



SUMITOMO

CARBIDE - CBN - DIAMOND

Sumitomo Electric Carbide, Inc.

TSX Milling Cutter Series

NEW

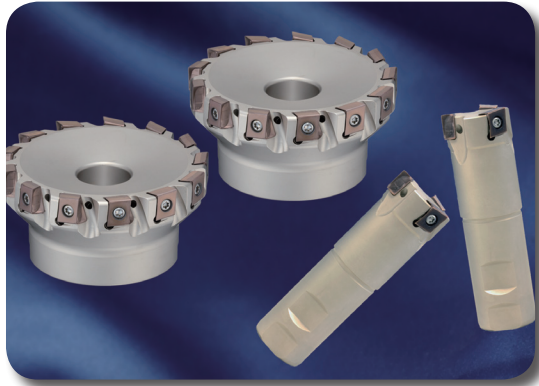
Tangential
Shoulder
Xcellence



90° Shoulder Tangential Milling Cutter

TSX SERIES

Features & Benefits

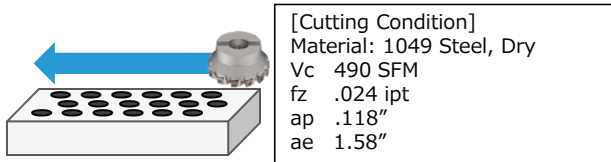


- TSX provides superior metal removal rates
- Employs a cost effective 4-corner ground tolerance insert
- Tangentially mounted insert achieves excellent edge sharpness and side wall accuracy with optimized chipbreaker
- TSX is available in two insert sizes offering a max depth of cut of 8mm (.315") and 12mm (.473")
- TSX provides the strength required for increased depths of cut ranging from a small job to a heavy duty roughing application

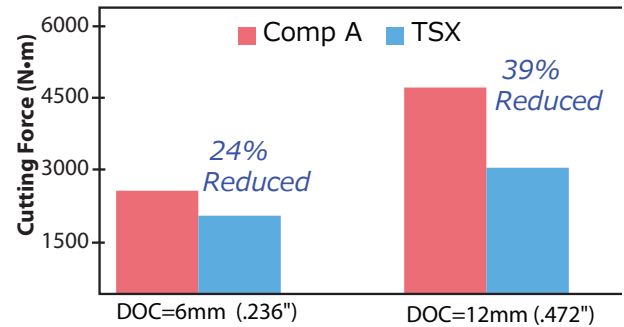
Cutting Force Comparison

Toughness Comparison

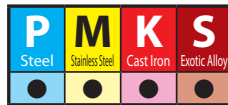
Cutting Conditions
 Material: 1049 Steel, Dry
 Vc 490 SFM
 fz .006 ipt
 ap .236" & .472"
 ae .118"



Fz .024 ipt	4th pass	8th pass	12th pass
Comp A (Tangential)	Brakeage		
Comp B (Tangential)	Breakage		
TSX (LNEX)	No Breakage		

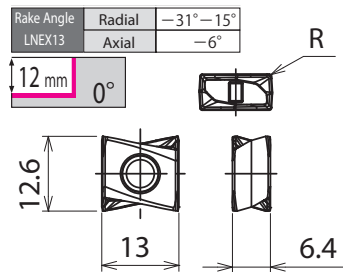
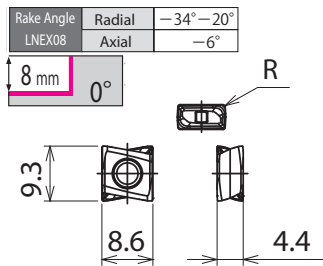


TSX Series Applicable Insert: LNEX



TSX3000 LNEX08
 Max. DOC 8mm (.315")

TSX4000 LNEX13
 Max. DOC 12 mm (.473")



