



TOOLFLO



BEST
IN
CLASS

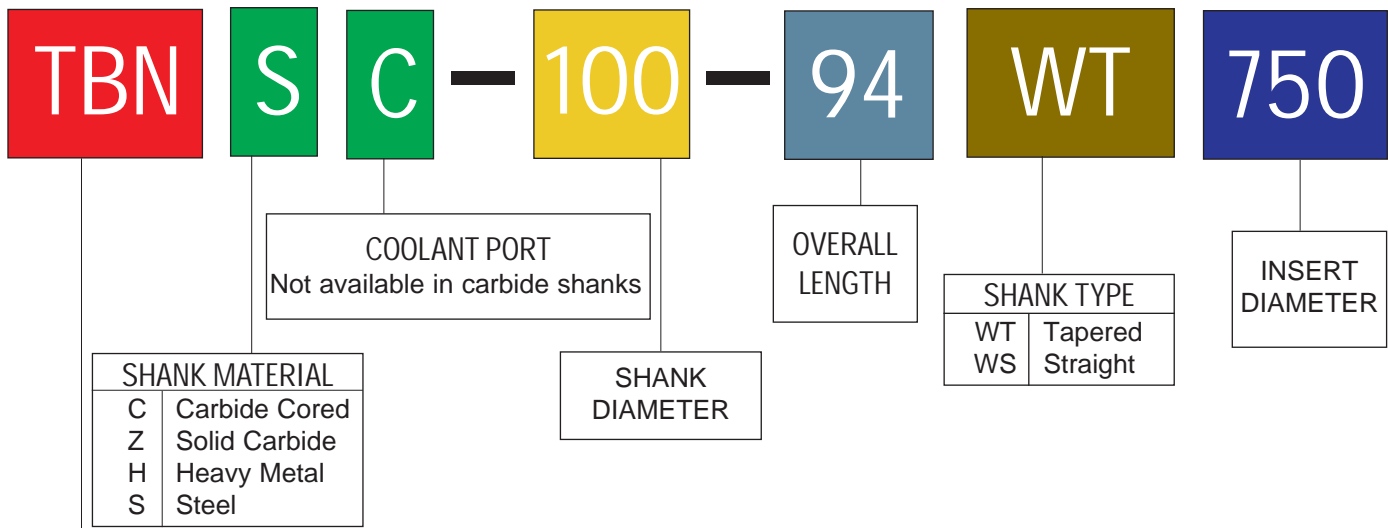
RIGID LOCK



RIGID-LOCK

Ball Nose End Mills

Rigid-Lock Ball Nose Cutter Nomenclature Chart



END MILL STYLE

TBNS Style End Mills

- Finishing style ball nose end mill for precision milling applications
- Inserts are CNC ground to tolerance of +/- .0005 effective in the cutter

TBDS Style End Mills

- 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%

TOOL-FLO GUARANTEE

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

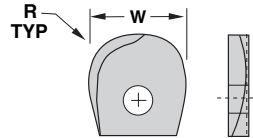
*excludes insert screw wear or tools that have been crashed



BALL NOSE

TBNR-N (Neutral-Rake Inserts)

CUTTER: TBNSC/TBNS/TBNC



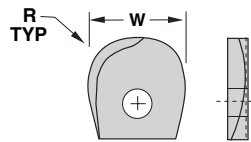
Insert Description	Dia	R	Coating						
			C26S	GP26	AT26S	AT26	DX200	CB200	
TBNR-250-N	.250	.125	●						
TBNR-312-N	.312	.156	●						
TBNR-375-N	.375	.187	●						
TBNR-500-N	.500	.250	●						
TBNR-625-N	.625	.312	●						
TBNR-750-N	.750	.375	●						
TBNR-1000-N	1.000	.500	●						
TBNR-1250-N	1.250	.625	●						

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

BALL NOSE

TBNR-P (Positive-Rake Inserts)

