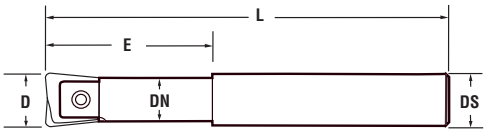
	C26S	GP26	ZS26S	ZS26	AC3	DX200	CB200
Cast Iron					●		
Non-Ferrous		▲			●		
Stainless/High Temp					●		
Steel					●		
Hardened Material					▲		●
Composite					▲	●	

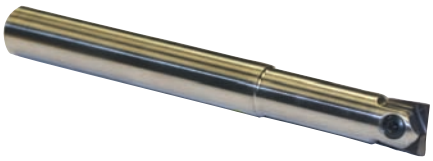
FLAT BOTTOM/ BACK DRAFT STYLE

TBDS-WS

Straight Neck Holder (INCH)

Use TBDI & TBFI Inserts Only





Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
1/2”	TBDS-500-59WS500	TBDS50059WS500	.500	1.890	5.980	.500	.413	TBDI / FI-500	STBN-4	K3 / T-10
5/8”	TBDS-625-63WS625	TBDS62563WS625	.625	2.160	6.380	.625	.551	TBDI / FI-625	STBN-5	K3 / T-10
3/4”	TBDS-750-68WS750	TBDS75068WS750	.750	2.480	6.890	.750	.709	TBDI / FI-750	STBN-6	K4 / T-20
1”	TBDS-100-74WS1000	TBDS10074WS1000	1.000	2.830	7.480	1.000	.882	TBDI / FI-1000	STBN-7	K5 / T-25

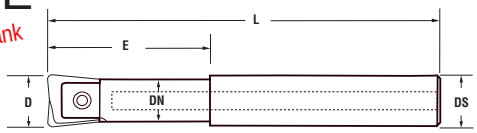
FLAT BOTTOM/ BACK DRAFT STYLE

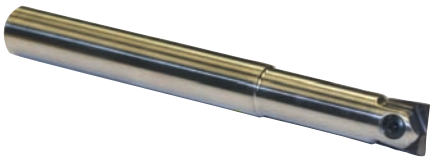
TBDC-WS

Carbide Cored Shank

Straight Neck Holder (INCH)

Use TBDI & TBFI Inserts Only



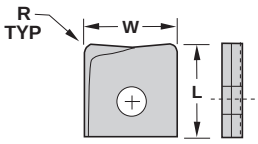


Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
1/2”	TBDC-500-59WS500	TBDC50059WS500	.500	1.890	5.980	.500	.413	TBDI / FI-500	STBN-4	K3 / T-10
5/8”	TBDC-625-63WS625	TBDC62563WS625	.625	2.160	6.380	.625	.551	TBDI / FI-625	STBN-5	K3 / T-10
3/4”	TBDC-750-68WS750	TBDC75068WS750	.750	2.480	6.890	.750	.709	TBDI / FI-750	STBN-6	K4 / T-20
1”	TBDC-100-74WS1000	TBDC10074WS1000	1.000	2.830	7.480	1.000	.882	TBDI / FI-1000	STBN-7	K5 / T-25