Hardware

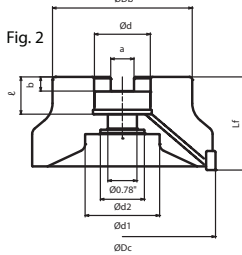
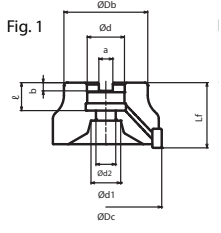
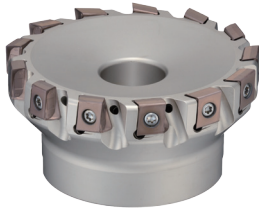
Insert Size	Catalog Number	Insert Screw	Wrench	Recommended Tightening Torque (In/ lbs)
TSX3000 (LNEX08)	TSX□30625□~TSX□30750□	BFTX0306IP	TRDR08IP	18
	TSX□31000□~TSX□32500□	BFTX0308IP		
TSX4000 (LNEX13)	TSX□40000□	BFTX03510IP	TRDR15IP	25

Cat. No.	Inserts					R		
	P	M	K	S	R			
	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	
LNEX080404PNER-L	●	●	●	●	●	●	●	.016
LNEX080404PNER-G	●	●	●	●	●	●	●	.016
LNEX080408PNER-L	●	●	●	●	●	●	●	.031
LNEX080408PNER-G	●	●	●	●	●	●	●	.031
LNEX080412PNER-G	●	●	●	●	●	●	●	.047
LNEX080416PNER-G	●	●	●	●	●	●	●	.063
LNEX130604PNER-L	●	●	●	●	●	●	●	.016
LNEX130604PNER-G	●	●	●	●	●	●	●	.016
LNEX130608PNER-L	●	●	●	●	●	●	●	.031
LNEX130608PNER-G	●	●	●	●	●	●	●	.031
LNEX130608PNER-H	●	●	●	●	●	●	●	.031
LNEX130616PNER-G	●	●	●	●	●	●	●	.063
LNEX130616PNER-H	●	●	●	●	●	●	●	.063
LNEX130624PNER-G	●	●	●	●	●	●	●	.094
LNEX130624PNER-H	●	●	●	●	●	●	●	.094
LNEX130632PNER-G	●	●	●	●	●	●	●	.126
LNEX130632PNER-H	●	●	●	●	●	●	●	.126

● = USA Stocked Item



TSX Shell Mill Series



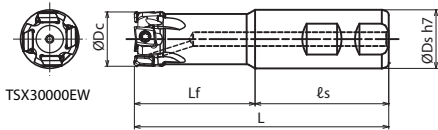
TSX Shell Mill - INCH										Insert: L NEX08 Type			
Cat. No.	Stock	Dimensions (in.)									No. of Teeth	Weight (lbs)	Fig.
		ϕD_c	ϕD_b	L_f	ϕd	a	b	ℓ	ϕd_1	ϕd_2			
TSX31500R	●	1.500	1.339	1.750	0.750	0.312	0.190	0.750	0.609	0.406	4	0.44	1
TSX32000R	●	2.000	1.500	1.750	0.750	0.312	0.190	0.750	0.609	0.406	5	0.88	1
TSX32500R	●	2.500	1.750	1.750	1.000	0.375	0.220	0.750	0.797	0.531	6	1.10	1
TSXF31500R	●	1.500	1.339	1.750	0.750	0.312	0.190	0.750	0.609	0.406	6	0.44	1
TSXF32000R	●	2.000	1.500	1.750	0.750	0.312	0.190	0.750	0.609	0.406	8	0.88	1
TSXF32500R	●	2.500	1.750	1.750	1.000	0.375	0.220	0.750	0.797	0.531	10	1.10	1