CUTTER: TBNSC/TBNS/TBNC

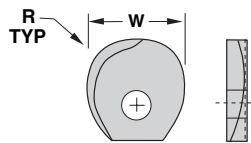


Insert Description	Dia	R	Coating						
			C26S	GP26	AT26S	AT26	DX200	CB200	
TBNR-250-P	.250	.125	●						
TBNR-312-P	.312	.156	●						
TBNR-375-P	.375	.187	●						
TBNR-500-P	.500	.250	●						
TBNR-625-P	.625	.312	●						
TBNR-750-P	.750	.375	●						
TBNR-875-P (Use in cutter for TBNR-750)	.875	.437	●						
TBNR-1000-P	1.000	.500	●						
TBNR-1125-P (Use in cutter for TBNR-1000)	1.125	.562	●						
TBNR-1250-P	1.250	.625	●						
TBNR-1500-P (Use in cutter for TBNR-1250)	1.500	.750	●						

BALL NOSE-Spheroid Style

TBRR-P (Positive-Rake Inserts)

CUTTER: TBNSC/TBNS/TBNC



Insert Description	Dia	R	Coating						
			C26S	GP26	AT26S	AT26	DX200	CB200	
TBRR-250-P	.250	.125	●						
TBRR-312-P	.312	.156	●						
TBRR-375-P	.375	.187	●						
TBRR-500-P	.500	.250	●						
TBRR-625-P	.625	.312	●						
TBRR-750-P	.750	.375	●						
TBRR-875-P (Use in cutter for TBRR-750)	.875	.437	●						
TBRR-1000-P	1.000	.500	●						
TBRR-1125-P (Use in cutter for TBRR-1000)	1.125	.562	●						
TBRR-1250-P	1.250	.625	●						
TBRR-1500-P (Use in cutter for TBRR-1250)	1.500	.750	●						

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.

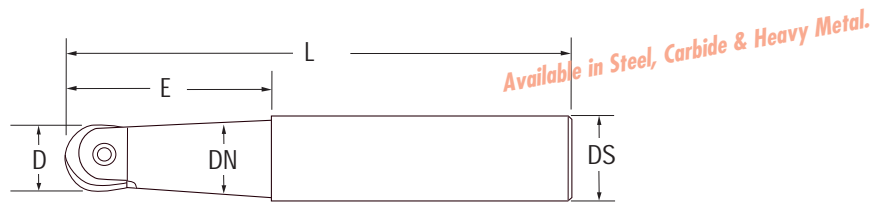
Material	C26S	GP26	AT26S	AT26	DX200	CB200
Cast Iron						●
Non-Ferrous	▲					●
Stainless/High Temp						●
Steel						●
Hardened Material				▲		
Composite						▲



BALL NOSE

TBNS-WT (Tapered Holders-Inches)

Tapered Neck with Coolant Port



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

Tapered Neck without Coolant Port

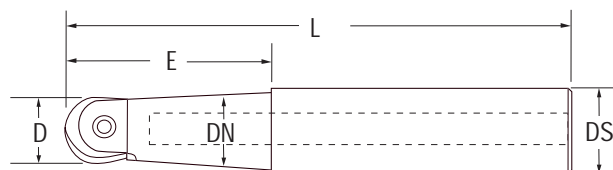
Size	Description	D	E	L	DS	DN	Insert	Screw	Wrench
1/4"	TBNS-375-40WT250	.250	1.375	4.000	.375	3° Taper	TBNR-250	STBN-1	K2
5/16"	TBNS-500-50WT312	.312	1.906	5.000	.500	3° Taper	TBNR-312	STBN-2	K3
3/8"	TBNS-500-50WT375	.375	1.375	5.000	.500	3° Taper	TBNR-375	STBN-3	K3
1/2"	TBNS-625-60WT500	.500	2.312	6.000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

BALL NOSE

TBNC-WT (Tapered Holders-Inches)

Straight Neck without Coolant Port

Carbide Cored Shank

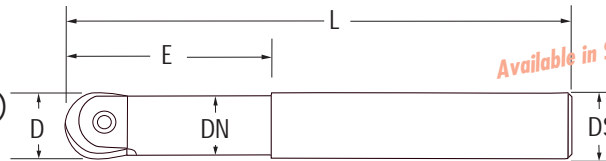


Size	Description	D	E	L	DS	DN	Insert	Screw	Wrench
5/8"	TBNC-750-68WT625	.625	2.562	6.875	.750	3° Taper	TBNR-625	STBN-5	K3
3/4"	TBNC-100-75WT750	.750	3.000	7.500	1.000	3° Taper	TBNR-750	STBN-6	K4
3/4"	TBNC-100-94WT750	.750	3.000	9.437	1.000	3° Taper	TBNR-750	STBN-6	K4
1"	TBNC-125-82WT1000	1.000	3.875	8.250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



BALL NOSE

TBNS-WS (Straight Holders-Inches)



Available in Steel, Carbide & Heavy Metal.

