SUMITOMO
CARBIDE - CBN - DIAMOND
Global Support, Global Solutions.

Tooling News No. 523

High Efficiency and High Precision Shoulder Milling Cutter with Tangential Inserts

# SEC-Sumi Dual Mill TSX series

Rev.7

## Realises good machined surface quality and excellent cutting edge strength with a high-precision tangentially-mounted insert

Expansion Coated Carbide Grades for Exotic Alloy Milling

**ACS1000/ACS2500/ACS3000 added to the TSX series lineup!!**

**4-Cornered Ground type Insert**

P M K N S H

SUMITOMO ELECTRIC GROUP

VIDEO OF CUTTING

## Features

- **Excellent Machined Surface Quality**
  Adopts ground type insert for high accuracy to realise excellent machined surface quality.
- **Cutting Edge Designed for High Cutting Edge Strength and Sharpness**
  Adopts tangential insert and optimised cutting edge shape to achieve both high cutting edge strength and sharpness.
- **Wide Ranging Product Lineup**
  An enhanced lineup of grades is available in addition to 2 types of insert sizes and 3 types of chipbreakers.
  Can be used for a wide variety of machining applications.
- **Applicable to Various Work Materials**
  Expansion of the new grade ACS series, achieving excellent stability and longer tool life in machining of stainless steel and exotic alloys.

## Product Range (Face Mills)

| Type | Cat. No. | Description | Dia. (mm) ø16 | ø20 | ø25 | ø32 | ø40 | ø50 | ø63 | ø80 | ø100 | ø125 | ø160 | ø200 | ø250 | ø315 | Shape |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shell | TSX 08000RS/LS | Standard Pitch | | | | | 4 | 5 | 6 | 7 | | | | | | |  |
| | TSX 08000R/L Inch | Standard Pitch | | | | | | | | 7 | | | | | | | |
| | TSXF 08000RS/LS | Extra Fine Pitch | | | | | 6 | 8 | 10 | 11 | | | | | | | |
| | TSXF 08000R/L Inch | Extra Fine Pitch | | | | | | | | 11 | | | | | | | |
| | TSX 13000RS/LS | Standard Pitch | | | | | 3 | 4 | 5 | 5 | 6 | 7 | 8 | 12 | 14 | 16 | |
| | TSX 13000R/L Inch | Standard Pitch | | | | | | | | 5 | 6 | 7 | 8 | 12 | 14 | 16 | |
| | TSXM 13000RS/LS | Fine Pitch | | | | | 4 | 5 | 6 | 7 | 8 | 10 | 12 | 16 | 20 | 24 | |
| | TSXM 13000R/L Inch | Fine Pitch | | | | | | | | 7 | 8 | 10 | 12 | 16 | 20 | 24 | |
| | TSXF 13000RS/LS | Extra Fine Pitch | | | | | 5 | 6 | 7 | 8 | 10 | 14 | 16 | | | | |
| | TSXF 13000R/L Inch | Extra Fine Pitch | | | | | | | | 8 | 10 | 14 | 16 | | | | |
| Shank | TSX 08000E | Standard Pitch | 2 | 2* | 3* | 3* | 4 | 5 | 6 | 7 | | | | | | |  |
| | TSXF 08000E | Extra Fine Pitch | | 3 | 4 | 5 | 6 | 8 | 10 | 11 | | | | | | | |
| | TSX 13000E | Standard Pitch | | | 2 | 2 | 3 | 4 | 5 | 5 | | | | | | | |
| | TSXM 13000E | Fine Pitch | | | | 3 | 4 | 5 | 6 | 7 | | | | | | | |
| | TSXF 13000E | Extra Fine Pitch | | | | | 5 | 6 | 7 | 8 | | | | | | | |

Number in ●● shows the number of teeth  Inch Inch Bore  * mark: Different diameter shanks available.
For the shell type, left-handed tools can also be manufactured.

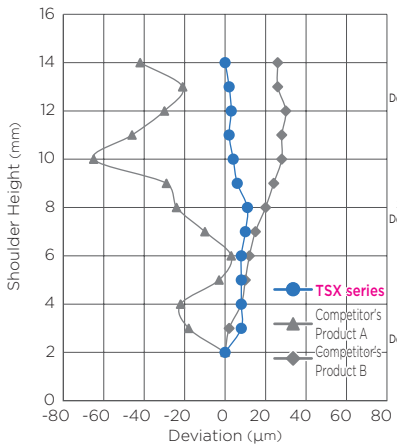
## Product Range (Repeaters)

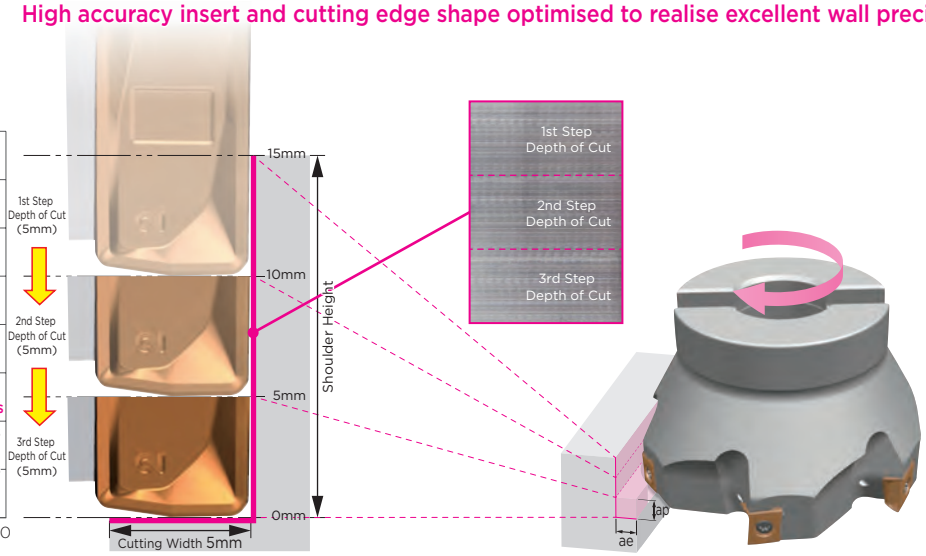
| Type | Cat. No. | Dia. (mm) ø20 | ø25 | ø32 | ø40 | ø50 | ø63 | ø80 | ø100 | ø125 | Shape |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Shell | TSXR 08000RS | | | 2 | 3 | 3 4 | 5 | | | |  |
| | TSXR 13000RS | | | | 2 | 3 | 3 4 | 4 5 | 5 6 | 7 | |
| Shank | TSXR 08000E | 1 | 2 | 2 | 3 | | | | | |  |
| | TSXR 13000E | | | | 2 | 3 | | | | | |

Number in ●● shows the number of teeth

## Shoulder Milling Precision

High accuracy insert and cutting edge shape optimised to realise excellent wall precision

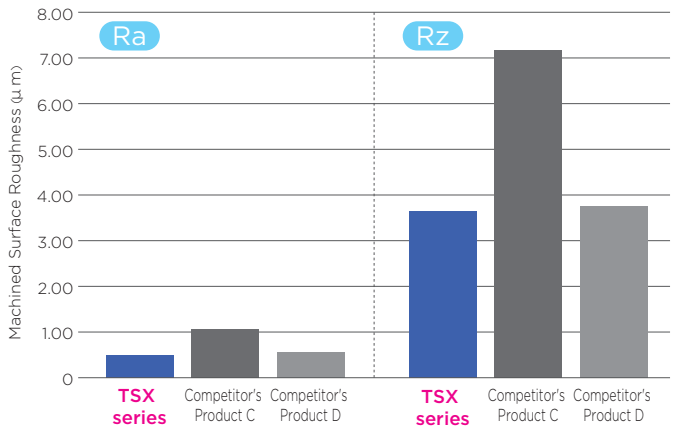



| | |
|---|---|
| Machine | : Vertical Machining Centre BT50, Work Material: S50C |
| Tool | : TSX 13100R, Insert: LNEX 130608PNER-G (ACP200) |
| Cutting Conditions | : vc = 200m/min, fz = 0.2mm/t, ap = 5mm x 3 Passes, ae = 5mm, Dry |

## Machined Surface Roughness

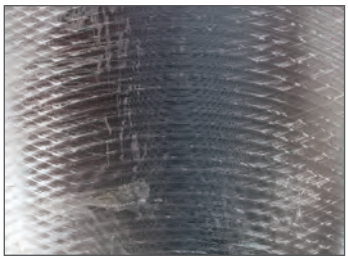
Cutting edge shape optimised to realise excellent machined surface roughness




Machined Surface Comparison

TSX series Without Cloudiness

Competitor's Product Cloudy



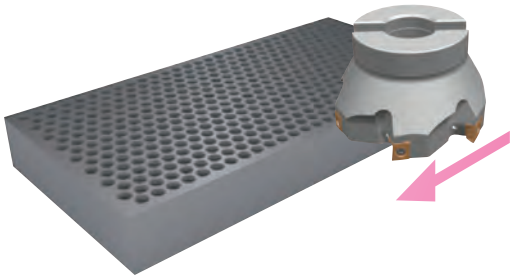
| | |
|---|---|
| Machine | : Vertical Machining Centre BT50, Work Material: S50C |
| Tool | : TSX 13100R, Insert: LNEX 130608PNER-G (ACP200) |
| Cutting Conditions | : vc = 200m/min, fz = 0.2mm/t, ap = 3mm, ae = 60mm, Dry |

## Cutting Edge Strength

TSX type has high cutting edge strength and enables high-efficiency machining

1 Pass = 300mm

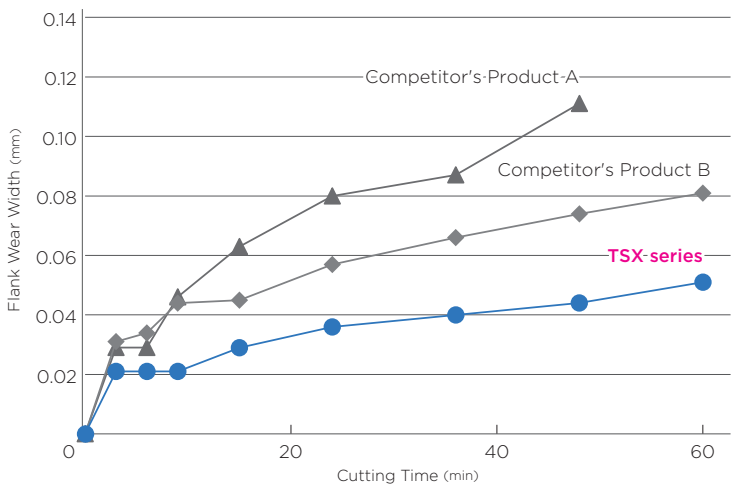
| Cutting Length | 4 Passes | 8 Passes | 12 Passes |
|---|---|---|---|
| TSX series | Continued Machining Possible | | |
| Competitor's Product E | Damage | | |
| Competitor's Product F | Damage | | |



| | |
|---|---|
| Machine | : Vertical Machining Centre BT50, Work Material: S50C |
| Tool | : TSX 13100R, Insert: LNEX 130608PNER-G (ACP200) |
| Cutting Conditions | : vc = 150m/min, fz = 0.6mm/t (Accelerating) |
| | ap = 3mm, ae = 40mm, Dry |

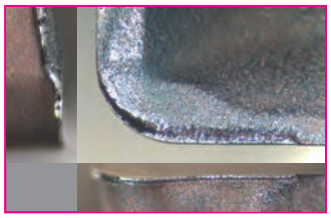
## Tool Life

**Excellent Wear Resistance Realises Stable Tool Life**

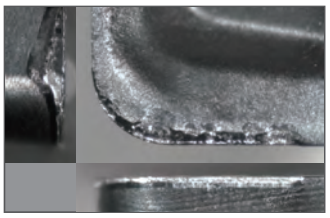



| | |
|---|---|
| Machine | : Vertical Machining Centre BT50, Work Material: S50C |
| Tool | : TSX 08025E, Insert: LNEX 080408PNER-G (ACP200) |
| Cutting Conditions | : vc = 200m/min, fz = 0.1mm/t, ap = 2mm, ae = 5mm, Dry |

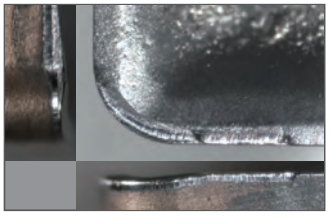
**TSX series**
(After cutting for 60 minutes)



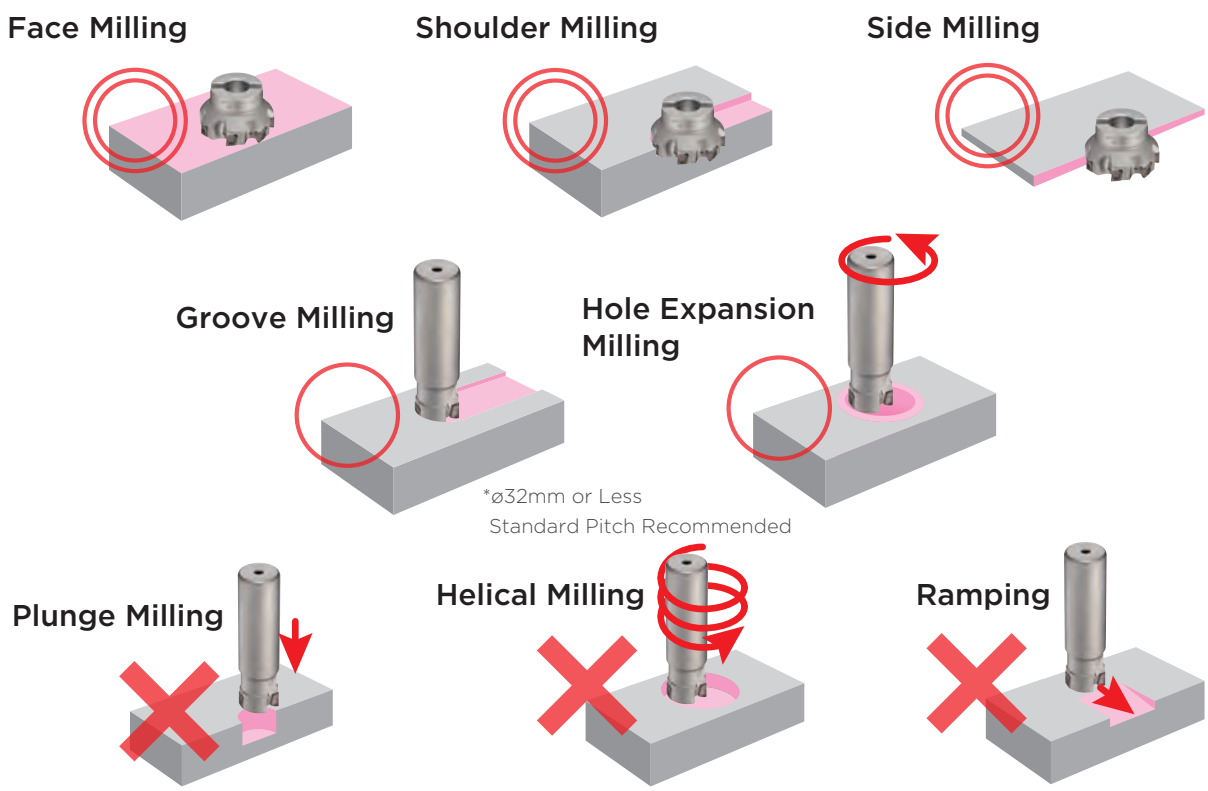
**Competitor's Product A**
(After cutting for 48 minutes)