TSX Shell Mill - INCH										Insert: L NEX13 Type			
Cat. No.	Stock	Dimensions (in.)									No. of Teeth	Weight (lbs)	Fig.
		ϕD_c	ϕD_b	L_f	ϕd	a	b	ℓ	ϕd_1	ϕd_2			
TSX41500R	●	1.500	1.339	1.750	0.750	0.312	0.190	0.750	0.609	0.406	4	0.44	1
TSX42000R	●	2.000	1.500	1.750	0.750	0.312	0.190	0.750	0.609	0.406	5	0.66	1
TSX42500R	●	2.500	1.750	1.750	1.000	0.375	0.220	0.750	0.797	0.531	6	1.10	1
TSX43000R	●	3.000	2.250	1.750	1.000	0.375	0.220	0.750	0.797	0.531	7	1.76	1
TSX44000R	●	4.000	2.870	2.000	1.500	0.625	0.380	1.000	2.000	0.781	9	4.85	2
TSX45000R	●	5.000	3.750	2.500	1.500	0.625	0.380	1.000	2.000	0.781	12	7.50	2
TSX46000R	●	6.000	4.380	2.500	1.500	0.625	0.380	1.000	2.000	0.781	14	11.0	2
TSXF41500R	●	1.500	1.339	1.750	0.750	0.312	0.190	0.750	0.609	0.406	5	0.44	1
TSXF42000R	●	2.000	1.500	1.750	0.750	0.312	0.190	0.750	0.609	0.406	6	0.66	1
TSXF42500R	●	2.500	1.750	1.750	1.000	0.375	0.220	0.750	0.797	0.531	8	1.10	1
TSXF43000R	●	3.000	2.250	1.750	1.000	0.375	0.220	0.750	0.797	0.531	10	1.76	1
TSXF44000R	●	4.000	2.870	2.000	1.500	0.625	0.380	1.000	2.000	0.781	13	4.85	2

TSX Shell Endmill Series

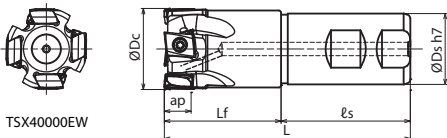


Fig. 1 Insert: L NEX08



TSX30000EW

Fig. 2 Insert: L NEX13



TSX40000EW

TSX Endmill - INCH							Insert: L NEX08 Type			
Cat. No.	Stock	Dimensions (in.)					No. of Teeth	Weight (lbs)	Fig.	
		ϕD_c	ϕD_s	L_f	ℓ_s	L				
TSX30625EW	●	0.625	0.625	1.312	1.906	3.218	2	0.22	1	
TSX30750EW	●	0.750	0.750	1.534	2.030	3.563	2	0.35	1	
TSX31000EW	●	1.000	1.000	2.060	2.281	4.341	3	0.88	1	
TSX31250EW	●	1.250	1.250	2.060	2.281	4.341	3	1.32	1	
TSX31500EW	●	1.500	1.250	2.060	2.281	4.341	4	1.54	1	
TSXF30750EW	●	0.750	0.750	1.534	2.030	3.563	3	0.44	1	
TSXF31000EW	●	1.000	1.000	2.060	2.281	4.341	4	0.88	1	
TSXF31250EW	●	1.250	1.250	2.060	2.281	4.341	5	1.32	1	
TSXF31500EW	●	1.500	1.250	2.060	2.281	4.341	6	1.54	1	

TSX Endmill - INCH							Insert: L NEX13 Type			
Cat. No.	Stock	Dimensions (in.)					No. of Teeth	Weight (lbs)	Fig.	
		ϕD_c	ϕD_s	L_f	ℓ_s	L				
TSX41000EW	●	1.000	1.000	2.060	2.281	4.341	2	0.66	2	
TSX41250EW	●	1.250	1.250	2.060	2.281	4.341	2	1.32	2	
TSX41500EW	●	1.500	1.250	2.060	2.281	4.341	3	1.54	2	
TSXF41250EW	●	1.250	1.250	2.060	2.281	4.341	3	1.32	2	
TSXF41500EW	●	1.500	1.250	2.060	2.281	4.341	4	1.54	2	

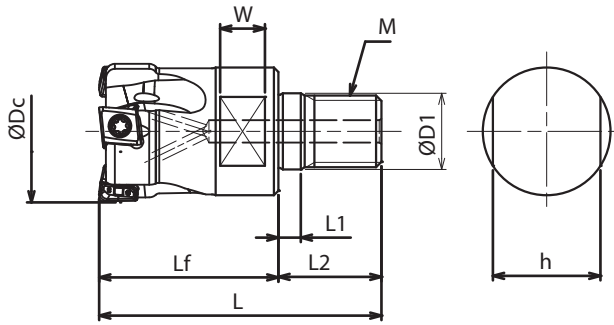
● = USA Stocked Item

Recommended Running Conditions

ISO	Work Material	Hardness	Cutting Speed v_c (sfm) Min-Max	Feed Rate f_z (ipt) Min-Max	Recommended Grade
P	Carbon Steel	180-280 HB	500-1000	.004-.014	ACP200 ACP300 ACP100
		> 280 HB	250-750	.004-.014	
M	Alloy Steel	180-280HB	330-815	.004-.012	
		220-280HB	300-600	.004-.010	ACM300 ACM200
S	Stainless Steel	> 280HB	250-550	.004-.010	
		-	100-300	.004-.008	ACM300 ACM200
K	Exotic Material	-	100-300	.004-.008	ACM300 ACM200
K	Cast Iron/Ductile Cast Iron	250HB	330-815	.004-.014	ACK300 ACK200