Straight Neck with Coolant Port

Size	Description	D	E	L	DS	DN	Insert	Screw	Wrench	
3/4"	TBNSC-750-67WS750	.750	2.375	6.750	.750	.750	.709	TBNR-750	STBN-6	K4
1"	TBNSC-100-75WS1000	1.000	2.750	7.500	1.000	1.000	.906	TBNR-1000	STBN-7	K5

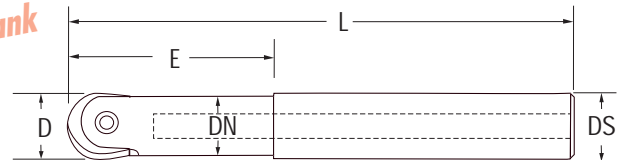
Straight Neck without Coolant Port

Size	Description	D	E	L	DS	DN	Insert	Screw	Wrench
1/4"	TBNS-375-40WS250	.250	.750	4.000	.375	.225	TBNR-250	STBN-1	K2
5/16"	TBNS-375-40WS312	.312	.750	4.000	.375	.281	TBNR-312	STBN-2	K3
3/8"	TBNS-500-35WS375	.375	1.344	3.562	.500	.335	TBNR-375	STBN-3	K3
1/2"	TBNS-500-35WS500	.500	1.250	3.562	.500	.413	TBNR-500	STBN-4	K3
1/2"	TBNS-500-50WS500	.500	1.250	5.000	.500	.413	TBNR-500	STBN-4	K3
5/8"	TBNS-625-55WS625	.625	1.375	5.500	.625	.551	TBNR-625	STBN-5	K3
5/8"	TBNS-625-62WS625	.625	2.000	6.281	.625	.551	TBNR-625	STBN-5	K3
3/4"	TBNS-750-45WS750	.750	1.750	4.500	.750	.709	TBNR-750	STBN-6	K4
3/4"	TBNS-750-62WS750	.750	1.750	6.281	.750	.709	TBNR-750	STBN-6	K4
3/4"	TBNS-750-67WS750	.750	2.375	6.750	.750	.709	TBNR-750	STBN-6	K4
3/4"	TBNS-750-82WS750	.750	2.375	8.250	.750	.709	TBNR-750	STBN-6	K4
7/8"	TBNS-100-62WS875	.875	2.375	6.281	1.000	.910	TBNR-875	STBN-7	K5
1"	TBNS-100-62WS1000	1.000	1.750	6.281	1.000	.906	TBNR-1000	STBN-7	K5
1"	TBNS-100-75WS1000	1.000	2.750	7.500	1.000	.906	TBNR-1000	STBN-7	K5
1"	TBNS-100-90WS1000	1.000	3.125	9.062	1.000	.906	TBNR-1000	STBN-7	K5
1-1/4"	TBNS-125-10WS1250	1.250	3.875	10.000	1.250	1.125	TBNR-1250	STBN-8	K6
1-1/2"	TBNS-150-12WS1500	1.500	4.000	12.000	1.500	1.375	TBNR-1500	STBN-8	K6

BALL NOSE

TBNC-WS (Straight Holders-Inches)