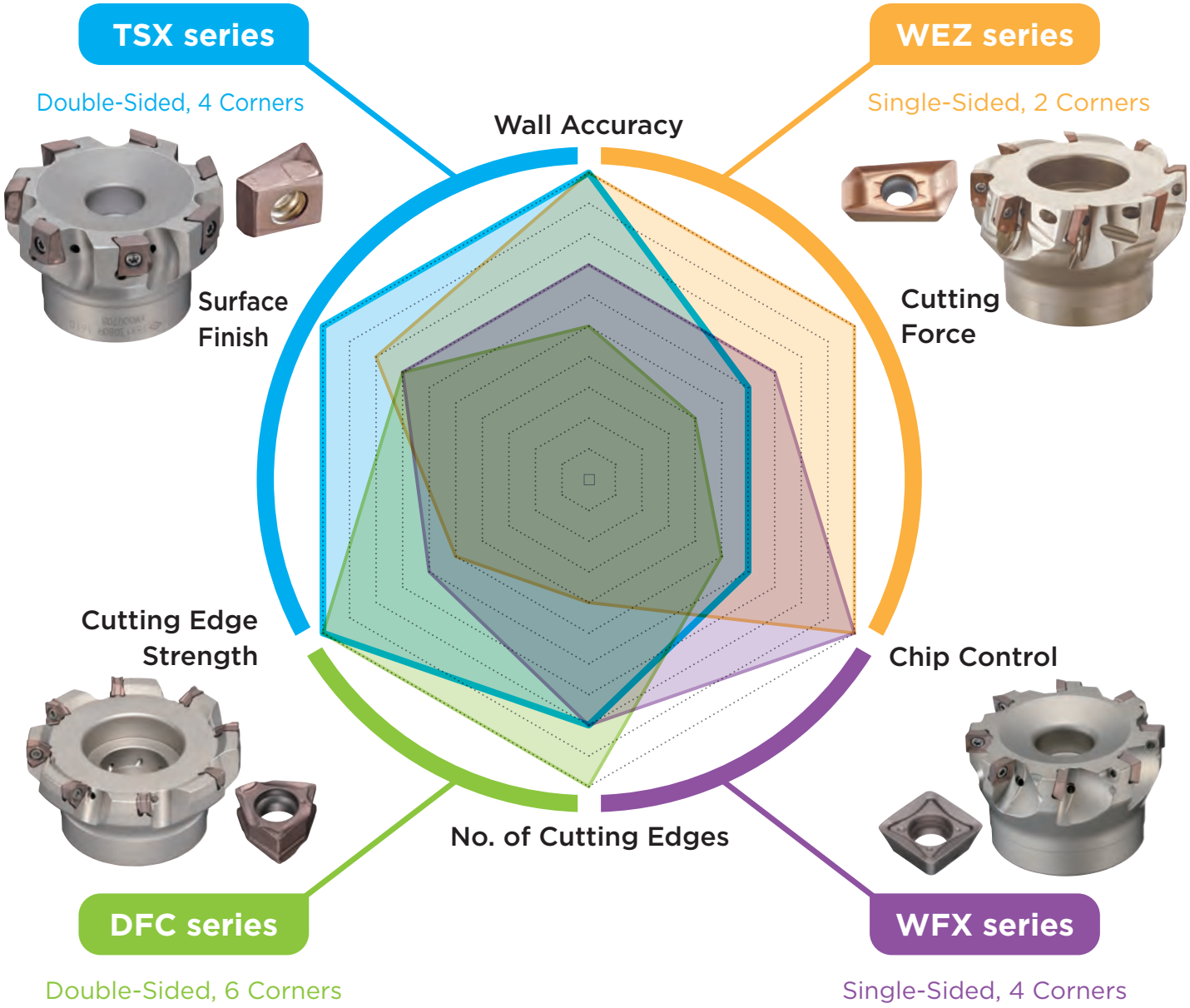
**Competitor's Product B**
(After cutting for 60 minutes)



## Applications



## Shoulder Milling Selection Guide



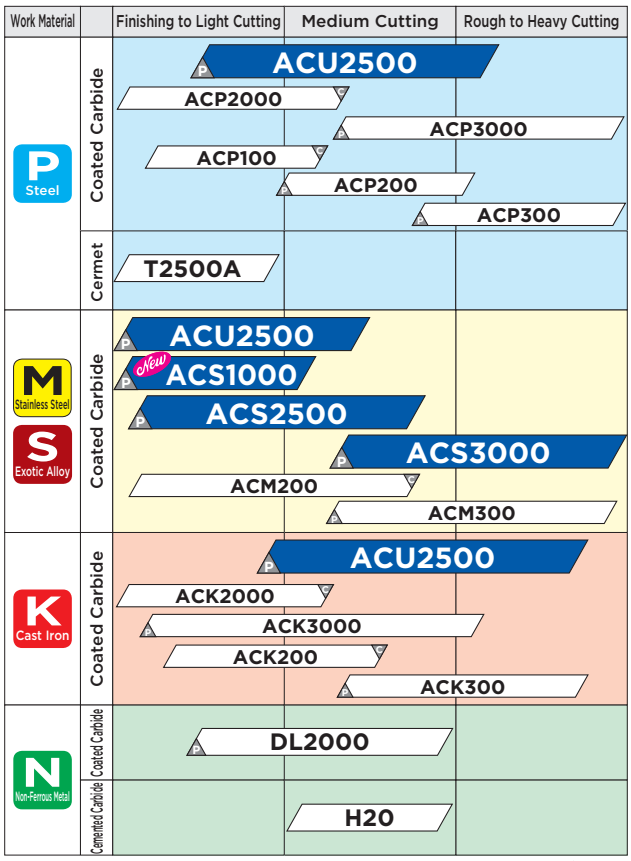

★★★: 1st Recommendation

| | Surface Finish | Wall Accuracy | Cutting Force | Chip Control | No. of Cutting Edges | Cutting Edge Strength |
|---|---|---|---|---|---|---|
| WEZ series | ★★★ | ★★★ | ★★★ | ★★★ | ★ | ★½ |
| TSX series | ★★★ | ★★★ | ★★ | ★½ | ★★ | ★★★ |
| DFC series | ★½ | ★ | ★ | ★½ | ★★★ | ★★★ |
| WFX series | ★½ | ★★ | ★★ | ★★★ | ★★ | ★★ |

* For the details of each product, see the WEZ series (Tooling News No. 528), DFC series (Tooling News No. 513), and WFX series (Tooling News No. 491).

## Grade Application Range

The **ACS1000/ACS2500/ACS3000** grades for exotic alloys have been expanded to a wide lineup applicable to various work materials

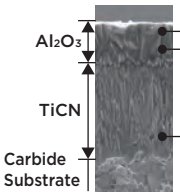



The letters "C" and "P" at the end of each grade indicate the coating type. C: CVD P: PVD

## Grade Features

New coating technology that realises absolute stability ABSOTECH™ (Absolute Technology)

**ABSOTECH** CVD



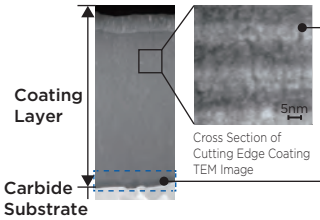

**Special Surface Treatment**
Suppresses thermal cracking by introducing high compressive stress, resulting in chipping resistance more than twice that of conventional coatings

**Crystal Orientation Control $Al_2O_3$**
By controlling the growth direction, $Al_2O_3$ is reinforced for crater wear resistance more than twice that of conventional coatings

**High Hardness TiCN**
Increased TiCN hardness by using a C-rich composition for flank wear resistance more than twice that of conventional coatings

Applicable Grades: ACP2000, ACK2000

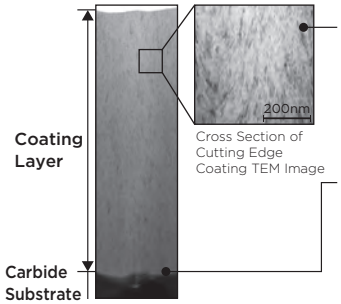
**ABSOTECH** PVD




**New Super Multi-Layered Structure**
Higher hardness and twice the conventional wear resistance due to a fine crystal structure AlTiCrBN-based nano-layered coating

**High Adhesion Strength**
Significantly improved coating adhesion has more than twice the chipping resistance of conventional coatings

Applicable Grades: ACU2500, ACP3000, ACK3000




**Ultra-fine Grained B Additive**
- New AlTiBN coating, with an ultra-fine coating structure, achieves high strength and toughness
- Outstanding balance of chipping resistance and wear resistance

**High Adhesion Strength**
Significantly improved coating adhesion has more than twice the chipping resistance of conventional coatings

Applicable Grades: ACS1000, ACS2500, ACS3000

### P ACP200/ACP300/ACK300/ACM300

NEW SUPER ZX COAT

Realises superb stability due to a carbide substrate optimised for steel, cast iron, and stainless steel with a highly chipping-resistant coating.

### ACP100/ACK200/ACM200 C

SUPER FF COAT

Realises superb stability in high-efficiency machining due to a carbide substrate optimised for steel, cast iron, and stainless steel with a highly wear-resistant coating.

### P DL2000

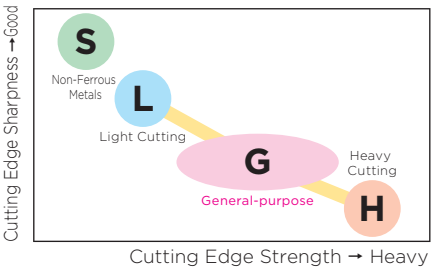
AURORA COAT (DLC: Diamond Like Carbon)

Second only to diamond in hardness, this smooth coating offers a low coefficient of friction and excellent adhesion resistance, improving machined surface quality.

## Chipbreaker Selection Guide

| Work Material | P M K S | | | N |
|---|---|---|---|---|
| Applications | Light Cutting, Low Rigidity Milling and Reduction of Burrs | General-purpose to Interrupted Milling | Heavy Cutting, Heavy Side Milling and Hardened Steel Milling | For Non-Ferrous Metals |
| Features | Low Cutting Force | General-purpose type | High Strength type | High Rake type |
| Chipbreaker | **L type** | **G type** | **H type** | **S type** |
| |  |  |  |  |
| LNEX08 type Cross Section |   |   | Not Available |   |
| LNEX13 type Cross Section |   |   |   |   |

## Chipbreaker Selection




## Product Range

| Cat. No. | Corner Radius RE (mm) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
| LNEX 0804○○PNE R/L-L | ● | ● | ● | ● | — | — | — |
| LNEX 0804○○PNE R/L-G | ● | ● | ● | ● | — | — | — |
| LNEX 0804○○PNF R/L-S | | | | | — | — | — |
| LNEX 1306○○PNE R/L-L | ● | ● | ● | ● | ● | ● | ● |
| LNEX 1306○○PNE R/L-G | ● | ● | ● | ● | ● | ● | ● |
| LNEX 1306○○PNE R-H | ● | ● | ● | ● | ● | ● | ● |
| LNEX 1306○○PNF R/L-S | | | | | | | |

# TSX(F) 08000R/L(S) type

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

| Rake Angle | Radial | -20° |
|---|---|---|
| | Axial | -6° |

8mm 90°

Face Milling | Shoulder Milling | Side Milling

Fig 1

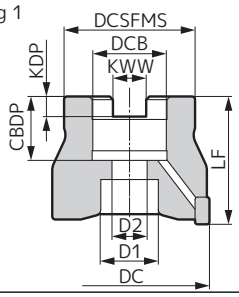



Figure shows right-handed (R) tool.

## Body (Standard Pitch)

Dimensions (mm)

| | Cat. No. | Stock R | Stock L | Dia. DC | Boss DCSFMS | Height LF | Hole Dia. DCB | Keyway Width KWW | Keyway Depth KDP | Mounting Depth CBDP | Bolt D1 | Bolt D2 | Number of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSX 08040RS/LS** | ● | | **40** | 33 | 40 | **16** | 8.4 | 5.6 | 18 | 14 | 9 | 4 | 0.21 | 1 |
| | **08050RS/LS** | ● | | **50** | 41 | 40 | **22** | 10.4 | 6.3 | 20 | 18 | 11 | 5 | 0.30 | 1 |
| | **08063RS/LS** | ● | | **63** | 50 | 40 | **22** | 10.4 | 6.3 | 20 | 18 | 11 | 6 | 0.53 | 1 |
| | **08080RS/LS** | ● | | ***80** | 55 | 50 | **27** | 12.4 | 7.0 | 22 | 20 | 14 | 7 | 0.99 | 1 |
| Inch | **TSX 08080R/L** | ● | | ***80** | 55 | 50 | **25.4** | 9.5 | 6.0 | 25 | 20 | 14 | 7 | 1.00 | 1 |

Inserts are sold separately. Take note of the cutter mounting size (DCB) when selecting a cutter.

Note For mounting the cutters marked with ＊ to an arbor, use a JIS B1176 hex socket bolt (M12 x 30 to 35mm).

## Body (Extra Fine Pitch)

Dimensions (mm)

| | Cat. No. | Stock R | Stock L | Dia. DC | Boss DCSFMS | Height LF | Hole Dia. DCB | Keyway Width KWW | Keyway Depth KDP | Mounting Depth CBDP | Bolt D1 | Bolt D2 | Number of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSXF 08040RS/LS** | ● | | **40** | 33 | 40 | **16** | 8.4 | 5.6 | 18 | 14 | 9 | 6 | 0.21 | 1 |
| | **08050RS/LS** | ● | | **50** | 41 | 40 | **22** | 10.4 | 6.3 | 20 | 18 | 11 | 8 | 0.31 | 1 |
| | **08063RS/LS** | ● | | **63** | 50 | 40 | **22** | 10.4 | 6.3 | 20 | 18 | 11 | 10 | 0.54 | 1 |
| | **08080RS/LS** | ● | | ***80** | 55 | 50 | **27** | 12.4 | 7.0 | 22 | 20 | 14 | 11 | 0.97 | 1 |
| Inch | **TSXF 08080R/L** | ● | | ***80** | 55 | 50 | **25.4** | 9.5 | 6.0 | 25 | 20 | 14 | 11 | 0.98 | 1 |

Inserts are sold separately. Take note of the cutter mounting size (DCB) when selecting a cutter.

Note For mounting the cutters marked with ＊ to an arbor, use a JIS B1176 hex socket bolt (M12 x 30 to 35mm).