FLAT BOTTOM STYLE

TBFI

Neutral Rake Finishing Insert - METRIC



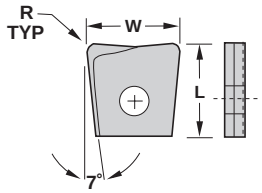
Cutter: TBDS & TBDC

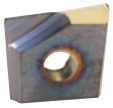
Size	Insert Description	EDP Code	W	R	L	Uncoated C26S	TiN Coated GP26	AlTiN Coated ZS26S	AlTiN Coated ZS26	AlTiN Coated AC3	PCD Coated DX200	CBN Tipped* CB200
8mm	TBFI-8M-02	TBDI8M02	8,0	(02) 0,81	12,7		●			●		●
8mm	TBFI-8M-04	TBFI8M04	8,0	(04) 1,60	12,7		●			●		●
16mm	TBFI-16M-02	TBFI16M02	16,0	(02) 0,81	14,7		●		●	●		
16mm	TBFI-16M-04	TBFI16M04	16,0	(04) 1,60	14,7		●			●		
20mm	TBFI-20M-02	TBFI20M02	20,0	(02) 0,81	16,3		●		●	●		●
20mm	TBFI-20M-04	TBFI20M04	20,0	(04) 1,60	16,3		●			●		●
25mm	TBFI-25M-02	TBFI25M02	25,0	(02) 0,81	22,0		●			●		●
25mm	TBFI-25M-04	TBFI25M04	25,0	(04) 1,60	22,0		●			●		●
25mm	TBFI-25M-08	TBFI25M08	25,0	(08) 3,18	22,0		●			●		●

BACK DRAFT STYLE

TBDI

Neutral Rake Finishing Insert - METRIC





Cutter: TBDS & TBDC

Size	Insert Description	EDP Code	W	R	L	C26S	GP26	ZS26S	ZS26	AC3	DX200	CB200
8mm	TBDI-8M-02	TBDI8M02	8,0	(02) 0,81	12,7		●			●		●
8mm	TBDI-8M-04	TBFI8M04	8,0	(04) 1,60	12,7		●			●		●
16mm	TBDI-16M-02	TBFI16M02	16,0	(02) 0,81	14,7		●		●	●		
16mm	TBDI-16M-04	TBFI16M04	16,0	(04) 1,60	14,7		●			●		
20mm	TBDI-20M-02	TBFI20M02	20,0	(02) 0,81	16,3		●		●	●		●
20mm	TBDI-20M-04	TBFI20M04	20,0	(04) 1,60	16,3		●			●		●
25mm	TBDI-25M-02	TBFI25M02	25,0	(02) 0,81	22,0		●			●		●
25mm	TBDI-25M-04	TBFI25M04	25,0	(04) 1,60	22,0		●			●		●
25mm	TBDI-25M-08	TBFI25M08	25,0	(08) 3,18	22,0		●			●		●

In an effort to improve our stock standard grade offering, there are periodic changes. Please see current price list for up to date grade offering.

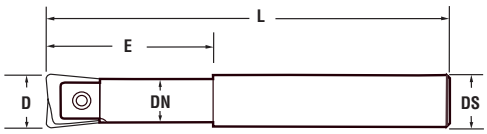
● High performance choice in optimal conditions.
▲ Recommended grade under general conditions.

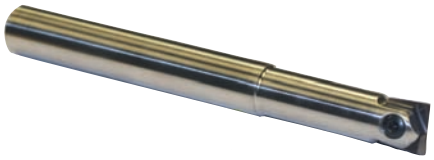
Cast Iron					●		
Non-Ferrous		▲			●		
Stainless/High Temp					●		
Steel					●		
Hardened Material					▲		●
Composite					▲	●	

FLAT BOTTOM/ BACK DRAFT STYLE

TBDS-WS

Straight Neck Holder (METRIC)





Use TBDI & TBFI Inserts Only

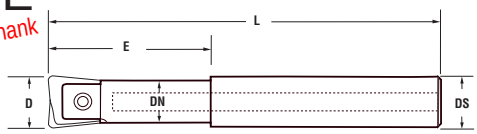
Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
8mm	TBDS-8M-59WS8	TBDS8M59WS8	8,0	48,0	151,9	8,0	10,5	TBDI / FI-8M	STBN-4	K3 / T-10
16mm	TBDS-16M-63WS16	TBDS16M63WS16	16,0	54,9	162,1	16,0	13,9	TBDI / FI-16M	STBN-5	K3 / T-10
20mm	TBDS-20M-68WS20	TBDS20M68WS20	20,0	62,9	175,0	20,0	18,0	TBDI / FI-20M	STBN-6	K4 / T-20
25mm	TBDS-25M-74WS25	TBDS25M74WS25	25,0	71,8	189,9	25,0	17,3	TBDI / FI-25M	STBN-7	K5 / T-25