Carbide Cored Shank



Straight Neck without Coolant Port

Size	Description	D	E	L	DS	DN	Insert	Screw	Wrench
1/2"	TBNC-500-35WS500*	.500	1.250	3.562	.500	.413	TBNR-500	STBN-4	K3
1/2"	TBNC-500-50WS500*	.500	1.250	5.000	.500	.413	TBNR-500	STBN-4	K3
5/8"	TBNC-625-55WS625	.625	1.375	5.500	.625	.551	TBNR-625	STBN-5	K3
5/8"	TBNC-625-62WS625	.625	2.000	6.281	.625	.551	TBNR-625	STBN-5	K3
3/4"	TBNC-750-45WS750	.750	1.750	4.500	.750	.709	TBNR-750	STBN-6	K4
3/4"	TBNC-750-62WS750	.750	1.750	6.281	.750	.709	TBNR-750	STBN-6	K4
3/4"	TBNC-750-67WS750	.750	2.375	6.750	.750	.709	TBNR-750	STBN-6	K4
3/4"	TBNC-750-82WS750	.750	2.375	8.250	.750	.709	TBNR-750	STBN-6	K4
7/8"	TBNC-100-62WS875	.875	2.375	6.281	1.000	.810	TBNR-875	STBN-7	K5
1"	TBNC-100-62WS1000	1.000	1.750	6.281	1.000	.906	TBNR-1000	STBN-7	K5
1"	TBNC-100-75WS1000	1.000	2.750	7.500	1.000	.906	TBNR-1000	STBN-7	K5
1"	TBNC-100-90WS1000	1.000	3.125	9.062	1.000	.906	TBNR-1000	STBN-7	K5
1-1/4"	TBNC-125-10WS1250	1.250	3.875	10.000	1.250	1.125	TBNR-1250	STBN-8	K6
1-1/2"	TBNC-150-12WS1500	1.500	4.000	12.000	1.500	1.375	TBNR-1500	STBN-8	K6

*Solid carbide shank

40

RIGID-LOCK

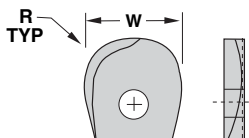
Ball Nose End Mills



BALL NOSE

TBNR-M-N (Neutral-Rake Inserts-Metric)

CUTTER: TBNSC/TBNS/TBNC



Insert Description

Insert Description	Dia	R	C26S	GP26	AT26S	AT26	DX200	CB200
TBNR-10M-N	10,0	5,0	●			●		
TBNR-12M-N	12,0	6,0	●			●		●
TBNR-16M-N	16,0	8,0	●			●		
TBNR-20M-N	20,0	10,0	●			●		●
TBNR-25M-N	25,0	12,5	●			●		●
TBNR-30M-N	30,0	15,0	●			●		
TBNR-32M-N	32,0	16,0	●			●		

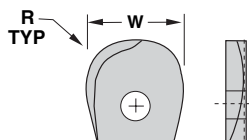
*CBN tipped inserts must run in machine with head tilted at 5° minimum

Uncoated	TIN Coated	AlTiN Coated	PCD Coated	CBN Tipped*

BALL NOSE

TBNR-M-P (Positive-Rake Inserts-Metric)

CUTTER: TBNSC/TBNS/TBNC



Insert Description

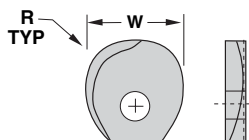
Insert Description	Dia	R	C26S	GP26	AT26S	AT26	DX200	CB200
TBNR-8M-P	8,0	4,0	●			●		
TBNR-10M-P	10,0	5,0	●			●		
TBNR-12M-P	12,0	6,0	●			●	●	
TBNR-16M-P	16,0	8,0	●			●		
TBNR-20M-P	20,0	10,0	●			●	●	
TBNR-25M-P	25,0	12,5	●			●	●	
TBNR-30M-P	30,0	15,0	●			●		
TBNR-32M-P	32,0	16,0	●			●		

Uncoated	TIN Coated	AlTiN Coated	PCD Coated	CBN Tipped*

BALL NOSE-Spheroid Style

TBRR-M-P (Positive-Rake Inserts-Metric)

CUTTER: TBNSC/TBNS/TBNC



Insert Description

Insert Description	Dia	R	C26S	GP26	AT26S	AT26	DX200	CB200
TBRR-8M-P	8,0	4,0	●			●		
TBRR-10M-P	10,0	5,0	●			●		
TBRR-12M-P	12,0	6,0	●			●	●	
TBRR-16M-P	16,0	8,0	●			●		
TBRR-20M-P	20,0	10,0	●			●	●	
TBRR-25M-P	25,0	12,5	●			●	●	
TBRR-30M-P	30,0	15,0	●			●		
TBRR-32M-P	32,0	16,0	●			●		

Uncoated	TIN Coated	AlTiN Coated	PCD Coated	CBN Tipped*

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 (Tapered Holders-Metric)