## Parts

| Flat Insert Screw | | Wrench | Anti-seizure Cream |
|---|---|---|---|
| BFTX0308IP | 2.0 | TRDR08IP | SUMI-P |

## Identification Code

**TSX F 08 050 R S**

| Series Code | Extra Fine Pitch | Insert Size | Dia. | R: Right-Hand L: Left-Hand | Metric Bore |
|---|---|---|---|---|---|

N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item Blank: Made-to-order item

# TSX(F) 08000R/L(S) type Expansion

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

## Insert

Dimensions (mm)

| Grade Classification | | Coated Carbide | | | | | | | | | | | Cemented Carbide | DLC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process | High-speed/Light Cutting | K M S | P M | | | K | | M S | M S | | M S | | | N | | |
| | Medium Cutting | K M S | P M | P M | | K | | | M S | M S | M S | M S | N | N | | |
| | Roughing | K M S | | P M | P M | | K | New | | M S | | M S | | | | |
| Cat. No. | | ACU2500 | ACP100 | ACP200 | ACP300 | ACK200 | ACK300 | ACS1000 | ACS2500 | ACS3000 | ACM200 | ACM300 | H20 | DL2000 | Corner Radius RE | Fig |
| LNEX 080404PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 080408PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.8 | 1 |
| 080412PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 080416PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| LNEX 080404PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 080408PNER-G | | ● | ● | ● | ● | ● | ● | | ● | ● | ▲ | ▲ | — | — | 0.8 | 1 |
| 080412PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 080416PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| LNEX 080402PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 1 |
| 080404PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 1 |
| 080408PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 1 |
| 080412PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 1 |
| 080416PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 1 |
| LNEX 080404PNEL-L | | | | ● | | | ● | | | | | | — | — | 0.4 | 2 |
| 080408PNEL-L | | | | ● | | | ● | | | | | | — | — | 0.8 | 2 |
| 080412PNEL-L | | | | ● | | | ● | | | | | | — | — | 1.2 | 2 |
| 080416PNEL-L | | | | ● | | | ● | | | | | | — | — | 1.6 | 2 |
| LNEX 080404PNEL-G | | | | ● | | ● | ● | | | | | ▲ | — | — | 0.4 | 2 |
| 080408PNEL-G | | | | ● | | ● | ● | | | | | ▲ | — | — | 0.8 | 2 |
| 080412PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 1.2 | 2 |
| 080416PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 1.6 | 2 |
| LNEX 080402PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 2 |
| 080404PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 2 |
| 080408PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 2 |
| 080412PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 2 |
| 080416PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 2 |

Fig 1
(Right-Hand)

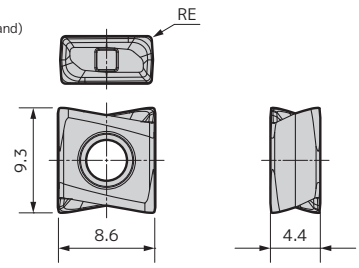
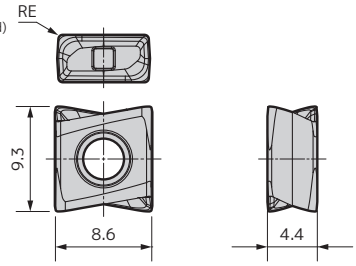



Fig 2
(Left-Hand)




## Recommended Cutting Conditions

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| P | Carbon Steel | 180 to 280 HB | 150 - **225** - 300 | 0.08 - **0.20** - 0.30 | ACU2500<br>ACP100<br>ACP200<br>ACP300 |
| | | > 280HB | 75 - **150** - 230 | 0.08 - **0.20** - 0.30 | |
| | Alloy Steel | 180 to 280 HB | 100 - **175** - 250 | 0.08 - **0.15** - 0.25 | |
| M | Stainless Steel | 220 to 280 HB | 90 - **135** - 180 | 0.08 - **0.15** - 0.25 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |
| | | > 280HB | 75 - **125** - 170 | 0.08 - **0.15** - 0.25 | |
| K | Cast Iron/ Ductile Cast Iron | 250HB | 150 - **175** - 250 | 0.08 - **0.20** - 0.30 | ACU2500<br>ACK200<br>ACK300 |
| S | Exotic Alloy | — | 30 - **60** - 90 | 0.05 - **0.10** - 0.15 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |

Note
- The above recommended cutting conditions may require adjustment depending on machine rigidity and workpiece rigidity.
- The above figures are guidelines for use with BT40 machine tools.

● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available

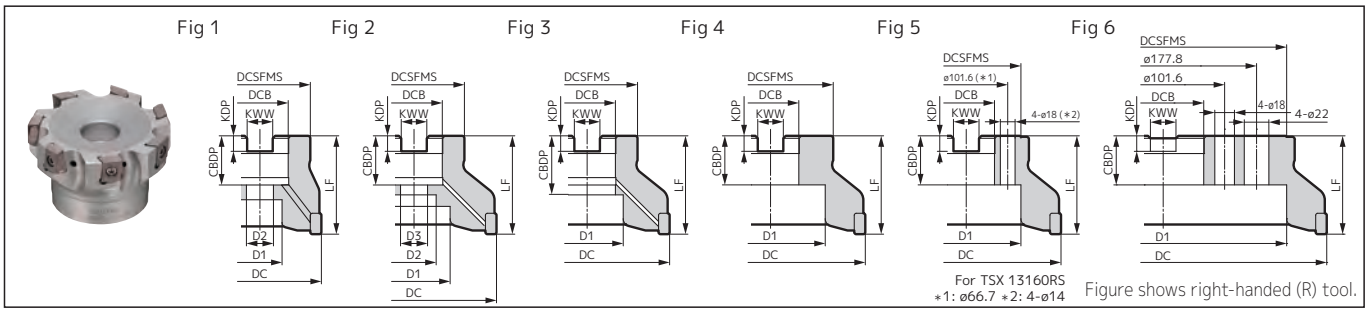
# TSX 13000R/L(S) type

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

| Rake Angle | | |
|---|---|---|
| | Radial | -23° to -15° |
| | Axial | -6° |

12mm 90°

Face Milling | Shoulder Milling | Side Milling




## Body (Standard Pitch)

Dimensions (mm)

| | Cat. No. | Stock R | Stock L | Dia. DC | Boss DCSFMS | Height LF | Hole Dia. DCB | Keyway Width KWW | Keyway Depth KDP | Mounting Depth CBDP | Bolt D1 | Bolt D2 | Bolt D3 | Number of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSX 13040RS/LS** | ● | | **40** | 33 | 40 | **16** | 8.4 | 5.6 | 18.0 | 14 | 9 | — | 3 | 0.20 | 1 |
| | **13050RS/LS** | ● | | **50** | 41 | 40 | **22** | 10.4 | 6.3 | 20.0 | 18 | 11 | — | 4 | 0.30 | 1 |
| | **13063RS/LS** | ● | | **63** | 50 | 40 | **22** | 10.4 | 6.3 | 20.0 | 18 | 11 | — | 5 | 0.50 | 1 |
| | **13080RS/LS** | ● | | ***80** | 55 | 50 | **27** | 12.4 | 7.0 | 22.0 | 20 | 14 | — | 5 | 0.92 | 1 |
| | **13100RS/LS** | ● | | **100** | 70 | 50 | **32** | 14.4 | 8.0 | 32.0 | 46 | — | — | 6 | 1.35 | 3 |
| | **13125RS/LS** | ● | | **125** | 80 | 63 | **40** | 16.4 | 9.0 | 29.0 | 52 | 29 | — | 7 | 2.55 | 1 |
| | **13160RS/LS** | ● | | **160** | 100 | 63 | **40** | 16.4 | 9.0 | 29.0 | 90 | — | — | 8 | 4.97 | 5 *1 *2 |
| | **13200RS/LS** | ● | | **200** | 130 | 63 | **60** | 25.7 | 14.0 | 35.0 | 135 | — | — | 12 | 6.20 | 5 |
| | **13250RS/LS** | ● | | **250** | 130 | 63 | **60** | 25.7 | 14.0 | 35.0 | 160 | — | — | 14 | 9.35 | 5 |
| | **13315RS/LS** | ● | | **315** | 240 | 63 | **60** | 25.7 | 14.0 | 35.0 | 230 | — | — | 16 | 16.42 | 6 |
| Inch | **TSX 13080R/L** | ● | | ***80** | 55 | 50 | **25.4** | 9.5 | 6.0 | 25.0 | 20 | 14 | — | 5 | 0.93 | 1 |
| | **13100R/L** | ● | | ***100** | 70 | 63 | **31.75** | 12.7 | 8.0 | 32.0 | 46 | 27 | 18 | 6 | 1.88 | 2 |
| | **13125R/L** | ● | | **125** | 80 | 63 | **38.1** | 15.9 | 10.0 | 35.5 | 55 | 30 | — | 7 | 2.61 | 1 |
| | **13160R/L** | ● | | **160** | 100 | 63 | **50.8** | 19.1 | 11.0 | 38.0 | 72 | — | — | 8 | 4.18 | 4 |
| | **13200R/L** | ● | | **200** | 130 | 63 | **47.625** | 25.4 | 14.0 | 35.0 | 135 | — | — | 12 | 6.36 | 5 |
| | **13250R/L** | ● | | **250** | 130 | 63 | **47.625** | 25.4 | 14.0 | 35.0 | 160 | — | — | 14 | 9.60 | 5 |
| | **13315R/L** | ● | | **315** | 240 | 63 | **47.625** | 25.4 | 14.0 | 35.0 | 230 | — | — | 16 | 16.68 | 6 |

Inserts are sold separately. Take note of the cutter mounting size (DCB) when selecting a cutter.

**Note** For mounting the cutters marked with * to an arbor, use a JIS B1176 hex socket bolt (ø80: M12 x 30 to 35mm, ø100: M16 x 40 to 45mm).

## Identification Code

**TSX 13 100 R S**

Series Code | Insert Size | Dia. | R: Right-Hand L: Left-Hand | Metric Bore

## Parts

| Applicable Cutter | Shim | Flat Insert Screw | | Integrated Wrench | Detachable Wrench: Handle Grip | Detachable Wrench: Bit | Anti-seizure Cream |
|---|---|---|---|---|---|---|---|
| TSX 13040RS/LS | — | BFTX03510IP | 3.0 | — | HPS1015 | TRB15IP | SUMI-P |
| TSX 13050RS/LS | | | | | | | |
| TSX 13063RS/LS | | | | | | | |
| TSX 13080RS/LS | | | | | | | |
| TSX 13100RS/LS | | | | | | | |
| TSX 13125RS/LS | | | | | | | |
| TSX 13160RS/LS | | | | TRDR15IP | — | — | |
| TSX 13200RS/LS | TSXS13R/L | | | | | | |
| TSX 13250RS/LS | | | | | | | |
| TSX 13315RS/LS | | | | | | | |
| TSX 13080R/L | — | | | — | HPS1015 | TRB15IP | |
| TSX 13100R/L | | | | | | | |
| TSX 13125R/L | | | | | | | |
| TSX 13160R/L | | | | TRDR15IP | — | — | |
| TSX 13200R/L | TSXS13R/L | | | | | | |
| TSX 13250R/L | | | | | | | |
| TSX 13315R/L | | | | | | | |

N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item Blank: Made-to-order item

# TSX 13000R/L(S) type Expansion

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

## Insert

Dimensions (mm)

| Grade Classification | | Coated Carbide | | | | | | | | | | | Cemented Carbide | DLC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process | High-speed/Light Cutting | K M S | P M | | | K | | M S | M S | | M S | | | N | | |
| | Medium Cutting | K M S | P M | P M | | K | | | M S | M S | M S | M S | N | N | | |
| | Roughing | K M S | | P M | P M | | K | New | | M S | | M S | | | | |
| Cat. No. | | ACU2500 | ACP100 | ACP200 | ACP300 | ACK200 | ACK300 | ACS1000 | ACS2500 | ACS3000 | ACM200 | ACM300 | H20 | DL2000 | Corner Radius RE | Fig |
| LNEX 130604PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-G | | ● | ● | ● | ● | ● | ● | | ● | ● | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.4 | 1 |
| 130608PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.8 | 1 |
| 130612PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.2 | 1 |
| 130616PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.6 | 1 |
| 130620PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.0 | 1 |
| 130624PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.4 | 1 |
| 130632PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 3.2 | 1 |
| LNEX 130602PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 1 |
| 130604PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 1 |
| 130608PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 1 |
| 130612PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 1 |
| 130616PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 1 |
| 130620PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.0 | 1 |
| 130624PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.4 | 1 |
| 130632PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 3.2 | 1 |
| LNEX 130604PNEL-L | | | | ● | | | ● | | | | | | — | — | 0.4 | 2 |
| 130608PNEL-L | | | | ● | | | ● | | | | | | — | — | 0.8 | 2 |
| 130612PNEL-L | | | | ● | | | ● | | | | | | — | — | 1.2 | 2 |
| 130616PNEL-L | | | | ● | | | ● | | | | | | — | — | 1.6 | 2 |
| 130620PNEL-L | | | | ● | | | ● | | | | | | — | — | 2.0 | 2 |
| 130624PNEL-L | | | | ● | | | ● | | | | | | — | — | 2.4 | 2 |
| 130632PNEL-L | | | | ● | | | ● | | | | | | — | — | 3.2 | 2 |
| LNEX 130604PNEL-G | | | | ● | | ● | ● | | | | | ▲ | — | — | 0.4 | 2 |
| 130608PNEL-G | | | | ● | | ● | ● | | | | | ▲ | — | — | 0.8 | 2 |
| 130612PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 1.2 | 2 |
| 130616PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 1.6 | 2 |
| 130620PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 2.0 | 2 |
| 130624PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 2.4 | 2 |
| 130632PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 3.2 | 2 |
| LNEX 130602PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 2 |
| 130604PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 2 |
| 130608PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 2 |
| 130612PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 2 |
| 130616PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 2 |
| 130620PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.0 | 2 |
| 130624PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.4 | 2 |
| 130632PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 3.2 | 2 |

Fig 1 (Right-Hand)

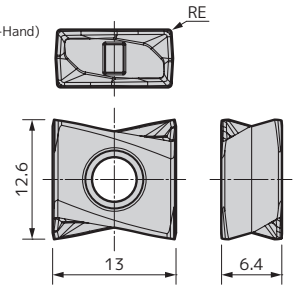
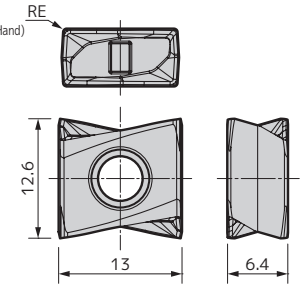



Fig 2 (Left-Hand)




## Recommended Cutting Conditions

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| P | Carbon Steel | 180 to 280HB | 150 - **225** - 300 | 0.10 - **0.30** - 0.40 | ACU2500 ACP100 ACP200 ACP300 |
| | | >280HB | 75 - **150** - 230 | 0.10 - **0.30** - 0.40 | |
| | Alloy Steel | 180 to 280HB | 100 - **175** - 250 | 0.10 - **0.25** - 0.35 | |
| M | Stainless Steel | 220 to 280HB | 90 - **135** - 180 | 0.10 - **0.20** - 0.30 | ACU2500 ACS2500 ACS3000 ACM200 ACM300 |
| | | >280HB | 75 - **125** - 170 | 0.10 - **0.20** - 0.30 | |

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| K | Cast Iron/ Ductile Cast Iron | 250HB | 150 - **175** - 250 | 0.10 - **0.30** - 0.40 | ACU2500 ACK200 ACK300 |
| S | Exotic Alloy | — | 30 - **60** - 90 | 0.10 - **0.15** - 0.20 | ACU2500 ACS2500 ACS3000 ACM200 ACM300 |

Note
- The above recommended cutting conditions may require adjustment depending on machine rigidity and workpiece rigidity.
- The above figures are guidelines for use with BT50 machine tools.

● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available

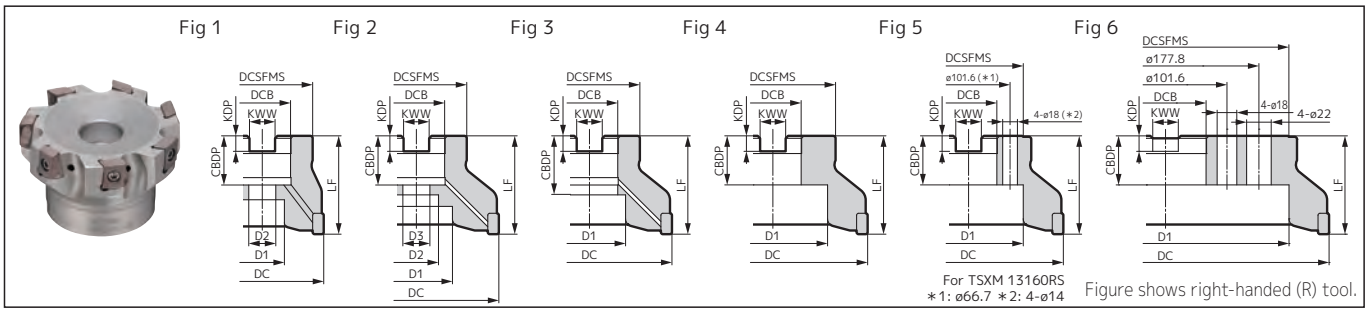
# TSXM 13000R/L(S) type

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

| Rake Angle | | |
|---|---|---|
| | Radial | -23° to 15° |
| | Axial | -6° |

12mm 90°

Face Milling | Shoulder Milling | Side Milling




## Body (Fine Pitch)

Dimensions (mm)

| | Cat. No. | Stock R | Stock L | Dia. DC | Boss DCSFMS | Height LF | Hole Dia. DCB | Keyway Width KWW | Keyway Depth KDP | Mounting Depth CBDP | Bolt D1 | Bolt D2 | Bolt D3 | Number of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSXM 13040RS/LS** | ● | | **40** | 33 | 40 | **16** | 8.4 | 5.6 | 18.0 | 14 | 9 | — | 4 | 0.19 | 1 |
| | **13050RS/LS** | ● | | **50** | 41 | 40 | **22** | 10.4 | 6.3 | 20.0 | 18 | 11 | — | 5 | 0.28 | 1 |
| | **13063RS/LS** | ● | | **63** | 50 | 40 | **22** | 10.4 | 6.3 | 20.0 | 18 | 11 | — | 6 | 0.50 | 1 |
| | **13080RS/LS** | ● | | ***80** | 55 | 50 | **27** | 12.4 | 7.0 | 22.0 | 20 | 14 | — | 7 | 0.92 | 1 |
| | **13100RS/LS** | ● | | **100** | 70 | 50 | **32** | 14.4 | 8.0 | 32.0 | 46 | — | — | 8 | 1.36 | 3 |
| | **13125RS/LS** | ● | | **125** | 80 | 63 | **40** | 16.4 | 9.0 | 29.0 | 52 | 29 | — | 10 | 2.57 | 1 |
| | **13160RS/LS** | ● | | **160** | 100 | 63 | **40** | 16.4 | 9.0 | 29.0 | 90 | — | — | 12 | 5.02 | 5 *1 *2 |
| | **13200RS/LS** | ● | | **200** | 130 | 63 | **60** | 25.7 | 14.0 | 35.0 | 135 | — | — | 16 | 6.32 | 5 |
| | **13250RS/LS** | ● | | **250** | 130 | 63 | **60** | 25.7 | 14.0 | 35.0 | 160 | — | — | 20 | 9.42 | 5 |
| | **13315RS/LS** | ● | | **315** | 240 | 63 | **60** | 25.7 | 14.0 | 35.0 | 230 | — | — | 24 | 16.37 | 6 |
| Inch | **TSXM 13080R/L** | ● | | ***80** | 55 | 50 | **25.4** | 9.5 | 6.0 | 25.0 | 20 | 14 | — | 7 | 0.93 | 1 |
| | **13100R/L** | ● | | ***100** | 70 | 63 | **31.75** | 12.7 | 8.0 | 32.0 | 46 | 27 | 18 | 8 | 1.90 | 2 |
| | **13125R/L** | ● | | **125** | 80 | 63 | **38.1** | 15.9 | 10.0 | 35.5 | 55 | 30 | — | 10 | 2.62 | 1 |
| | **13160R/L** | ● | | **160** | 100 | 63 | **50.8** | 19.1 | 11.0 | 38.0 | 72 | — | — | 12 | 4.22 | 4 |
| | **13200R/L** | ● | | **200** | 130 | 63 | **47.625** | 25.4 | 14.0 | 35.0 | 135 | — | — | 16 | 6.48 | 5 |
| | **13250R/L** | ● | | **250** | 130 | 63 | **47.625** | 25.4 | 14.0 | 35.0 | 160 | — | — | 20 | 9.68 | 5 |
| | **13315R/L** | ● | | **315** | 240 | 63 | **47.625** | 25.4 | 14.0 | 35.0 | 230 | — | — | 24 | 16.63 | 6 |

Inserts are sold separately. Take note of the cutter mounting size (DCB) when selecting a cutter.

**Note** For mounting the cutters marked with * to an arbor, use a JIS B1176 hex socket bolt (ø80: M12 x 30 to 35mm, ø100: M16 x 40 to 45mm).

## Identification Code

**TSX M 13 100 R S**

| TSX | M | 13 | 100 | R | S |
|---|---|---|---|---|---|
| Series Code | Fine Pitch | Insert Size | Dia. | R: Right-Hand L: Left-Hand | Metric Bore |

## Parts

| Applicable Cutter | Shim | Flat Insert Screw | | Integrated Wrench | Detachable Wrench Handle Grip | Detachable Wrench Bit | Anti-seizure Cream |
|---|---|---|---|---|---|---|---|
| | | | N·m | | | | |
| TSXM 13040RS/LS | — | BFTX03510IP | 3.0 | — | HPS1015 | TRB15IP | SUMI-P |
| TSXM 13050RS/LS | | | | | | | |
| TSXM 13063RS/LS | | | | | | | |
| TSXM 13080RS/LS | | | | | | | |
| TSXM 13100RS/LS | | | | | | | |
| TSXM 13125RS/LS | | | | | | | |
| TSXM 13160RS/LS | | | | | | | |
| TSXM 13200RS/LS | TSXS13R/L | | | TRDR15IP | — | — | |
| TSXM 13250RS/LS | | | | | | | |
| TSXM 13315RS/LS | | | | | | | |
| TSXM 13080R/L | — | | | — | HPS1015 | TRB15IP | |
| TSXM 13100R/L | | | | | | | |
| TSXM 13125R/L | | | | | | | |
| TSXM 13160R/L | | | | | | | |
| TSXM 13200R/L | TSXS13R/L | | | TRDR15IP | — | — | |
| TSXM 13250R/L | | | | | | | |
| TSXM 13315R/L | | | | | | | |

N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item Blank: Made-to-order item

# TSXM 13000R/L(S) type Expansion

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

## Insert

Dimensions (mm)

| Grade Classification | | Coated Carbide | | | | | | | | | | | Cemented Carbide | DLC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process | High-speed/Light Cutting | K M S | P M | | | K | | M S | M S | | M S | | | N | | |
| | Medium Cutting | K M S | P M | P M | | K | | | M S | M S | M S | M S | N | N | | |
| | Roughing | K M S | | P M | P M | | K | New | | M S | | M S | | | | |
| Cat. No. | | ACU2500 | ACP100 | ACP200 | ACP300 | ACK200 | ACK300 | ACS1000 | ACS2500 | ACS3000 | ACM200 | ACM300 | H20 | DL2000 | Corner Radius RE | Fig |
| LNEX 130604PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-G | | ● | ● | ● | ● | ● | ● | | ● | ● | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.4 | 1 |
| 130608PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.8 | 1 |
| 130612PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.2 | 1 |
| 130616PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.6 | 1 |
| 130620PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.0 | 1 |
| 130624PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.4 | 1 |
| 130632PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 3.2 | 1 |
| LNEX 130602PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 1 |
| 130604PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 1 |
| 130608PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 1 |
| 130612PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 1 |
| 130616PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 1 |
| 130620PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.0 | 1 |
| 130624PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.4 | 1 |
| 130632PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 3.2 | 1 |
| LNEX 130604PNEL-L | | | | ● | | | ● | | | | | | — | — | 0.4 | 2 |
| 130608PNEL-L | | | | ● | | | ● | | | | | | — | — | 0.8 | 2 |
| 130612PNEL-L | | | | ● | | | ● | | | | | | — | — | 1.2 | 2 |
| 130616PNEL-L | | | | ● | | | ● | | | | | | — | — | 1.6 | 2 |
| 130620PNEL-L | | | | ● | | | ● | | | | | | — | — | 2.0 | 2 |
| 130624PNEL-L | | | | ● | | | ● | | | | | | — | — | 2.4 | 2 |
| 130632PNEL-L | | | | ● | | | ● | | | | | | — | — | 3.2 | 2 |
| LNEX 130604PNEL-G | | | | ● | | ● | ● | | | | | ▲ | — | — | 0.4 | 2 |
| 130608PNEL-G | | | | ● | | ● | ● | | | | | ▲ | — | — | 0.8 | 2 |
| 130612PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 1.2 | 2 |
| 130616PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 1.6 | 2 |
| 130620PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 2.0 | 2 |
| 130624PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 2.4 | 2 |
| 130632PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 3.2 | 2 |
| LNEX 130602PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 2 |
| 130604PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 2 |
| 130608PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 2 |
| 130612PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 2 |
| 130616PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 2 |
| 130620PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.0 | 2 |
| 130624PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.4 | 2 |
| 130632PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 3.2 | 2 |

Fig 1 (Right-Hand)

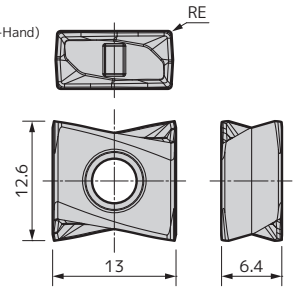
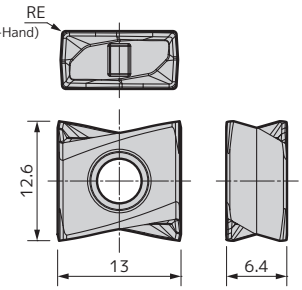



Fig 2 (Left-Hand)




## Recommended Cutting Conditions

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| P | Carbon Steel | 180 to 280HB | 150 - **225** - 300 | 0.10 - **0.30** - 0.40 | ACU2500 ACP100 ACP200 ACP300 |
| | | >280HB | 75 - **150** - 230 | 0.10 - **0.30** - 0.40 | |
| | Alloy Steel | 180 to 280HB | 100 - **175** - 250 | 0.10 - **0.25** - 0.35 | |
| M | Stainless Steel | 220 to 280HB | 90 - **135** - 180 | 0.10 - **0.20** - 0.30 | ACU2500 ACS2500 ACS3000 ACM200 ACM300 |
| | | >280HB | 75 - **125** - 170 | 0.10 - **0.20** - 0.30 | |

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| K | Cast Iron/ Ductile Cast Iron | 250HB | 150 - **175** - 250 | 0.10 - **0.30** - 0.40 | ACU2500 ACK200 ACK300 |
| S | Exotic Alloy | — | 30 - **60** - 90 | 0.10 - **0.15** - 0.20 | ACU2500 ACS2500 ACS3000 ACM200 ACM300 |

Note
- The above recommended cutting conditions may require adjustment depending on machine rigidity and workpiece rigidity.
- The above figures are guidelines for use with BT50 machine tools.

● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available

# TSXF 13000R/L(S) type

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

| Rake Angle | Radial | -23 to -15° |
|---|---|---|
| | Axial | -6° |

12mm 90°

Face Milling | Shoulder Milling | Side Milling

Fig 1 Fig 2 Fig 3 Fig 4 Fig 5

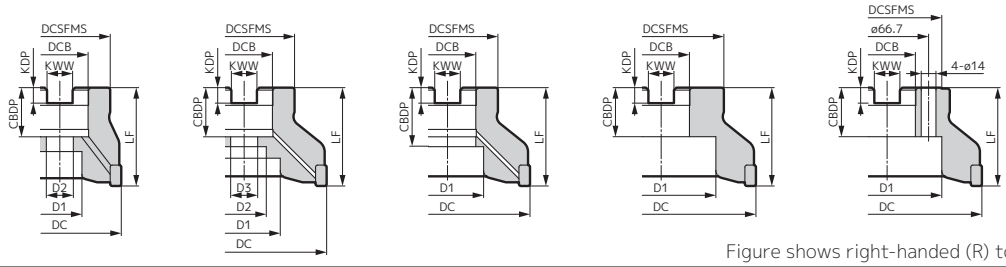



Figure shows right-handed (R) tool.

## Body (Extra Fine Pitch)

Dimensions (mm)

| | Cat. No. | Stock R | Stock L | Dia. DC | Boss DCSFMS | Height LF | Hole Dia. DCB | Keyway Width KWW | Keyway Depth KDP | Mounting Depth CBDP | Bolt D1 | Bolt D2 | Bolt D3 | Number of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSXF 13040RS/LS** | ● | | **40** | 33 | 40 | **16** | 8.4 | 5.6 | 18.0 | 14 | 9 | — | 5 | 0.18 | 1 |
| | **13050RS/LS** | ● | | **50** | 41 | 40 | **22** | 10.4 | 6.3 | 20.0 | 18 | 11 | — | 6 | 0.29 | 1 |
| | **13063RS/LS** | ● | | **63** | 50 | 40 | **22** | 10.4 | 6.3 | 20.0 | 18 | 11 | — | 7 | 0.50 | 1 |
| | **13080RS/LS** | ● | | ***80** | 55 | 50 | **27** | 12.4 | 7.0 | 22.0 | 20 | 14 | — | 8 | 0.92 | 1 |
| | **13100RS/LS** | ● | | **100** | 70 | 50 | **32** | 14.4 | 8.0 | 32.0 | 46 | — | — | 10 | 1.34 | 3 |
| | **13125RS/LS** | ● | | **125** | 80 | 63 | **40** | 16.4 | 9.0 | 29.0 | 52 | 29 | — | 14 | 2.58 | 1 |
| | **13160RS/LS** | ● | | **160** | 130 | 63 | **40** | 16.4 | 9.0 | 29.0 | 90 | — | — | 16 | 5.08 | 5 |
| Inch | **TSXF 13080R/L** | ● | | ***80** | 55 | 50 | **25.4** | 9.5 | 6.0 | 25.0 | 20 | 14 | — | 8 | 0.93 | 1 |
| | **13100R/L** | ● | | ***100** | 70 | 63 | **31.75** | 12.7 | 8.0 | 32.0 | 46 | 27 | 18 | 10 | 1.88 | 2 |
| | **13125R/L** | ● | | **125** | 80 | 63 | **38.1** | 15.9 | 10.0 | 35.5 | 55 | 30 | — | 14 | 2.60 | 1 |
| | **13160R/L** | ● | | **160** | 100 | 63 | **50.8** | 19.1 | 11.0 | 38.0 | 72 | — | — | 16 | 4.28 | 4 |

Inserts are sold separately. Take note of the cutter mounting size (DCB) when selecting a cutter.

**Note** For mounting the cutters marked with * to an arbor, use a JIS B1176 hex socket bolt (ø80: M12 x 30 to 35mm, ø100: M16 x 40 to 45mm).

## Identification Code

**TSX F 13 100 R S**

| TSX | F | 13 | 100 | R | S |
|---|---|---|---|---|---|
| Series Code | Extra Fine Pitch | Insert Size | Dia. | R: Right-Hand L: Left-Hand | Metric Bore |

## Parts

| Applicable Cutter | Flat Insert Screw | | Integrated Wrench | Detachable Wrench Handle Grip | Detachable Wrench Bit | Anti-seizure Cream |
|---|---|---|---|---|---|---|
| | | N·m | | | | |
| TSXF 13040RS/LS | BFTX03510IP | 3.0 | — | HPS1015 | TRB15IP | SUMI-P |
| TSXF 13050RS/LS | | | | | | |
| TSXF 13063RS/LS | | | | | | |
| TSXF 13080RS/LS | | | | | | |
| TSXF 13100RS/LS | | | | | | |
| TSXF 13125RS/LS | | | | | | |
| TSXF 13160RS/LS | | | TRDR15IP | — | — | |
| TSXF 13080R/L | | | — | HPS1015 | TRB15IP | |
| TSXF 13100R/L | | | | | | |
| TSXF 13125R/L | | | | | | |
| TSXF 13160R/L | | | TRDR15IP | — | — | |

N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item Blank: Made-to-order item