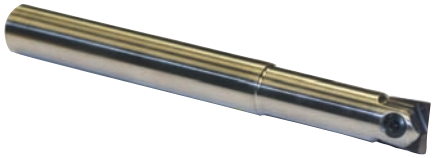
FLAT BOTTOM/ BACK DRAFT STYLE

TBDC-WS

Carbide Cored Shank

Straight Neck Holder (METRIC)





Use TBDI & TBFI Inserts Only

Size	Description	EDP Code	D	E	L	DS	DN	Insert	Screw	Wrench
8mm	TBDS-8M-59WS8	TBDS8M59WS8	8,0	48,0	151,9	8,0	10,5	TBDI / FI-8M	STBN-4	K3 / T-10
16mm	TBDS-16M-63WS16	TBDS16M63WS16	16,0	54,9	162,1	16,0	13,9	TBDI / FI-16M	STBN-5	K3 / T-10
20mm	TBDS-20M-68WS20	TBDS20M68WS20	20,0	62,9	175,0	20,0	18,0	TBDI / FI-20M	STBN-6	K4 / T-20
25mm	TBDS-25M-74WS25	TBDS25M74WS25	25,0	71,8	189,9	25,0	17,3	TBDI / FI-25M	STBN-7	K5 / T-25

BALLNOSE

RIGID-LOCK

Trouble Shooting

Problem	Solution	Problem	Solution	Problem	Solution	Problem	Solution	Problem	Solution
Insert is wearing prematurely	Decrease speed Increase feed Increase DOC	Insert is chipping	Use ZS26 grade Increase speed Decrease feed Decrease DOC Use Tapered Shank Use Neutral insert	Insert has built up edge	Increase speed Increase feed	Insert is wearing at center	Increase feed by 10% Decrease speed	Toolholder failure	Reduce feed Decrease tool extension Reduce DOC

RIGID-LOCK

Grade Description

Grades	Descriptions
C26S	Uncoated, tough, fine grain substrate with sharp edge. Ideal for plastics and soft materials that produce little or no heat.
ZS26	PVD AlTiN grade with a tough, fine grain substrate. FIRST CHOICE for general applications in steels, stainless, and high temp alloys. Excellent in low to high speeds and will handle interruptions and high feed rates. Coating provides highest resistance to oxidation, physical abrasion and chip welding. Dry machining capable.
ZS26S	Same as grade AT26 except with a sharper edge for light depths of cut in finishing operations. FIRST CHOICE for non-ferrous and composite materials at medium to high SFM.
CB400	PCBN tip brazed onto a carbide insert. To be used for roughing to finishing in hardened steels greater than 45 HRC such as bearing steel, hot and cold work tool steels, high-speed steels, die steels, case hardened steels, nitrided irons and some hard coatings.
DX200	CVD PCD coated grade. Excellent wear resistance in nonmetalic materials such as graphite, epoxy based resins and plastics. FIRST CHOICE in aluminum and composites at high SFM.

Chart 1

Feed, Speed and Diameter Information

Materials	Cast Iron		Steels				Stainless Steels		Nickel Based Alloys	Titanium	Aluminum
Materials	Grey	Nodular	Low Carbon up to 240 BHN	High Carbon Medium Tensile 240-300 BHN	High Alloy Tool Steel 300-400	Hard Steels 48-65 HRC	300 Series	400 Series	Inconel Waspalloy Hastalloy	6AL 4V	6061 T6 7075 T6
Insert Grades	ZS26	ZS26	ZS26	ZS26	ZS26	ZS26	ZS26	ZS26	ZS26	ZS26	ZS26S/C26S
Speed (SFPM)	500-1000	400-800	500-1000	400-800	300-600	125-300	300-700	400-800	100-200	200-300	1500-5000
Feed Rate (IPR)	.006/.020	.006/.020	.006/.016	.006/.016	.006/.016	.003/.009	.006/.012	.006/.014	.004/.010	.004/.011	.015/.035

Effective Cutting Diameter Information

The charts listed below are applicable when the depth of cut is less than the radius of the tool. The IPR can be increased as the DOC is reduced.