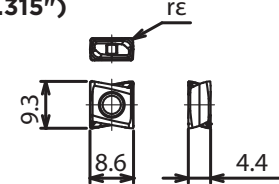
NOTE: The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, cutting depth and other factors.

TSX Modular Head Series

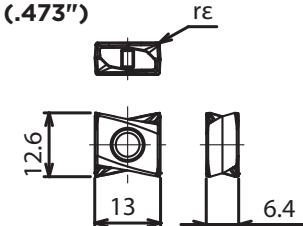


TSX Series Applicable Insert: LNEXT

TSX3000
LNEXT08
Max. DOC 8mm (.315")



TSX4000
LNEXT13
Max. DOC 12 mm (.473")

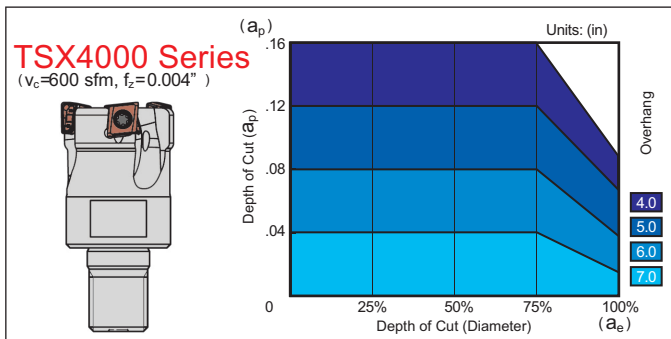


Modular Head - INCH		Insert: LNEXT08 Type								No. of Teeth	
Catalog Number	Stock	Dimensions (in.)									
		ØD _c	ØD ₁	M	L	L _f	L ₁	L ₂	W	h	
TSXF30750M10Z3	○	0.750	0.413	M10	1.929	1.181	0.197	0.748	0.315	0.591	3
TSXF31000M12Z4	○	1.000	0.492	M12	2.205	1.378	0.197	0.827	0.394	0.748	4
TSXF31250M16Z5	○	1.250	0.669	M16	2.480	1.575	0.197	0.906	0.394	0.945	5
TSXF31500M16Z6	○	1.500	0.669	M16	2.480	1.575	0.197	0.906	0.394	0.945	6

Modular Head - INCH		Insert: LNEXT13 Type								No. of Teeth	
Catalog Number	Stock	Dimensions (in.)									
		ØD _c	ØD ₁	M	L	L _f	L ₁	L ₂	W	h	
TSX41000M12Z2	○	1.000	0.492	M12	2.205	1.378	0.197	0.827	0.394	0.748	2
TSX41250M16Z3	○	1.250	0.669	M16	2.480	1.575	0.197	0.906	0.394	0.945	3
TSX41500M16Z4	○	1.500	0.669	M16	2.480	1.575	0.197	0.906	0.394	0.945	4

○ Available 2nd Quarter 2017

Application Range



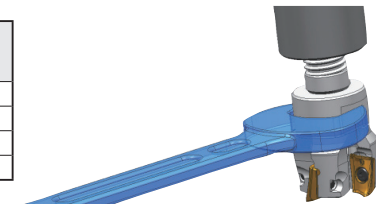
Note: These tables indicate reference machining conditions. Actual machining parameters should be adjusted based on machine rigidity and work clamp rigidity.

Recommended Tightening Torque (N·m)

*Notes about tightening the head.

- When attaching the head to an arbor, follow the standard tightening torque in the table below.
- Check the mounting screw size for the head and arbor beforehand.