# TSXF 13000R/L(S) type Expansion

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

## Insert

Dimensions (mm)

| Grade Classification | | Coated Carbide | | | | | | | | | | | Cemented Carbide | DLC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process | High-speed/Light Cutting | S M | P M | | | K | | M S | M S | | M S | | | N | | |
| | Medium Cutting | S M | P M | P M | | K | | | M S | M S | M S | M S | N | N | | |
| | Roughing | S M | | P M | P M | | K | New | | M S | | M S | | | | |
| Cat. No. | | ACU2500 | ACP100 | ACP200 | ACP300 | ACK200 | ACK300 | ACS1000 | ACS2500 | ACS3000 | ACM200 | ACM300 | H20 | DL2000 | Corner Radius RE | Fig |
| LNEX 130604PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-G | | ● | ● | ● | ● | ● | ● | | ● | ● | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.4 | 1 |
| 130608PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.8 | 1 |
| 130612PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.2 | 1 |
| 130616PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.6 | 1 |
| 130620PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.0 | 1 |
| 130624PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.4 | 1 |
| 130632PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 3.2 | 1 |
| LNEX 130602PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 1 |
| 130604PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 1 |
| 130608PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 1 |
| 130612PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 1 |
| 130616PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 1 |
| 130620PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.0 | 1 |
| 130624PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.4 | 1 |
| 130632PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 3.2 | 1 |
| LNEX 130604PNEL-L | | | | ● | | | ● | | | | | | — | — | 0.4 | 2 |
| 130608PNEL-L | | | | ● | | | ● | | | | | | — | — | 0.8 | 2 |
| 130612PNEL-L | | | | ● | | | ● | | | | | | — | — | 1.2 | 2 |
| 130616PNEL-L | | | | ● | | | ● | | | | | | — | — | 1.6 | 2 |
| 130620PNEL-L | | | | ● | | | ● | | | | | | — | — | 2.0 | 2 |
| 130624PNEL-L | | | | ● | | | ● | | | | | | — | — | 2.4 | 2 |
| 130632PNEL-L | | | | ● | | | ● | | | | | | — | — | 3.2 | 2 |
| LNEX 130604PNEL-G | | | | ● | | ● | ● | | | | | ▲ | — | — | 0.4 | 2 |
| 130608PNEL-G | | | | ● | | ● | ● | | | | | ▲ | — | — | 0.8 | 2 |
| 130612PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 1.2 | 2 |
| 130616PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 1.6 | 2 |
| 130620PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 2.0 | 2 |
| 130624PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 2.4 | 2 |
| 130632PNEL-G | | | | ● | | ● | ● | | | | | | — | — | 3.2 | 2 |
| LNEX 130602PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 2 |
| 130604PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 2 |
| 130608PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 2 |
| 130612PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 2 |
| 130616PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 2 |
| 130620PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.0 | 2 |
| 130624PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.4 | 2 |
| 130632PNFL-S | | — | — | — | — | — | — | — | — | — | — | — | | | 3.2 | 2 |

Fig 1 (Right-Hand)

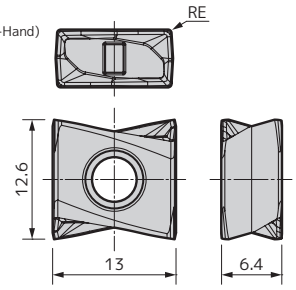
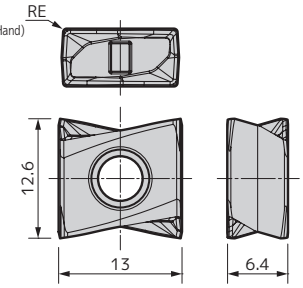



Fig 2 (Left-Hand)




## Recommended Cutting Conditions

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| P | Carbon Steel | 180 to 280HB | 150 - **225** - 300 | 0.10 - **0.30** - 0.40 | ACU2500 ACP100 ACP200 ACP300 |
| | | >280HB | 75 - **150** - 230 | 0.10 - **0.30** - 0.40 | |
| | Alloy Steel | 180 to 280HB | 100 - **175** - 250 | 0.10 - **0.25** - 0.35 | |
| M | Stainless Steel | 220 to 280HB | 90 - **135** - 180 | 0.10 - **0.20** - 0.30 | ACU2500 ACS2500 ACS3000 ACM200 ACM300 |
| | | >280HB | 75 - **125** - 170 | 0.10 - **0.20** - 0.30 | |

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| K | Cast Iron/ Ductile Cast Iron | 250HB | 150 - **175** - 250 | 0.10 - **0.30** - 0.40 | ACU2500 ACK200 ACK300 |
| S | Exotic Alloy | — | 30 - **60** - 90 | 0.10 - **0.15** - 0.20 | ACU2500 ACS2500 ACS3000 ACM200 ACM300 |

Note
- The above recommended cutting conditions may require adjustment depending on machine rigidity and workpiece rigidity.
- The above figures are guidelines for use with BT50 machine tools.

● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available

# TSX(F) 08000E type

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

| Rake Angle | Radial | -36 to -20° |
|---|---|---|
| | Axial | -6° |

8mm 90°

Face Milling | Shoulder Milling | Groove Milling | Side Milling

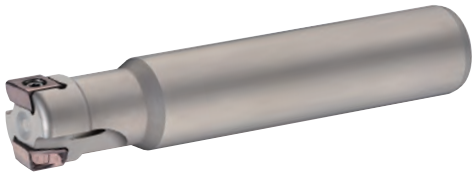
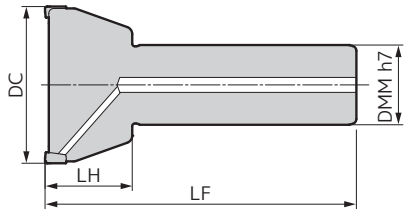


Fig 1


Fig 2




## Body (Standard Pitch)

Dimensions (mm)

| | Cat. No. | Stock | Dia. DC | Shank Dia. DMM | Head LH | Overall Length LF | Number of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSX 08016E** | ● | **16** | 16 | 25 | 100 | 2 | 0.13 | 1 |
| | **08020E** | ● | **20** | 20 | 30 | 110 | 2 | 0.22 | 1 |
| | **08020E-16** | ● | **20** | 16 | 30 | 110 | 2 | 0.15 | 2 |
| | **08025E** | ● | **25** | 25 | 30 | 120 | 3 | 0.40 | 1 |
| | **08025E-20** | ● | **25** | 20 | 30 | 120 | 3 | 0.26 | 2 |
| | **08032E** | ● | **32** | 32 | 30 | 120 | 3 | 0.67 | 1 |
| | **08032E-25** | ● | **32** | 25 | 30 | 120 | 3 | 0.43 | 2 |
| | **08040E** | ● | **40** | 32 | 30 | 120 | 4 | 0.72 | 2 |
| | **08050E** | ● | **50** | 32 | 30 | 120 | 5 | 0.85 | 2 |
| | **08063E** | ● | **63** | 32 | 35 | 125 | 6 | 1.09 | 2 |
| | **08080E** | ● | **80** | 32 | 35 | 125 | 7 | 1.44 | 2 |

Inserts are sold separately.

## Body (Extra Fine Pitch)

Dimensions (mm)

| | Cat. No. | Stock | Dia. DC | Shank Dia. DMM | Head LH | Overall Length LF | Number of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSXF 08020E** | ● | **20** | 20 | 30 | 110 | 3 | 0.22 | 1 |
| | **08025E** | ● | **25** | 25 | 30 | 120 | 4 | 0.40 | 1 |
| | **08032E** | ● | **32** | 32 | 30 | 120 | 5 | 0.67 | 1 |
| | **08040E** | ● | **40** | 32 | 30 | 120 | 6 | 0.73 | 2 |
| | **08050E** | ● | **50** | 32 | 30 | 120 | 8 | 0.85 | 2 |
| | **08063E** | ● | **63** | 32 | 35 | 125 | 10 | 1.10 | 2 |
| | **08080E** | ● | **80** | 32 | 35 | 125 | 11 | 1.42 | 2 |

Inserts are sold separately.

## Identification Code

| TSX | F | 08 | 032 | E | (-25) |
|---|---|---|---|---|---|
| Series Code | Extra Fine Pitch | Insert Size | Dia. | Shank type | Shank Dia. |

## Parts

| Applicable Cutter | Flat Insert Screw | | Wrench | Anti-seizure Cream |
|---|---|---|---|---|
| TSX 08016E, TSX 08020E, TSXF 08020E | BFTX0306IP | 2.0 | TRDR08IP | SUMI-P |
| TSX 08025E to 80E, TSXF 08025E to 80E | BFTX0308IP | | | |

N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item

# TSX(F) 08000E type Expansion

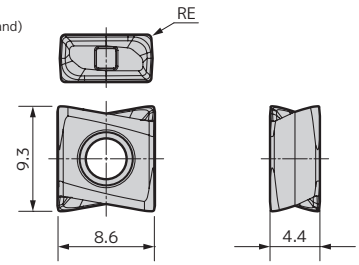
P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

## Insert

Dimensions (mm)

| Grade Classification | | Coated Carbide | | | | | | | | | | | Cemented Carbide | DLC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process | High-speed/Light Cutting | K M S | P M | | | K | | M S | M S | | M S | | | N | | |
| | Medium Cutting | K M S | P M | P M | | K | | | M S | M S | M S | M S | N | N | | |
| | Roughing | K M S | | P M | P M | | K | New | | M S | | M S | | | | |
| Cat. No. | | ACU2500 | ACP100 | ACP200 | ACP300 | ACK200 | ACK300 | ACS1000 | ACS2500 | ACS3000 | ACM200 | ACM300 | H20 | DL2000 | Corner Radius RE | Fig |
| LNEX 080404PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 080408PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.8 | 1 |
| 080412PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 080416PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| LNEX 080404PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 080408PNER-G | | ● | ● | ● | ● | ● | ● | | ● | ● | ▲ | ▲ | — | — | 0.8 | 1 |
| 080412PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 080416PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| LNEX 080402PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 1 |
| 080404PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 1 |
| 080408PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 1 |
| 080412PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 1 |
| 080416PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 1 |

Fig 1
(Right-Hand)




## Recommended Cutting Conditions

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| P | Carbon Steel | 180 to 280 HB | 150 - **225** - 300 | 0.08 - **0.20** - 0.30 | ACU2500<br>ACP100<br>ACP200<br>ACP300 |
| | | > 280HB | 75 - **150** - 230 | 0.08 - **0.20** - 0.30 | |
| | Alloy Steel | 180 to 280 HB | 100 - **175** - 250 | 0.08 - **0.15** - 0.25 | |
| M | Stainless Steel | 220 to 280 HB | 90 - **135** - 180 | 0.08 - **0.15** - 0.25 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |
| | | > 280HB | 75 - **125** - 170 | 0.08 - **0.15** - 0.25 | |
| K | Cast Iron/ Ductile Cast Iron | 250HB | 150 - **175** - 250 | 0.08 - **0.20** - 0.30 | ACU2500<br>ACK200<br>ACK300 |
| S | Exotic Alloy | — | 30 - **60** - 90 | 0.05 - **0.10** - 0.15 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |

**Note**
- The above recommended cutting conditions may require adjustment depending on machine rigidity and workpiece rigidity.
- The above figures are guidelines for use with BT40 machine tools.
- For groove milling, adjust the feed rate to around 70% of the above values.
  ＊For goove milling, use ø32mm or less; standard pitch is recommended.

● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available

# TSX(M/F) 13000E type

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

| Rake Angle | | |
|---|---|---|
| | Radial | -31 to -15° |
| | Axial | -6° |

12mm 90°

Face Milling | Shoulder Milling | Groove Milling | Side Milling

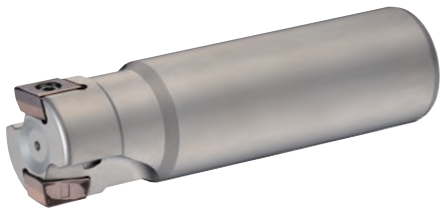


Fig 1

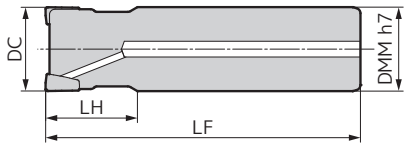
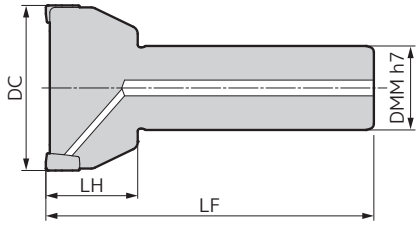



Fig 2




## Body (Standard Pitch)

Dimensions (mm)

| | Cat. No. | Stock | Dia. DC | Shank Dia. DMM | Head LH | Overall Length LF | Number of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSX 13025E** | ● | **25** | 25 | 35 | 120 | 2 | 0.38 | 1 |
| | **13032E** | ● | **32** | 32 | 35 | 120 | 2 | 0.66 | 1 |
| | **13040E** | ● | **40** | 32 | 30 | 120 | 3 | 0.71 | 2 |
| | **13050E** | ● | **50** | 32 | 30 | 120 | 4 | 0.81 | 2 |
| | **13063E** | ● | **63** | 32 | 35 | 125 | 5 | 1.08 | 2 |
| | **13080E** | ● | **80** | 32 | 35 | 125 | 5 | 1.40 | 2 |

Inserts are sold separately.

## Body (Fine Pitch)

Dimensions (mm)

| | Cat. No. | Stock | Dia. DC | Shank Dia. DMM | Head LH | Overall Length LF | Number of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSXM 13032E** | ● | **32** | 32 | 35 | 120 | 3 | 0.65 | 1 |
| | **13040E** | ● | **40** | 32 | 30 | 120 | 4 | 0.71 | 2 |
| | **13050E** | ● | **50** | 32 | 30 | 120 | 5 | 0.80 | 2 |
| | **13063E** | ● | **63** | 32 | 35 | 125 | 6 | 1.07 | 2 |
| | **13080E** | ● | **80** | 32 | 35 | 125 | 7 | 1.41 | 2 |

Inserts are sold separately.

## Body (Extra Fine Pitch)

Dimensions (mm)

| | Cat. No. | Stock | Dia. DC | Shank Dia. DMM | Head LH | Overall Length LF | Number of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSXF 13040E** | ● | **40** | 32 | 30 | 120 | 5 | 0.70 | 2 |
| | **13050E** | ● | **50** | 32 | 30 | 120 | 6 | 0.80 | 2 |
| | **13063E** | ● | **63** | 32 | 35 | 125 | 7 | 1.07 | 2 |
| | **13080E** | ● | **80** | 32 | 35 | 125 | 8 | 1.42 | 2 |

Inserts are sold separately.

## Parts

| Flat Insert Screw | | Wrench | Anti-seizure Cream |
|---|---|---|---|
|  | N·m |  |  |
| BFTX03510IP | 3.0 | TRDR15IP | SUMI-P |

## Identification Code

**TSX M 13 050 E**

- TSX: Series Code
- M: M : Fine Pitch, F : Extra Fine Pitch
- 13: Insert Size
- 050: Dia.
- E: Shank type

N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item

# TSX(M/F) 1300E type Expansion

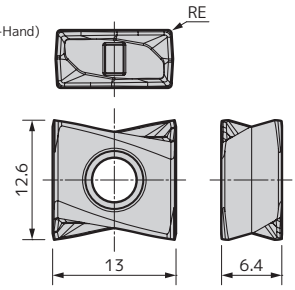
P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

## Insert

Dimensions (mm)

| Grade Classification | | Coated Carbide | | | | | | | | | | | Cemented Carbide | DLC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process | High-speed/Light Cutting | K M S | P M | | | K | | M S | M S | | M S | | | N | | |
| | Medium Cutting | K M S | P M | P M | | K | | | M S | M S | M S | M S | N | N | | |
| | Roughing | K M S | | P M | P M | | K | New | | M S | | M S | | | | |
| Cat. No. | | ACU2500 | ACP100 | ACP200 | ACP300 | ACK200 | ACK300 | ACS1000 | ACS2500 | ACS3000 | ACM200 | ACM300 | H20 | DL2000 | Corner Radius RE | Fig |
| LNEX 130604PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-G | | ● | ● | ● | ● | ● | ● | | ● | ● | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.4 | 1 |
| 130608PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.8 | 1 |
| 130612PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.2 | 1 |
| 130616PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.6 | 1 |
| 130620PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.0 | 1 |
| 130624PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.4 | 1 |
| 130632PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 3.2 | 1 |
| LNEX 130602PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 1 |
| 130604PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 1 |
| 130608PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 1 |
| 130612PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 1 |
| 130616PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 1 |
| 130620PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.0 | 1 |
| 130624PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.4 | 1 |
| 130632PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 3.2 | 1 |

Fig 1
(Right-Hand)




## Recommended Cutting Conditions

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| P | Carbon Steel | 180 to 280HB | 150 - **225** - 300 | 0.10 - **0.30** - 0.40 | ACU2500<br>ACP100<br>ACP200<br>ACP300 |
| | | >280HB | 75 - **150** - 230 | 0.10 - **0.30** - 0.40 | |
| | Alloy Steel | 180 to 280HB | 100 - **175** - 250 | 0.10 - **0.25** - 0.35 | |
| M | Stainless Steel | 220 to 280HB | 90 - **135** - 180 | 0.10 - **0.20** - 0.30 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |
| | | >280HB | 75 - **125** - 170 | 0.10 - **0.20** - 0.30 | |
| K | Cast Iron/ Ductile Cast Iron | 250HB | 150 - **175** - 250 | 0.10 - **0.30** - 0.40 | ACU2500<br>ACK200<br>ACK300 |
| S | Exotic Alloy | — | 30 - **60** - 90 | 0.10 - **0.15** - 0.20 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |

**Note**
- The above recommended cutting conditions may require adjustment depending on machine rigidity and workpiece rigidity.
- The above figures are guidelines for use with BT50 machine tools.
- For groove milling, adjust the feed rate to around 70% of the above values.
  ∗For goove milling, use ø32mm or less; standard pitch is recommended.

● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available

# TSXR 08000RS type

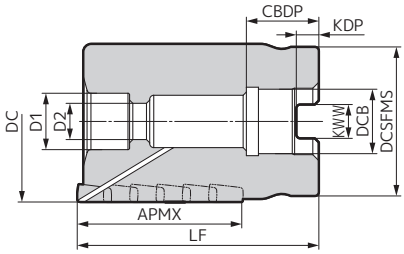
P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

| Rake Angle | | |
|---|---|---|
| | Radial | -20 to -15° |
| | Axial | -6 to -3° |

34-60mm 90°

Shoulder Milling | Side Milling

Fig 1




## Body

Dimensions (mm)

| | Cat. No. | Stock | Dia. DC | Max. Depth of Cut APMX | Boss DCSFMS | Height LF | Hole Dia. DCB | Keyway Width KWW | Keyway Depth KDP | Mounting Depth CBDP | Bolt D1 | Bolt D2 | Total No. of Teeth | No. of Stages | Effective No. of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSXR 08032RS3416Z02** | ● | **32** | 34 | 33 | 55 | **16** | 8.4 | 5.6 | 18.0 | 14 | 9 | 10 | 5 | 2 | 0.17 | 1 |
| | **08040RS4016Z03** | ● | **40** | 40 | 37 | 60 | **16** | 8.4 | 5.6 | 18.0 | 14 | 9 | 18 | 6 | 3 | 0.32 | 1 |
| | **08050RS5422Z03** | ● | **50** | 54 | 47 | 75 | **22** | 10.4 | 6.3 | 20.0 | 18 | 11 | 24 | 8 | 3 | 0.70 | 1 |
| | **08050RS5422Z04** | ● | **50** | 54 | 47 | 75 | **22** | 10.4 | 6.3 | 20.0 | 18 | 11 | 32 | 8 | 4 | 0.68 | 1 |
| | **08063RS6027Z05** | ● | **63** | 60 | 60 | 80 | **27** | 12.4 | 7.0 | 22.0 | 20 | 14 | 45 | 9 | 5 | 1.25 | 1 |

Inserts are sold separately.

## Identification Code

**TSXR 08 050 R S 54 22 Z03**

| TSXR | 08 | 050 | R | S | 54 | 22 | Z03 |
|---|---|---|---|---|---|---|---|
| Series Code | Insert Size | Dia. | Right-Hand | Metric Bore | Max. Depth of Cut | Mounting Size | Effective No. of Teeth |

## Parts

| Applicable Cutter | Flat Insert Screw | | Wrench | Bolt | Anti-seizure Cream |
|---|---|---|---|---|---|
| TSXR 08032RS3416Z02 | BFTX0308IP | 2.0 | TRDR08IP | BX0845 | SUMI-P |
| TSXR 08040RS4016Z03 | | | | BX0850 | |
| TSXR 08050RS5422Z03 | | | | BX1060 | |
| TSXR 08050RS5422Z04 | | | | | |
| TSXR 08063RS6027Z05 | | | | BX1265 | |

N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item

# TSXR 08000RS type Expansion

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

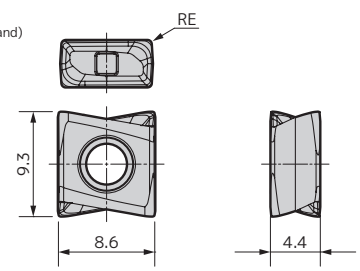
## Insert

Dimensions (mm)

| Grade Classification | | Coated Carbide | | | | | | | | | | | Cemented Carbide | DLC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process | High-speed/Light Cutting | K M S | P M | | | K | | M S | M S | | M S | | | N | | |
| | Medium Cutting | K M S | P M | P M | | K | | | M S | M S | M S | M S | N | N | | |
| | Roughing | K M S | | P M | P M | | K | New | | M S | | M S | | | | |
| Cat. No. | | ACU2500 | ACP100 | ACP200 | ACP300 | ACK200 | ACK300 | ACS1000 | ACS2500 | ACS3000 | ACM200 | ACM300 | H20 | DL2000 | Corner Radius RE | Fig |
| **LNEX 080404PNER-L** | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| **080408PNER-L** | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.8 | 1 |
| **080412PNER-L** | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| **080416PNER-L** | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| **LNEX 080404PNER-G** | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| **080408PNER-G** | | ● | ● | ● | ● | ● | ● | | ● | ● | ▲ | ▲ | — | — | 0.8 | 1 |
| **080412PNER-G** | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| **080416PNER-G** | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| **LNEX 080402PNFR-S** | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 1 |
| **080404PNFR-S** | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 1 |
| **080408PNFR-S** | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 1 |
| **080412PNFR-S** | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 1 |
| **080416PNFR-S** | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 1 |

Use peripheral inserts with RE of 0.8mm or less from the second stage and above.

Fig 1
(Right-Hand)




## Recommended Cutting Conditions

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| P | Carbon Steel | 180 to 280HB | 110 - **200** - 280 | 0.08 - **0.20** - 0.30 | ACU2500<br>ACP100<br>ACP200<br>ACP300 |
| | | >280HB | 70 - **135** - 200 | 0.08 - **0.20** - 0.30 | |
| | Alloy Steel | 180 to 280HB | 90 - **155** - 220 | 0.08 - **0.15** - 0.25 | |
| M | Stainless Steel | 220 to 280HB | 90 - **135** - 180 | 0.08 - **0.15** - 0.25 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |
| | | >280HB | 70 - **115** - 160 | 0.08 - **0.15** - 0.25 | |
| K | Cast Iron/ Ductile Cast Iron | 250HB | 125 - **175** - 225 | 0.08 - **0.20** - 0.30 | ACU2500<br>ACK200<br>ACK300 |
| S | Exotic Alloy | — | 30 - **60** - 90 | 0.05 - **0.10** - 0.15 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |

**Note**
- The above recommended cutting conditions may require adjustment depending on machine rigidity and workpiece rigidity.
- The above figures are guidelines for use with BT50 machine tools.
- The above are the recommended cutting conditions for ae = diameter DC 20% or less.

● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available

# TSXR 13000RS type

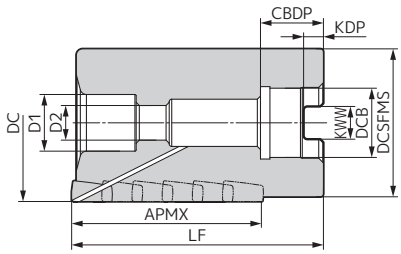
P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

| Rake Angle | | |
|---|---|---|
| | Radial | -23 to -15° |
| | Axial | -6 to -3° |

41-60mm 90°

Shoulder Milling | Side Milling

Fig 1




## Body

Dimensions (mm)

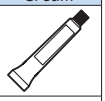
| | Cat. No. | Stock | Dia. DC | Max. Depth of Cut APMX | Boss DCSFMS | Height LF | Hole Dia. DCB | Keyway Width KWW | Keyway Depth KDP | Mounting Depth CBDP | Bolt D1 | Bolt D2 | Total No. of Teeth | No. of Stages | Effective No. of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSXR 13040RS4116Z02** | ● | **40** | 41 | 37 | 60 | **16** | 8.4 | 5.6 | 18.0 | 14 | 9 | 8 | 4 | 2 | 0.31 | 1 |
| | **13050RS6022Z03** | ● | **50** | 60 | 47 | 80 | **22** | 10.4 | 6.3 | 20.0 | 18 | 11 | 18 | 6 | 3 | 0.66 | 1 |
| | **13063RS5027Z03** | ● | **63** | 50 | 60 | 75 | **27** | 12.4 | 7.0 | 22.0 | 20 | 14 | 15 | 5 | 3 | 1.12 | 1 |
| | **13063RS6027Z04** | ● | **63** | 60 | 60 | 80 | **27** | 12.4 | 7.0 | 22.0 | 20 | 14 | 24 | 6 | 4 | 1.15 | 1 |
| | **13080RS6032Z04** | ● | **80** | 60 | 77 | 80 | **32** | 14.4 | 8.0 | 26.0 | 25 | 18 | 24 | 6 | 4 | 2.06 | 1 |
| | **13080RS6032Z05** | ● | **80** | 60 | 77 | 80 | **32** | 14.4 | 8.0 | 26.0 | 25 | 18 | 30 | 6 | 5 | 2.04 | 1 |
| | **13100RS6040Z05** | ● | **100** | 60 | 88 | 85 | **40** | 16.4 | 9.0 | 29.0 | 32 | 21 | 30 | 6 | 5 | 3.45 | 1 |
| | **13100RS6040Z06** | ● | **100** | 60 | 88 | 85 | **40** | 16.4 | 9.0 | 29.0 | 32 | 21 | 36 | 6 | 6 | 3.44 | 1 |
| | **13125RS6040Z07** | ● | **125** | 60 | 100 | 85 | **40** | 16.4 | 9.0 | 29.0 | 32 | 21 | 42 | 6 | 7 | 5.63 | 1 |

Inserts are sold separately.

## Identification Code

| TSXR | 13 | 050 | R | S | 60 | 22 | Z03 |
|---|---|---|---|---|---|---|---|
| Series Code | Insert Size | Dia. | Right-Hand | Metric Bore | Max. Depth of Cut | Mounting Size | Effective No. of Teeth |

## Parts

| Applicable Cutter | Flat Insert Screw | | Integrated Wrench | Detachable Wrench: Handle Grip | Detachable Wrench: Bit | Bolt | Anti-seizure Cream |
|---|---|---|---|---|---|---|---|
| |  | N·m |  |  |  |  |  |
| TSXR 13040RS4116Z02 | BFTX03510IP | **3.0** | — | HPS1015 | TRB15IP | BX0850 | SUMI-P |
| TSXR 13050RS6022Z03 | | | | | | BX1060 | |
| TSXR 13063RS5027Z03 | | | | | | BX1260 | |
| TSXR 13063RS6027Z04 | | | | | | BX1265 | |
| TSXR 13080RS6032Z04 | | | TRDR15IP | — | — | BX1660 | |
| TSXR 13080RS6032Z05 | | | | | | | |
| TSXR 13100RS6040Z05 | | | | | | BX2065 | |
| TSXR 13100RS6040Z06 | | | | | | | |
| TSXR 13125RS6040Z07 | | | | | | | |

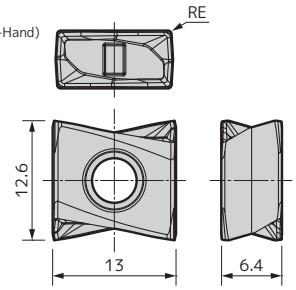
N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item

## Insert

Dimensions (mm)

| Grade Classification | | Coated Carbide | | | | | | | | | | | Cemented Carbide | DLC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process | High-speed/Light Cutting | P M S | P M | | | K | | M S | M S | | M S | | | N | | |
| | Medium Cutting | P M S | P M | P M | | K | | | M S | M S | M S | M S | N | N | | |
| | Roughing | P M S | | P M | P M | | K | New | | M S | | M S | | | | |
| Cat. No. | | ACU2500 | ACP100 | ACP200 | ACP300 | ACK200 | ACK300 | ACS1000 | ACS2500 | ACS3000 | ACM200 | ACM300 | H20 | DL2000 | Corner Radius RE | Fig |
| LNEX 130604PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-G | | ● | ● | ● | ● | ● | ● | | ● | ● | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.4 | 1 |
| 130608PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.8 | 1 |
| 130612PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.2 | 1 |
| 130616PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.6 | 1 |
| 130620PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.0 | 1 |
| 130624PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.4 | 1 |
| 130632PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 3.2 | 1 |
| LNEX 130602PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 1 |
| 130604PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 1 |
| 130608PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 1 |
| 130612PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 1 |
| 130616PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 1 |
| 130620PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.0 | 1 |
| 130624PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.4 | 1 |
| 130632PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 3.2 | 1 |

Fig 1
(Right-Hand)




Use peripheral inserts with RE of 0.8mm or less from the second stage and above.

## Recommended Cutting Conditions

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| P | Carbon Steel | 180 to 280 HB | 110 - **200** - 280 | 0.10 - **0.20** - 0.30 | ACU2500<br>ACP100<br>ACP200<br>ACP300 |
| | | > 280HB | 70 - **135** - 200 | 0.10 - **0.20** - 0.30 | |
| | Alloy Steel | 180 to 280 HB | 90 - **155** - 220 | 0.10 - **0.15** - 0.25 | |
| M | Stainless Steel | 220 to 280 HB | 90 - **135** - 180 | 0.10 - **0.15** - 0.25 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |
| | | > 280HB | 70 - **115** - 160 | 0.10 - **0.15** - 0.25 | |
| K | Cast Iron/ Ductile Cast Iron | 250HB | 125 - **175** - 225 | 0.10 - **0.20** - 0.30 | ACU2500<br>ACK200<br>ACK300 |
| S | Exotic Alloy | — | 30 - **60** - 90 | 0.05 - **0.10** - 0.15 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |

Note
- The above recommended cutting conditions may require adjustment depending on machine rigidity and workpiece rigidity.
- The above figures are guidelines for use with BT50 machine tools.
- The above are the recommended cutting conditions for ae = diameter DC 20% or less.

● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available

# TSXR 08000E type

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

| Rake Angle | | |
|---|---|---|
| | Radial | -33 to -18° |
| | Axial | -6° to -3° |

21-40mm 90°

Shoulder Milling | Side Milling

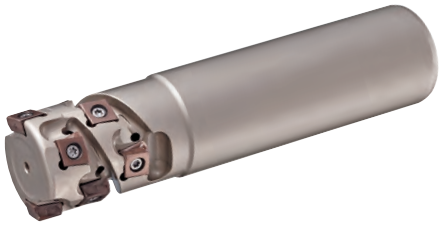


Fig 1

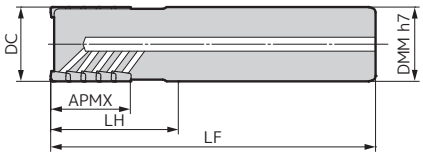
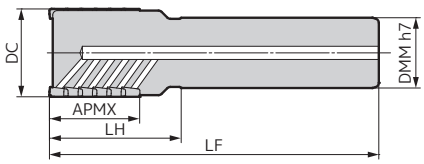



Fig 2




## Body

Dimensions (mm)

| | Cat. No. | Stock | Dia. DC | Max. Depth of Cut APMX | Shank Dia. DMM | Head LH | Overall Length LF | Total No. of Teeth | No. of Stages | Effective No. of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSXR 08020E2120Z01** | ● | **20** | 21 | 20 | 30 | 110 | 3 | 3 | 1 | 0.22 | 1 |
| | **08025E2725Z02** | ● | **25** | 27 | 25 | 35 | 125 | 8 | 4 | 2 | 0.39 | 1 |
| | **08032E3432Z02** | ● | **32** | 34 | 32 | 50 | 140 | 10 | 5 | 2 | 0.74 | 1 |
| | **08040E4032Z03** | ● | **40** | 40 | 32 | 60 | 150 | 18 | 6 | 3 | 0.92 | 2 |

Inserts are sold separately.