Tapered Neck with Coolant Port



Size	Description	D	E	L	DS	DN	Insert	Screw	Wrench
20mm	TBNSC-25M-200WT20	20,0	80,0	200,0	25,0	3° Taper	TBNR-20M	STBN-6	K4
25mm	TBNSC-32M-225WT25	25,0	100,0	225,0	32,0	3° Taper	TBNR-25M	STBN-7	K5
30mm	TBNSC-40M-225WT30	30,0	120,0	225,0	40,0	3° Taper	TBNR-30M	STBN-7	K5
32mm	TBNSC-40M-225WT32	32,0	120,0	225,0	40,0	3° Taper	TBNR-32M	STBN-8	K6

Tapered Neck without Coolant Port

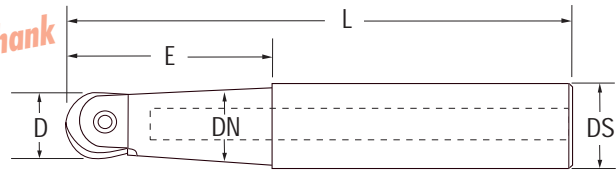
Size	Description	D	E	L	DS	DN	Insert	Screw	Wrench
8mm	TBNS-10M-125WT8	8,0	35,0	125,0	10,0	3° Taper	TBNR-8M	STBN-2	K3
10mm	TBNS-12M-125WT10	10,0	35,0	125,0	12,0	3° Taper	TBNR-10M	STBN-3	K3
12mm	TBNS-16M-160WT12	12,0	60,0	160,0	16,0	3° Taper	TBNR-12M	STBN-4	K3
16mm	TBNS-20M-180WT16	16,0	60,0	180,0	20,0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

BALL NOSE

TBNC-WT (Tapered Holders-Metric)

Tapered Neck without Coolant Port

Carbide Cored Shank



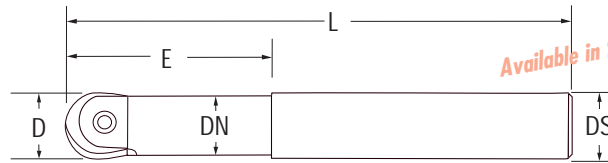
Size	Description	D	E	L	DS	DN	Insert	Screw	Wrench
16mm	TBNC-20M-180WT16	16,0	60,0	180,0	20,0	3° Taper	TBNR-16M	STBN-5	K3
20mm	TBNC-25M-190WT20	20,0	80,0	190,0	25,0	3° Taper	TBNR-20M	STBN-6	K4
20mm	TBNC-25M-230WT20	20,0	80,0	230,0	25,0	3° Taper	TBNR-20M	STBN-6	K4
25mm	TBNC-32M-210WT25	25,0	100,0	210,0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



BALL NOSE

TBNS-WS (Straight Holders-Metric)

Straight Neck with Coolant Port (RH Only)

*Available in Steel, Carbide & Heavy Metal.*

Size	Description	D	E	L	DS	DN	Insert	Screw	Wrench
25mm	TBNSC-25M-190WS25	25,0	70,0	190,0	25,0	23,0	TBNR-25M	STBN-7	K5
32mm	TBNSC-32M-210WS32	32,0	80,0	210,0	32,0	27,2	TBNR-32M	STBN-8	K6

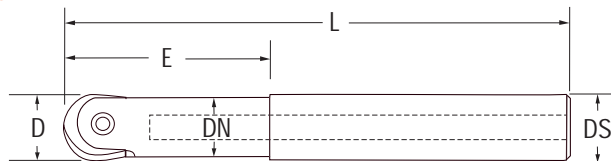
Straight Neck without Coolant Port (RH Only)