Screw Size	Torque (foot / lbs)
M8	17
M10	34
M12	59
M16	67



Modular Head Identification Details

TSX F 3 0750 M12 Z3

(1)	(2)	(3)	(4)	(5)	(6)
Cutter Series	Pitch Type	Insert Size	Diameter	Mounting Screw	No. of Teeth
		3:08		4:13	

Inserts Cat. No.	P		K		M		S	R
	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200		
LNEX080404PNER-L	●	●	●	●	●	●	●	.016
LNEX080404PNER-G	●	●	●	●	●	●	●	.016
LNEX080408PNER-L	●	●	●	●	●	●	●	.031
LNEX080408PNER-G	●	●	●	●	●	●	●	.031
LNEX080412PNER-G	●	●	●	●	●	●	●	.047
LNEX080416PNER-G	●	●	●	●	●	●	●	.063
LNEX130604PNER-L	●	●	●	●	●	●	●	.016
LNEX130604PNER-G	●	●	●	●	●	●	●	.016
LNEX130608PNER-L	●	●	●	●	●	●	●	.031
LNEX130608PNER-G	●	●	●	●	●	●	●	.031
LNEX130608PNER-H	●	●	●	●	●	●	●	.031
LNEX130616PNER-G	●	●	●	●	●	●	●	.063
LNEX130616PNER-H	●	●	●	●	●	●	●	.063
LNEX130624PNER-G	●	●	●	●	●	●	●	.094
LNEX130624PNER-H	●	●	●	●	●	●	●	.094
LNEX130632PNER-G	●	●	●	●	●	●	●	.126
LNEX130632PNER-H	●	●	●	●	●	●	●	.126

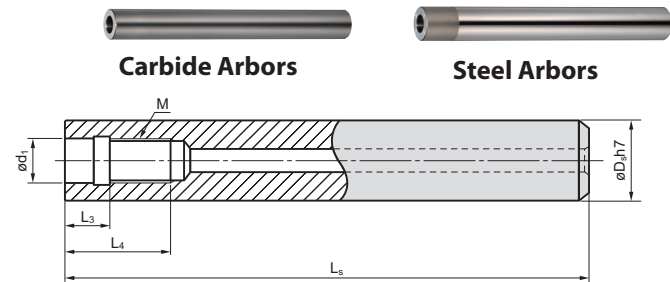
● = USA Stocked Item

Hardware

Insert Size	Catalog Number	Insert Screw	Wrench	Recommended Tightening Torque (In/ lbs)
TSX3000 (LNEXT08)	TSX□30625□~TSX□30750□	BFTX0306IP	TRDR08IP	18
	TSX□31000□~TSX□32500□	BFTX0308IP		
TSX4000 (LNEXT13)	TSX□40000□	BFTX03510IP	TRDR15IP	25

■ **Modular Tools Special Arbors (Carbide Arbors/Steel Arbors)**

*Suitable for milling with **long overhangs** when combined with carbide or steel arbors*



★ Worldwide Warehouse Item

Carbide Arbors								
Catalog Number	Stock	Dimension (mm)						
		M	ød ₁	øD ₅	L ₅	L ₃	L ₄	L ₅ *
MA15M08L120C	★	M8	8.5	15	120	10	18	145
MA15M08L160C	★	M8	8.5	15	160	10	18	185
MA16M08L120C	★	M8	8.5	16	120	10	18	145
MA16M08L160C	★	M8	8.5	16	160	10	18	185
MA18M10L150C	★	M10	10.5	18	150	10	20	180
MA18M10L200C	★	M10	10.5	18	200	10	20	230
MA20M10L150C	★	M10	10.5	20	150	10	20	180
MA20M10L200C	★	M10	10.5	20	200	10	20	230
MA23M12L200C	★	M12	12.5	23	200	10	22	235
MA23M12L250C	★	M12	12.5	23	250	10	22	285
MA25M12L200C	★	M12	12.5	25	200	10	22	235
MA25M12L250C	★	M12	12.5	25	250	10	22	285
MA28M16L200C	★	M16	17.0	28	200	10	24	240
MA28M16L300C	★	M16	17.0	28	300	10	24	340
MA32M16L200C	★	M16	17.0	32	200	10	24	240
MA32M16L300C	★	M16	17.0	32	300	10	24	340