Chart 2 Select the effective diameter of the insert based on DOC

DOC	INSERT DIAMETER							
	0.250	0.312	0.375	0.500	0.625	0.750	1.000	1.250
0.020	0.136	0.153	0.169	0.196	0.220	0.242	0.280	0.314
0.050	0.200	0.229	0.255	0.300	0.339	0.374	0.436	0.490
0.075	0.229	0.267	0.300	0.357	0.406	0.450	0.527	0.594
0.100	0.245	0.292	0.332	0.400	0.458	0.510	0.600	0.678
0.125	0.250	0.306	0.354	0.433	0.500	0.559	0.661	0.750
0.156		0.312	0.370	0.463	0.541	0.609	0.726	0.826
0.188			0.375	0.484	0.573	0.650	0.781	0.893
0.250				0.500	0.612	0.707	0.866	1.000
0.312					0.625	0.739	0.927	1.082
0.375						0.750	0.968	1.146
0.500							1.000	1.225
0.625	Effective diameters for standard inserts at various DOC's							1.250

RPM = SFM X 3.82/Effective cutting diameter

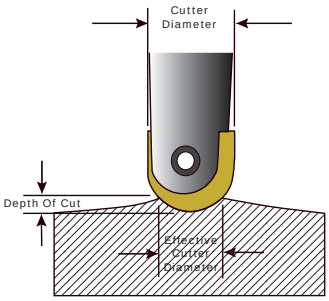


Chart 3 Feed - Multiply factor below times IPR in Chart 1 for adjusted IPR

DOC	INSERT DIAMETER							
	0.250	0.312	0.375	0.500	0.625	0.750	1.000	1.250
0.020	3.356	3.953	4.330	5.000	5.590	6.124	7.071	7.906
0.050	2.236	2.500	2.739	3.162	3.536	3.873	4.472	5.000
0.075	1.826	2.041	2.236	2.582	2.887	3.162	3.651	4.082
0.100	1.581	1.768	1.936	2.236	2.500	2.739	3.162	3.536
0.125	1.414	1.581	1.732	2.000	2.236	2.449	2.828	3.162
0.156		1.415	1.550	1.790	2.002	2.193	2.532	2.831
0.188			1.414	1.633	1.826	2.000	2.309	2.582
0.250				1.414	1.581	1.732	2.000	2.236
0.312					1.415	1.550	1.790	2.002
0.375						1.414	1.633	1.826
0.500							1.414	1.581
0.625								1.414

EXAMPLE

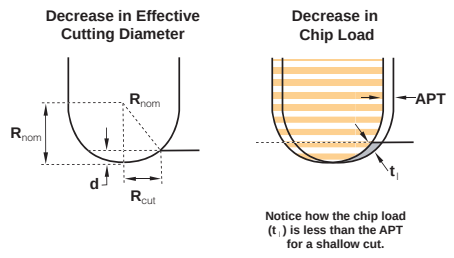
EFFECTIVE DIAMETER		
ACTUAL DIAMETER	DOC	EFFECTIVE DIAMETER
.750	.100	.510

EXAMPLE

ADJUSTED FEED RATE FOR ABOVE		
CHART 1 IPR	CHART 3 MULTIPLIER	ADJUSTED IPR
.008	2.739	.022

BALLNOSE

Shallow Cutting with Rigid-Lock Ball Nose End Mill



Formula for calculating the effective diameter of a cutter.