Size	Description	D	E	L	DS	DN	Insert	Screw	Wrench
8mm	TBNS-8M-100WS8	8,0	19,0	100,0	8,0	7,5	TBNR-8M	STBN-2	K3
10mm	TBNS-10M-100WS10	10,0	19,0	100,0	10,0	9,0	TBNR-10M	STBN-3	K3
12mm	TBNS-12M-130WS12	12,0	36,0	130,0	12,0	10,5	TBNR-12M	STBN-4	K3
12mm	TBNS-12M-150WS12	12,0	46,0	150,0	12,0	10,5	TBNR-12M	STBN-4	K3
16mm	TBNS-16M-140WS16	16,0	36,0	140,0	16,0	14,0	TBNR-16M	STBN-5	K3
16mm	TBNS-16M-160WS16	16,0	36,0	160,0	16,0	14,0	TBNR-16M	STBN-5	K3
20mm	TBNS-20M-160WS20	20,0	45,0	160,0	20,0	18,0	TBNR-20M	STBN-6	K4
20mm	TBNS-20M-175WS20	20,0	45,0	175,0	20,0	18,0	TBNR-20M	STBN-6	K4
25mm	TBNS-25M-160WS25	25,0	45,0	160,0	25,0	23,0	TBNR-25M	STBN-7	K5
25mm	TBNS-25M-190WS25	25,0	70,0	190,0	25,0	23,0	TBNR-25M	STBN-7	K5
30mm	TBNS-30M-175WS30	30,0	56,0	175,0	30,0	27,2	TBNR-30M	STBN-7	K5
30mm	TBNS-30M-210WS30	30,0	80,0	210,0	30,0	27,2	TBNR-30M	STBN-7	K5
32mm	TBNS-32M-175WS32	32,0	56,0	175,0	32,0	27,2	TBNR-32M	STBN-8	K6
32mm	TBNS-32M-210WS32	32,0	80,0	210,0	32,0	27,2	TBNR-32M	STBN-8	K6

BALL NOSE

TBNC-WS (Straight Holders-Metric)

Straight Neck without Coolant Port (RH Only)

*Carbide Cored Shank*

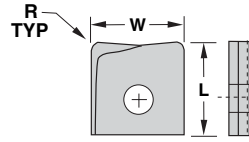
Size	Description	D	E	L	DS	DN	Insert	Screw	Wrench
12mm	TBNC-12M-130WS12*	12,0	36,0	130,0	12,0	10,5	TBNR-12M	STBN-4	K3
12mm	TBNC-12M-150WS12*	12,0	46,0	150,0	12,0	10,5	TBNR-12M	STBN-4	K3
16mm	TBNC-16M-140WS16	16,0	36,0	140,0	16,0	14,0	TBNR-16M	STBN-5	K3
16mm	TBNC-16M-160WS16	16,0	36,0	160,0	16,0	14,0	TBNR-16M	STBN-5	K3
20mm	TBNC-20M-160WS20	20,0	45,0	160,0	20,0	18,0	TBNR-20M	STBN-6	K4
20mm	TBNC-20M-175WS20	20,0	45,0	175,0	20,0	18,0	TBNR-20M	STBN-6	K4
25mm	TBNC-25M-160WS25	25,0	45,0	160,0	25,0	23,0	TBNR-25M	STBN-7	K5
25mm	TBNC-25M-190WS25	25,0	70,0	190,0	25,0	23,0	TBNR-25M	STBN-7	K5
30mm	TBNC-30M-175WS30	30,0	56,0	175,0	30,0	27,2	TBNR-30M	STBN-7	K5
30mm	TBNC-30M-210WS30	30,0	80,0	210,0	30,0	27,2	TBNR-30M	STBN-7	K5
32mm	TBNC-32M-175WS32	32,0	56,0	175,0	32,0	27,2	TBNR-32M	STBN-8	K6
32mm	TBNC-32M-210WS32	32,0	80,0	210,0	32,0	27,2	TBNR-32M	STBN-8	K6

*Solid carbide shank



FLAT BOTTOM Style TBFI Neutral-Rake Inserts

CUTTER: TBDS/TBDC

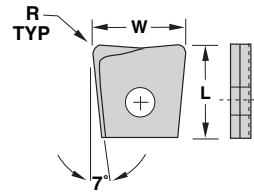


Size	Insert Description	W	R	L	Coating						
					C26S	GP26	AT26S	AT26	DX200	CB200	
1/2"	TBFI-500-02	.500	.032	.500	●						
1/2"	TBFI-500-04	.500	.063	.500	●						
5/8"	TBFI-625-02	.625	.032	.580	●						
5/8"	TBFI-625-04	.625	.063	.580	●						
3/4"	TBFI-750-02	.750	.032	.642	●						
3/4"	TBFI-750-04	.750	.063	.642	●						
1"	TBFI-1000-02	1.000	.032	.867	●						
1"	TBFI-1000-04	1.000	.063	.867	●						
1"	TBFI-1000-08	1.000	.125	.867	●						