## Identification Code

| TSXR | 08 | 025 | E | 27 | 25 | Z02 |
|---|---|---|---|---|---|---|
| Series Code | Insert Size | Dia. | Shank type | Max. Depth of Cut | Shank Dia. | Effective No. of Teeth |

## Parts

| Flat Insert Screw | | Wrench | Anti-seizure Cream |
|---|---|---|---|
|  |  |  |  |
| BFTX0308IP | 2.0 | TRDR08IP | SUMI-P |

N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item

# TSXR 08000E type Expansion

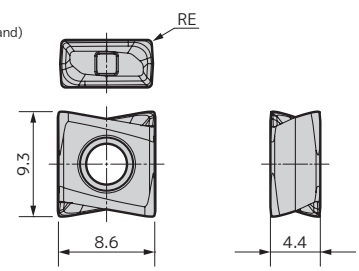
P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

## Insert

Dimensions (mm)

| Grade Classification | | Coated Carbide | | | | | | | | | | | Cemented Carbide | DLC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process | High-speed/Light Cutting | K M S | P M | | | K | | M S | M S | | M S | | | N | | |
| | Medium Cutting | K M S | P M | P M | | K | | | M S | M S | M S | M S | N | N | | |
| | Roughing | K M S | | P M | P M | | K | New | | M S | | M S | | | | |
| Cat. No. | | ACU2500 | ACP100 | ACP200 | ACP300 | ACK200 | ACK300 | ACS1000 | ACS2500 | ACS3000 | ACM200 | ACM300 | H20 | DL2000 | Corner Radius RE | Fig |
| **LNEX 080404PNER-L** | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| **080408PNER-L** | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.8 | 1 |
| **080412PNER-L** | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| **080416PNER-L** | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| **LNEX 080404PNER-G** | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| **080408PNER-G** | | ● | ● | ● | ● | ● | ● | | ● | ● | ▲ | ▲ | — | — | 0.8 | 1 |
| **080412PNER-G** | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| **080416PNER-G** | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| **LNEX 080402PNFR-S** | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 1 |
| **080404PNFR-S** | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 1 |
| **080408PNFR-S** | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 1 |
| **080412PNFR-S** | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 1 |
| **080416PNFR-S** | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 1 |

Fig 1
(Right-Hand)




Use peripheral inserts with RE of 0.8mm or less from the second stage and above.

## Recommended Cutting Conditions

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| P | Carbon Steel | 180 to 280HB | 110 - **200** - 280 | 0.08 - **0.20** - 0.30 | ACU2500<br>ACP100<br>ACP200<br>ACP300 |
| | | >280HB | 70 - **135** - 200 | 0.08 - **0.20** - 0.30 | |
| | Alloy Steel | 180 to 280HB | 90 - **155** - 220 | 0.08 - **0.15** - 0.25 | |
| M | Stainless Steel | 220 to 280HB | 90 - **135** - 180 | 0.08 - **0.15** - 0.25 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |
| | | >280HB | 70 - **115** - 160 | 0.08 - **0.15** - 0.25 | |
| K | Cast Iron/ Ductile Cast Iron | 250HB | 125 - **175** - 225 | 0.08 - **0.20** - 0.30 | ACU2500<br>ACK200<br>ACK300 |
| S | Exotic Alloy | — | 30 - **60** - 90 | 0.05 - **0.10** - 0.15 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |

**Note**
- The above recommended cutting conditions may require adjustment depending on machine rigidity and workpiece rigidity.
- The above figures are guidelines for use with BT50 machine tools.
- The above are the recommended cutting conditions for ae = diameter DC 20% or less.

● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available

# TSXR 13000E type

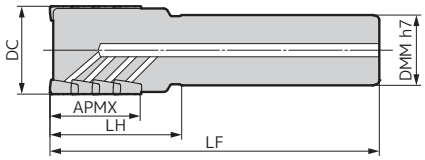
P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

| Rake Angle | Radial | -23 to -18° |
|---|---|---|
| | Axial | -6° to -3° |

41-60mm 90°

Shoulder Milling | Side Milling

Fig 1




## Body

Dimensions (mm)

| | Cat. No. | Stock | Dia. DC | Max. Depth of Cut APMX | Shank Dia. DMM | Head LH | Overall Length LF | Total No. of Teeth | No. of Stages | Effective No. of Teeth | Weight (kg) | Fig |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric | **TSXR 13040E4132Z02** | ● | **40** | 41 | 32 | 60 | 150 | 8 | 4 | 2 | 0.91 | 1 |
| | **13050E6042Z03** | ● | **50** | 60 | 42 | 80 | 170 | 18 | 6 | 3 | 1.74 | 1 |

Inserts are sold separately.

## Identification Code

| TSXR | 13 | 050 | E | 60 | 42 | Z03 |
|---|---|---|---|---|---|---|
| Series Code | Insert Size | Dia. | Shank type | Max. Depth of Cut | Shank Dia. | Effective No. of Teeth |

## Parts

| Flat Insert Screw | | Wrench | Anti-seizure Cream |
|---|---|---|---|
|  | N·m |  |  |
| BFTX03510IP | 3.0 | TRDR15IP | SUMI-P |

N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item

# TSXR 13000E type Expansion

P Steel | M Stainless Steel | K Cast Iron | S Exotic Alloy

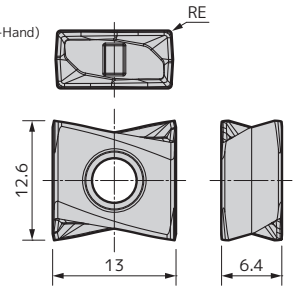
## Insert

Dimensions (mm)

| Grade Classification | | Coated Carbide | | | | | | | | | | | Cemented Carbide | DLC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Process | High-speed/Light Cutting | K M S | P M | | | K | | M S | M S | | M S | | | N | | |
| | Medium Cutting | K M S | P M | P M | | K | | | M S | M S | M S | M S | N | N | | |
| | Roughing | K M S | | P M | P M | | K | New | | M S | | M S | | | | |
| Cat. No. | | ACU2500 | ACP100 | ACP200 | ACP300 | ACK200 | ACK300 | ACS1000 | ACS2500 | ACS3000 | ACM200 | ACM300 | H20 | DL2000 | Corner Radius RE | Fig |
| LNEX 130604PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-L | | ● | | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-L | | ● | | ● | | | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 0.4 | 1 |
| 130608PNER-G | | ● | ● | ● | ● | ● | ● | | ● | ● | ▲ | ▲ | — | — | 0.8 | 1 |
| 130612PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.2 | 1 |
| 130616PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 1.6 | 1 |
| 130620PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.0 | 1 |
| 130624PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 2.4 | 1 |
| 130632PNER-G | | ● | ● | ● | ● | ● | ● | | | | ▲ | ▲ | — | — | 3.2 | 1 |
| LNEX 130604PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.4 | 1 |
| 130608PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 0.8 | 1 |
| 130612PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.2 | 1 |
| 130616PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 1.6 | 1 |
| 130620PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.0 | 1 |
| 130624PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 2.4 | 1 |
| 130632PNER-H | | ● | | ● | ● | ● | ● | | | | | | — | — | 3.2 | 1 |
| LNEX 130602PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.2 | 1 |
| 130604PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.4 | 1 |
| 130608PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 0.8 | 1 |
| 130612PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.2 | 1 |
| 130616PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 1.6 | 1 |
| 130620PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.0 | 1 |
| 130624PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 2.4 | 1 |
| 130632PNFR-S | | — | — | — | — | — | — | — | — | — | — | — | | | 3.2 | 1 |

Use peripheral inserts with RE of 0.8mm or less from the second stage and above.

Fig 1
(Right-Hand)




## Recommended Cutting Conditions

| ISO | Work Material | Hardness | Cutting Speed vc (m/min) Min. - **Optimum** - Max. | Feed Rate fz (mm/t) Min. - **Optimum** - Max. | Insert Grade |
|---|---|---|---|---|---|
| P | Carbon Steel | 180 to 280 HB | 110 - **200** - 280 | 0.10 - **0.20** - 0.30 | ACU2500<br>ACP100<br>ACP200<br>ACP300 |
| | | > 280HB | 70 - **135** - 200 | 0.10 - **0.20** - 0.30 | |
| | Alloy Steel | 180 to 280 HB | 90 - **155** - 220 | 0.10 - **0.15** - 0.25 | |
| M | Stainless Steel | 220 to 280 HB | 90 - **135** - 180 | 0.10 - **0.15** - 0.25 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |
| | | > 280HB | 70 - **115** - 160 | 0.10 - **0.15** - 0.25 | |
| K | Cast Iron/ Ductile Cast Iron | 250HB | 125 - **175** - 225 | 0.10 - **0.20** - 0.30 | ACU2500<br>ACK200<br>ACK300 |
| S | Exotic Alloy | — | 30 - **60** - 90 | 0.05 - **0.10** - 0.15 | ACU2500<br>ACS2500<br>ACS3000<br>ACM200<br>ACM300 |

Note
- The above recommended cutting conditions may require adjustment depending on machine rigidity and workpiece rigidity.
- The above figures are guidelines for use with BT50 machine tools.
- The above are the recommended cutting conditions for ae = diameter DC 20% or less.

● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available

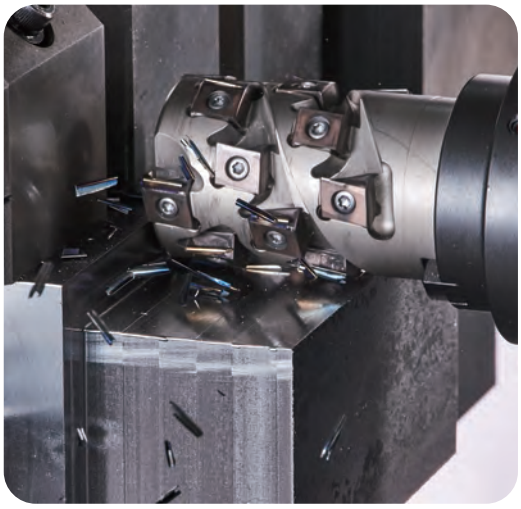
# SEC-Sumi Dual Mill TSX series Repeater Made-to-Order Request Sheet (1)

**Select a cutter design and enter the dimensions in ☐.**

After completion, send the sheet to our nearest sales office or distributor.

Feel free to contact us for other shapes or dimensions or with other requests.

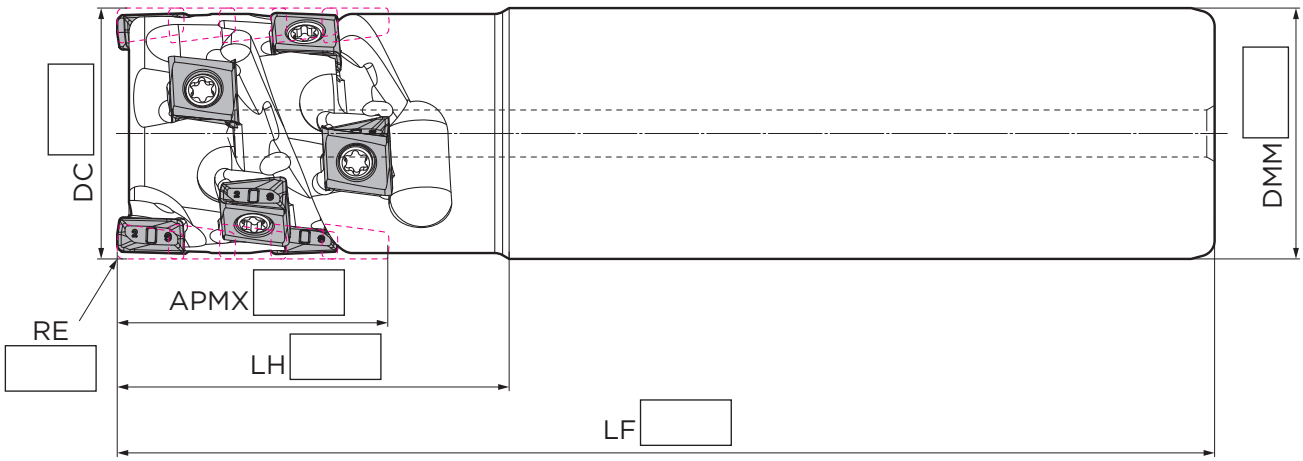
Company Name/Contact



**Reference Specifications**

| Applicable Inserts | Dia. (mm) DC | Max. Depth of Cut (mm) APMX | Total No. of Teeth | No. of Stages | Max. Effective No. of Teeth | Specifications Shell | Specifications Shank |
|---|---|---|---|---|---|---|---|
| LNEX08 (Refer to P21) | 20 | 21 | 3 | 3 | 1 | | ○ |
| | 25 | 27 | 8 | 4 | 2 | | ○ |
| | 32 | 34 | 10 | 5 | 2 | ○ | ○ |
| | 40 | 40 | 18 | 6 | 3 | ○ | ○ |
| | 50 | 54 | 32 | 8 | 4 | ○ | |
| | 63 | 60 | 45 | 9 | 5 | ○ | |
| LNEX13 (Refer to P23) | 40 | 41 | 8 | 4 | 2 | ○ | ○ |
| | 50 | 60 | 18 | 6 | 3 | ○ | ○ |
| | 63 | 60 | 24 | 6 | 4 | ○ | |
| | 80 | 60 | 30 | 6 | 5 | ○ | |
| | 100 | 60 | 36 | 6 | 6 | ○ | |
| | 125 | 60 | 42 | 6 | 7 | ○ | |

☑ **Shank type** Refer to the reference specifications above when completing.




## Accessories

| Flat Insert Screw | Wrench | Anti-seizure Cream |
|---|---|---|
|  |  |  |

- The tip insert corner radius (RE) can be selected. (Applicable size: Refer to P7 ■ Product Range) Other inserts are all RE = 0.8mm or less.
- Effective No. of Teeth Desired: ☐
- Coolant Hole: Yes ☑ No ☑

# SEC-Sumi Dual Mill TSX series Repeater Made-to-Order Request Sheet (2)

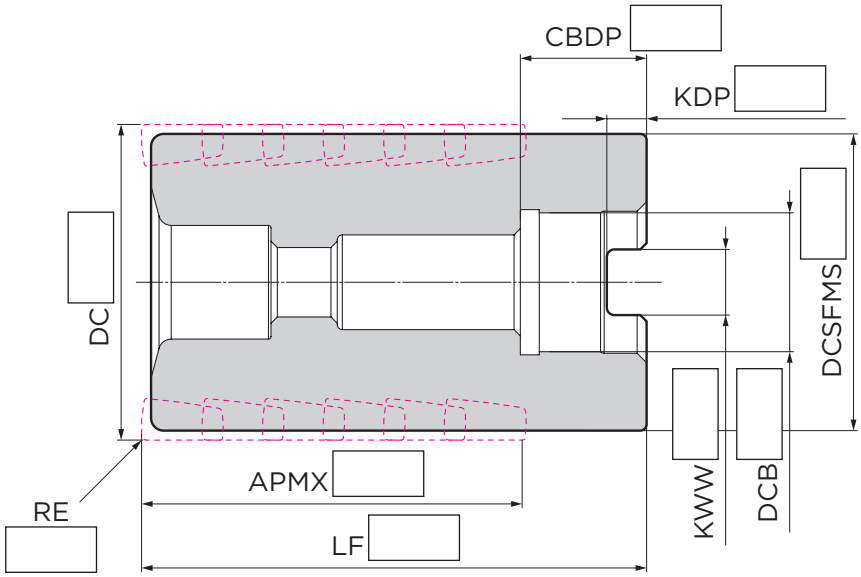
**Select a cutter design and enter the dimensions in ☐.**

After completion, send the sheet to our nearest sales office or distributor.