Steel Arbors								
Catalog Number	Stock	Dimension (mm)						
		M	ød ₁	øD ₅	L ₅	L ₃	L ₄	L ₅
MA16M08L120S	★	M8	8.5	16	120	10	18	145
MA18M10L150S	○	M10	10.5	18	150	10	20	180
MA20M10L150S	★	M10	10.5	20	150	10	20	180
MA25M12L200S	★	M12	12.5	25	200	10	22	235
MA28M16L200S	○	M16	17.0	28	200	10	24	240
MA32M16L200S	★	M16	17.0	32	200	10	24	240

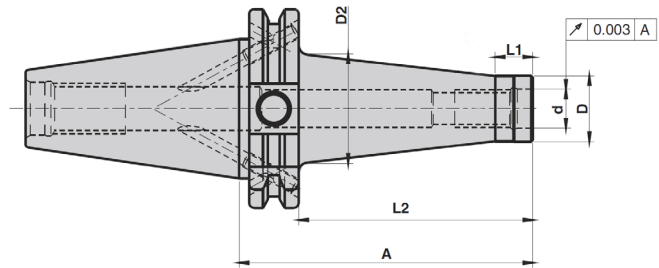
★ Worldwide Warehouse Item
○ Available 2nd Quarter 2017

■ **Arbor Identification**

MA 15 M08 L120 C

(1) Cutter Series (2) Shank Diameter (3) Mounting Screw (4) Arbor Length (5) C: Carbide S: Steel

■ **Modular Tools Adapters**



Modular Adapters - SK40								
Catalog Number	Stock	Dimension (mm)						
		M	d	D ₁	D ₂	A	L ₁	L ₂
SMA-M8-69-SK40	★	M8	8.5	13.8	23	69	12	49.9
SMA-M8-94-SK40	★	M8	8.5	13.8	25	94	12	74.9
SMA-M8-119-SK40	★	M8	8.5	13.8	30	119	12	99.9
SMA-M10-69-SK40	★	M8	8.5	18.0	25	69	12	49.9
SMA-M10-94-SK40	★	M10	10.5	18.0	30	94	12	74.9
SMA-M10-119-SK40	★	M10	10.5	18.0	35	119	12	99.9
SMA-M10-169-SK40	★	M10	10.5	18.0	45	169	12	149.9
SMA-M12-69-SK40	★	M10	12.5	21.0	30	69	12	49.9
SMA-M12-94-SK40	★	M12	12.5	21.0	35	94	12	74.9
SMA-M12-119-SK40	★	M12	12.5	21.0	38	119	12	99.9
SMA-M12-169-SK40	★	M12	12.5	21.0	48	169	12	149.9
SMA-M16-69-SK40	★	M12	17.0	29.0	34	69	12	49.9
SMA-M16-94-SK40	★	M16	17.0	29.0	35	94	12	74.9
SMA-M16-119-SK40	★	M16	17.0	29.0	40	119	12	99.9
SMA-M16-169-SK40	★	M16	17.0	29.0	48	169	12	149.9

Note: The above holders require an M16 thread retention knob

Modular Adapters - SK50								
Catalog Number	Stock	Dimension (mm)						
		M	d	D ₁	D ₂	A	L ₁	L ₂
SMA-M8-69-SK50	★	M8	8.5	13.8	23	69	12	49.9
SMA-M8-119-SK50	★	M8	8.5	13.8	30	119	12	74.9
SMA-M8-169-SK50	★	M8	8.5	13.8	45	169	12	99.9
SMA-M10-69-SK50	★	M10	10.5	18.0	25	69	12	49.9
SMA-M10-119-SK50	★	M10	10.5	18.0	35	119	12	99.9
SMA-M10-169-SK50	★	M10	10.5	18.0	45	169	12	149.9
SMA-M12-69-SK50	★	M12	12.5	21.0	30	69	12	49.9
SMA-M12-119-SK50	★	M12	12.5	21.0	38	119	12	99.9
SMA-M12-169-SK50	★	M12	12.5	21.0	52	169	12	149.9
SMA-M16-69-SK50	★	M16	17.0	29.0	34	69	12	49.9
SMA-M16-119-SK50	★	M16	17.0	29.0	40	119	12	99.9
SMA-M16-169-SK50	★	M16	17.0	29.0	48	169	12	149.9

Note: The above holders require an M24 thread retention knob



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