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

BACK DRAFT Style TBDI Neutral-Rake Inserts

CUTTER: TBDS/TBDC



Size	Insert Description	W	R	L	Coating						
					C26S	GP26	AT26S	AT26	DX200	CB200	
1/2"	TBDI-500-02	.500	.032	.500	●						
1/2"	TBDI-500-04	.500	.063	.500	●						
5/8"	TBDI-625-02	.625	.032	.580	●						
5/8"	TBDI-625-04	.625	.063	.580	●						
3/4"	TBDI-750-02	.750	.032	.642	●						
3/4"	TBDI-750-04	.750	.063	.642	●						
1"	TBDI-1000-02	1.000	.032	.867	●						
1"	TBDI-1000-04	1.000	.063	.867	●						
1"	TBDI-1000-08	1.000	.125	.867	●						

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

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.

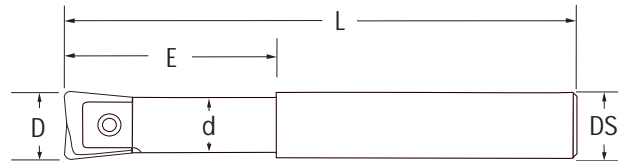
Cast Iron				●			
Non-Ferrous	▲			●			
Stainless/High Temp				●			
Steel				●			
Hardened Material				▲		●	
Composite				▲	●		



FLAT BOTTOM/BACK DRAFT Style

TBDS-WS Straight Holders-Inches

Use TBDI & TBFI Inserts Only



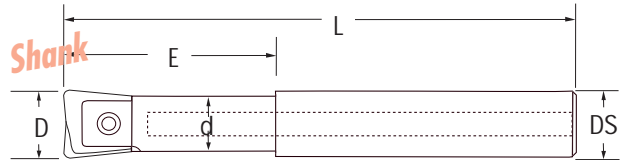
Size	Description	D	E	L	DS	d	Insert	Screw	Wrench
1/2"	TBDS-500-59WS500	.500	1.890	5.980	.500	.413	TBDI / TBFI-500	STBN-4	K3 / T-10
5/8"	TBDS-625-63WS625	.625	2.160	6.380	.625	.551	TBDI / TBFI-625	STBN-5	K3 / T-10
3/4"	TBDS-750-68WS750	.750	2.480	6.890	.750	.709	TBDI / TBFI-750	STBN-6	K4 / T-20
1"	TBDS-100-74WS1000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

FLAT BOTTOM/BACK DRAFT Style

TBDC-WS Straight Holders-Inches

Carbide Cored Shank

Use TBDI & TBFI Inserts Only



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

*Solid carbide shank

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 AT26 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 Descriptions

Grades	Descriptions
C26S	Uncoated, tough, fine grain substrate with sharp edge. Ideal for plastics and soft materials that produce little or no heat.
AT26	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.
AT26S	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 nonmetallic materials such as graphite, epoxy based resins and plastics. FIRST CHOICE in aluminum and composites at high SFM.



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	AT26	AT26	AT26	AT26	AT26	AT26	AT26	AT26	AT26	AT26	AT26S/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

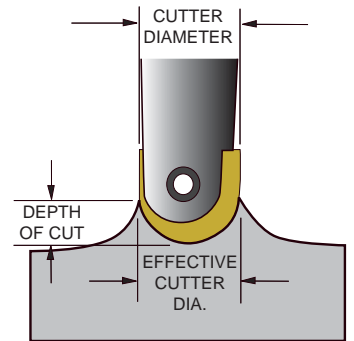
The charts listed below are applicable when the depth of cut is less than the radius of the tool. The IPR can be increased as the DOC is reduced.

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								1.250

Effective diameters for standard inserts at various DOC's

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

RPM = SFM X 3.82/Effective cutting diameter



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



Decrease in Effective Cutting Diameter

Decrease in Chip Load

Notice how the chip load (t₁) is less than the APT for a shallow cut.

Formula for calculating the effective diameter of a cutter.

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



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 TBF1 inserts if work piece has a draft angle on the walls. TBD1 inserts are for work pieces with straight walls.

Balance chipload, RPM, feed rate, tool extension, and material.

TBF1 and TBD1 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	K3/T-10	6.0/53	Yes
STBN-5	5/8"	16mm	K3/T-10	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