$$\text{Effective Diameter} = 2 \times \sqrt{R_{nom}^2 - (R_{nom} - d)^2}$$

Using your Rigid-Lock Ball Nose End Mill

Use Anti-seize grease every time an insert is changed.
Use positive geometry inserts on stainless, aluminum, titanium and Inconel.
Climb mill whenever possible.
Step over should be greater than depth of cut
Use TBFI inserts if work piece has a draft angle on the walls. TBDI inserts are for work pieces with straight walls.
Balance chipload, RPM, feed rate, tool extension, and material.
TBFI and TBDI inserts cannot plunge, ramp at 1˚ to 2˚ angle maximum.
1/4” and 5/16” endmills have a maximum feed rate of .006 to .008 per revolution and a .015 to .018 depth of cut.

Recommended torque specifications for Rigid-Lock insert screws

	INSERT SIZE			TORQUE	
	inch	metric	wrench	Nm/inch lbs.	anti-seize
STBN-1	1/4”	1/4”	K2/T-8	Manual	Yes
STBN-2	5/16”	8mm	K3/T-10	Manual	Yes
STBN-3	3/8”	10mm	K3/T-10	Manual	Yes
STBN-4	1/2”	12mm	K35/T-15	6.0/53	Yes
STBN-5	5/8”	16mm	K35/T-15	6.2/55	Yes
STBN-6/TS352	3/4”	20mm	K4/T-20	6.2/55	Yes
STBN-7/TS41	1”	25mm	K5/T-25	6.5/58	Yes
STBN-8/TS50	1-1/4”	32mm	K6/T-30	6.5/58	Yes
STBN-8	1-1/2”	38mm	K6/T-30	6.5/58	Yes
STBN-8	2”	55mm	K8/T-40	6.5/58	Yes
STBN-10	2-1/2”	63mm	K8/T-40	6.5/58	Yes

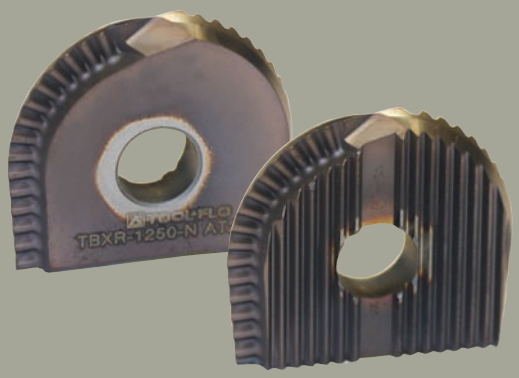
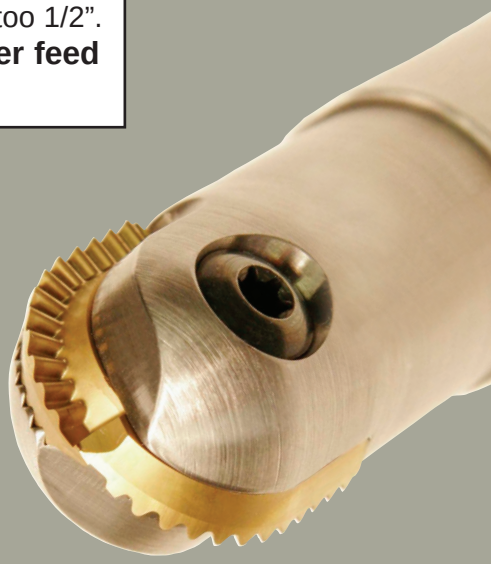
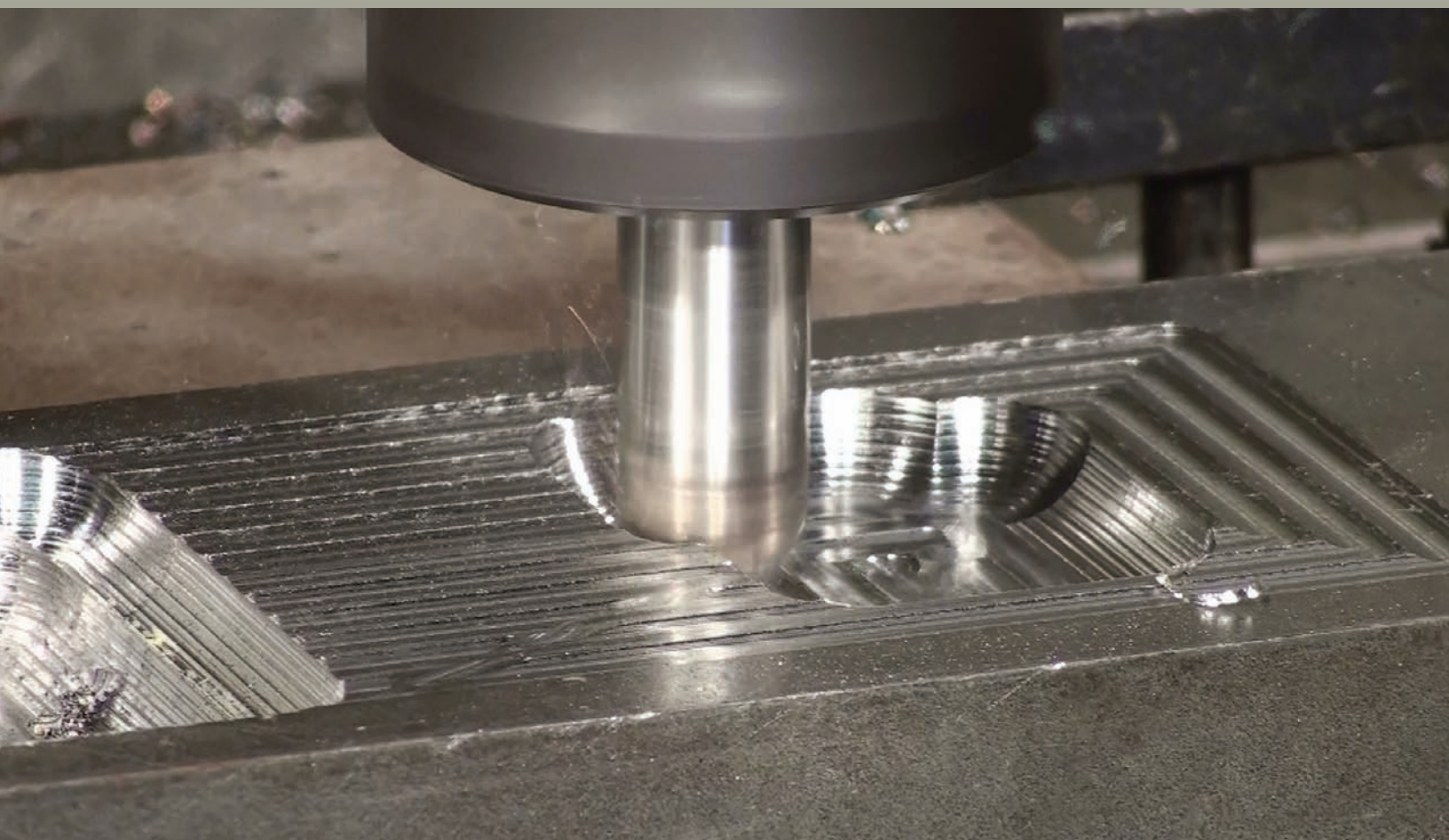
Using your Rigid-Lock Ball Nose End Mill for Roughing - TBXR

Adjust to your own cutting conditions.

Ex: Cutting 4140 material, 3/4 diameter ball nose insert, .010 chip load and .375 D.O.C.

Chip load per tooth: Should be a maximum of .007-.010.

Maximum Depth of Cut: Equal to half the raduis of the insert.

Ex. If you are using a 1” diameter insert, then the D.O.C. would be up too 1/2”.

For optimal tool life of our ballnose system, we recommend lighter feed rates and higher surface speeds.