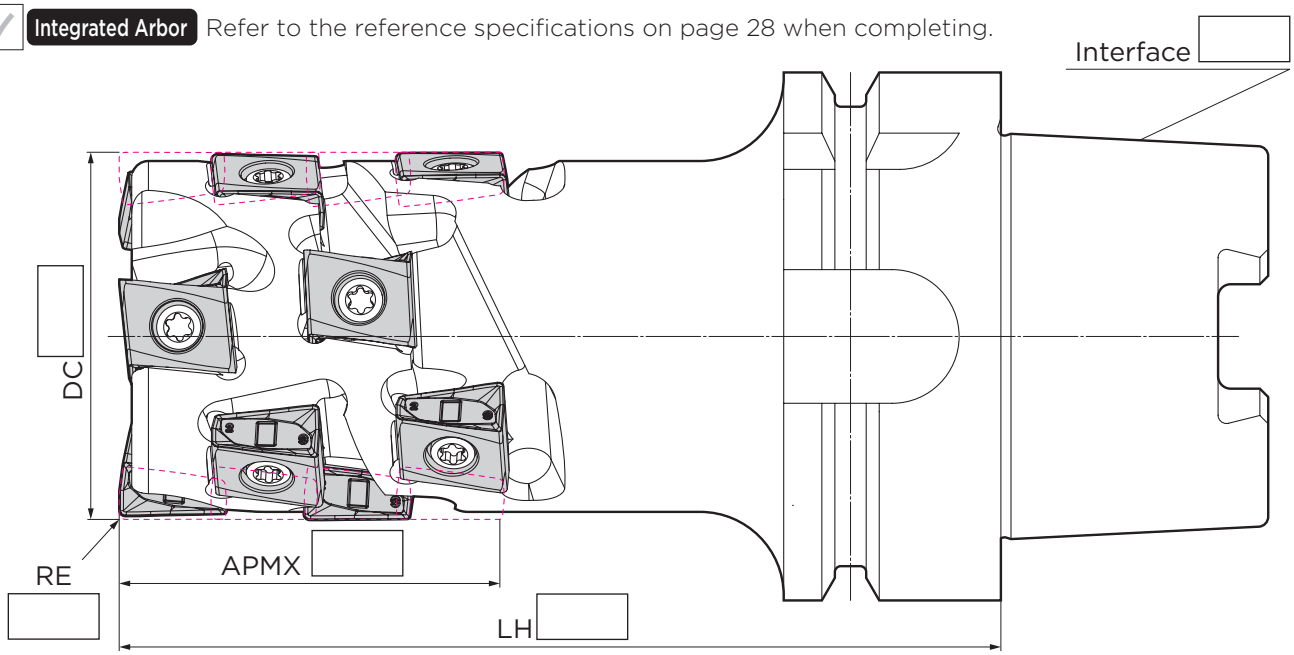
Feel free to contact us for other shapes or dimensions or with other requests.

Company Name/Contact

☑ **Shell type** Refer to the reference specifications on page 28.




☑ **Integrated Arbor** Refer to the reference specifications on page 28 when completing.




## Accessories

| Flat Insert Screw | Wrench | Bolt | Anti-seizure Cream |
|---|---|---|---|
|  |  |  ∗Shell type Only |  |

- The tip insert corner radius (RE) can be selected. (Applicable size: Refer to P7 ■ Product Range) Other inserts are all RE = 0.8mm or less.
- Effective No. of Teeth Desired: ☐
- Coolant Hole: Yes ☑ No ☑

# SEC-Sumi Dual Mill TSX series Side Cutter Made-to-Order Sheet

**Select a cutter design and enter the dimensions in ☐.**

After completion, send the sheet to our nearest sales office or distributor.

Feel free to contact us for other shapes or dimensions or with other requests.

Company Name/Contact

## Insert series Configuration

| Cat. No. | Corner Radius RE (mm) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
| LNEX 0804○○PNER/L-L | ● | ● | ● | ● | — | — | — |
| LNEX 0804○○PNER/L-G | ● | ● | ● | ● | — | — | — |
| LNEX 1306○○PNER/L-L | ● | ● | ● | ● | ● | ● | ● |
| LNEX 1306○○PNER/L-G | ● | ● | ● | ● | ● | ● | ● |
| LNEX 1306○○PNER-H | ● | ● | ● | ● | ● | ● | ● |

— mark: Not available

**[Insert Special Orders]**

LNEX08 has Corner Radius (RE) = 0.4 to 1.6mm

LNEX13 has Corner Radius (RE) = 0.4 to 3.2mm. Both right-hand and left-hand types are supported.
(Radius shape after machining may differ from the mounted insert corner radius RE size.)

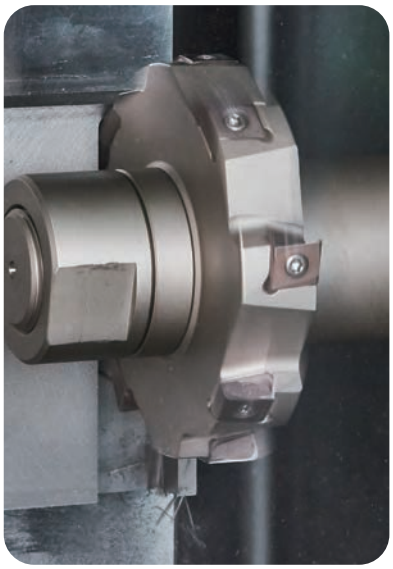
LNEX1306SSPNEL-H (left-handed H type chipbreaker) is not available.

| CW Size Reference Specification | |
|---|---|
| 14mm | LNEX08 (Refer to P21) |
| 18 to 22mm | LNEX13 (Refer to P23) |

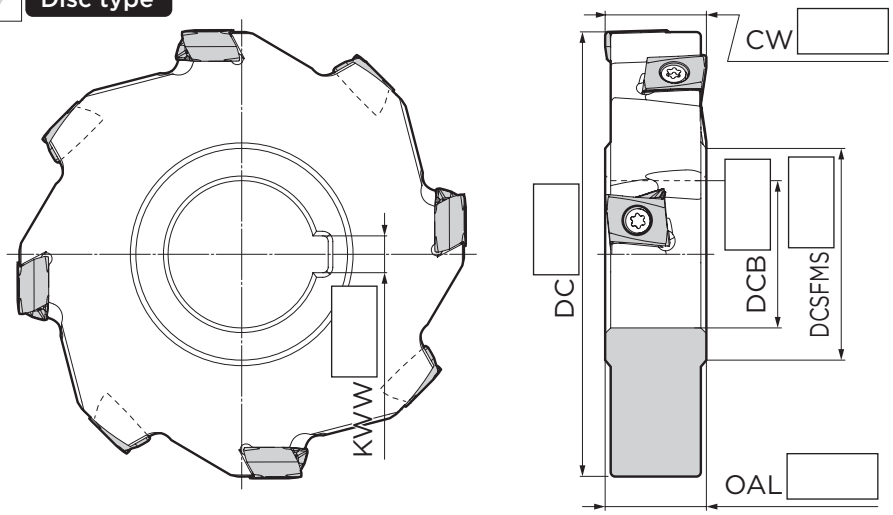
A multi-stage design is required if the CW size exceeds the above.

## Accessories

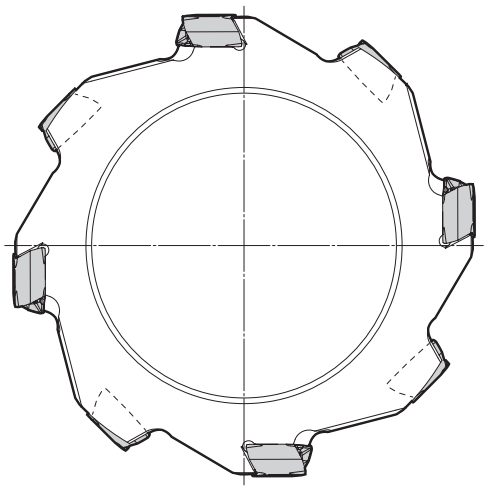
| Flat Insert Screw | Wrench | Anti-seizure Cream |
|---|---|---|
|  |  |  |

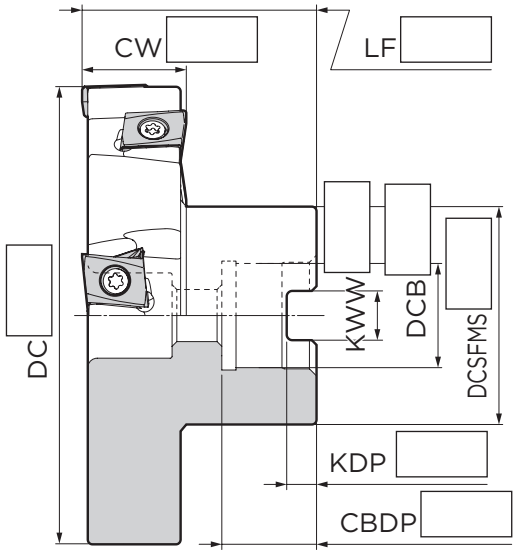


✓ **Disc type**




✓ **Boss type**






· Effective No. of Teeth Desired: ☐

# SEC-Sumi Dual Mill TSX series Made-to-Order Request Sheet

Company Name/Contact

## Select a cutter design and enter the dimensions in ☐.

After completion, send the sheet to our nearest sales office or distributor.

Feel free to contact us for other shapes or dimensions or with other requests.

## Insert series Configuration

| Cat. No. | Corner Radius RE (mm) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 | 2.4 | 3.2 |
| LNEX 0804○○PNER/L-L | ● | ● | ● | ● | — | — | — |
| LNEX 0804○○PNER/L-G | ● | ● | ● | ● | — | — | — |
| LNEX 1306○○PNER/L-L | ● | ● | ● | ● | ● | ● | ● |
| LNEX 1306○○PNER/L-G | ● | ● | ● | ● | ● | ● | ● |
| LNEX 1306○○PNER-H | ● | ● | ● | ● | ● | ● | ● |

— mark: Not available

**[Insert Special Orders]**

LNEX08 has Corner Radius (RE) = 0.4 to 1.6mm

LNEX13 has Corner Radius (RE) = 0.4 to 3.2mm. Both right-hand and left-hand types are supported.
(Radius shape after machining may differ from the mounted insert corner radius RE size.)

LNEX1306SSPNEL-H (left-handed H type chipbreaker) is not available.

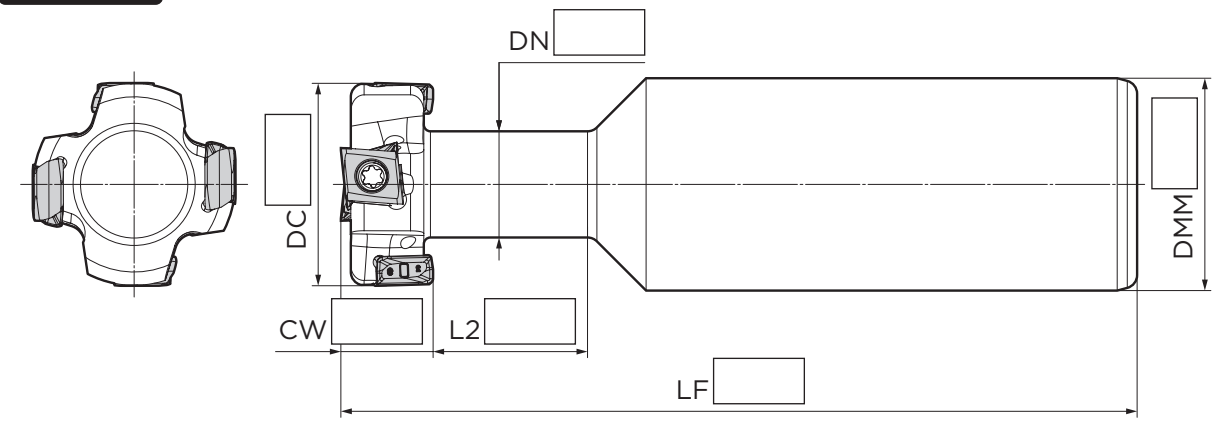
| CW Size Reference Specification | |
|---|---|
| 14mm | LNEX08 (Refer to P21) |
| 18 to 22mm | LNEX13 (Refer to P23) |

A multi-stage design is required if the CW size exceeds the above.

## Accessories

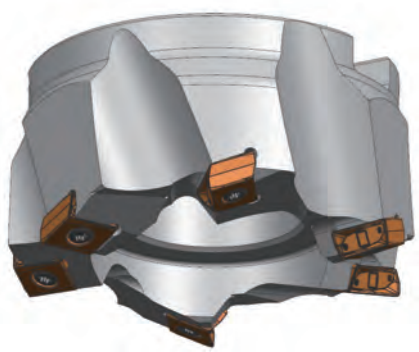
| Flat Insert Screw | Wrench | Anti-seizure Cream |
|---|---|---|
|  |  |  |

☑ **T-Slot type**

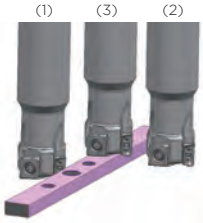



· Effective No. of Teeth Desired: ☐ · Coolant Hole: Yes ☑ No ☑

## Angled cutters, high-feed cutters and bore cutters can be designed. For details, please contact us.

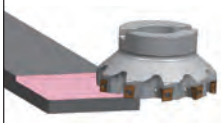


## Application Examples

| SCM440 Machine Component | | Sumitomo | Conventional Tool |
|---|---|---|---|
| Machining Centre: BT30 | Tool | TSXF 08020E | Vertical type 4 Corners |
|  | Grade | ACP200 | — |
| | Chipbreaker | G | — |
| | Cutter Dia. (mm) | 20 | 20 |
| | Number of Teeth | 3 | 3 |
| | vc (m/min) | 270 | 270 |
| | vf (mm/min) | 650 | 650 |
| | fz (mm/t) | 0.05 | 0.05 |
| | ap (mm) | 8.0 | 8.0 |
| | ae (mm) | 0.64 | 0.64 |
| | Coolant | Wet | Wet |
| | Results | Reduced finishing processes thanks to wall accuracy superior to conventional tools. | |



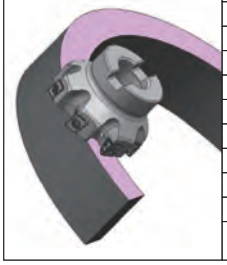
(1)(2) Side Milling
(3) Face Milling

| SUS304L Guide | | Sumitomo | Conventional Tool |
|---|---|---|---|
| Machining Centre: BT50 | Tool | TSXM 13125RS | — |
|  | Grade | ACM200 | — |
| | Chipbreaker | L | — |
| | Cutter Dia. (mm) | 125 | 125 |
| | Number of Teeth | 10 | 8 |
| | vc (m/min) | 70 | 70 |
| | vf (mm/min) | 80 | 40 |
| | fz (mm/t) | 0.045 | 0.028 |
| | ap (mm) | 5.0 | 5.0 |
| | ae (mm) | 95 | 95 |
| | Coolant | Wet | Wet |
| | Results | 2 times the machining efficiency and 2 times longer tool life. | |

| FC250 Cylinder Block | | Sumitomo | Conventional Tool |
|---|---|---|---|
| Machining Centre: BT40 | Tool | TSX 13050RS | — |
|  | Grade | ACK300 | — |
| | Chipbreaker | L | — |
| | Cutter Dia. (mm) | 50 | 50 |
| | Number of Teeth | 4 | 4 |
| | vc (m/min) | 235 | 235 |
| | vf (mm/min) | 600 | 600 |
| | fz (mm/t) | 0.1 | 0.1 |
| | ap (mm) | 0.8 | 0.8 |
| | ae (mm) | 0.8 | 0.8 |
| | Coolant | Wet | Wet |
| | Results | Dimensional tolerance and surface roughness superior to conventional tools. | |

| Cast Steel Shaft Housing | | Sumitomo | Conventional Tool |
|---|---|---|---|
| Machining Centre: BT40 | Tool | TSX 13100R | — |
|  | Grade | ACP200 | — |
| | Chipbreaker | G | — |
| | Cutter Dia. (mm) | 100 | 100 |
| | Number of Teeth | 6 | 8 |
| | vc (m/min) | 180 | 141 |
| | vf (mm/min) | 962 | 1,000 |
| | fz (mm/t) | 0.28 | 0.28 |
| | ap (mm) | Roughing: 3mm, Finishing: 1mm | Roughing: 3mm, Finishing: 1mm |
| | ae (mm) | — | — |
| | Coolant | Wet | Wet |
| | Results | Machined surface superior to conventional tools. | |

| Ductile Cast Iron Housing | | Sumitomo | Conventional Tool |
|---|---|---|---|
| Machining Centre: BT40 | Tool | TSXM 13050RS | Single-Sided, 4 Corners |
|  | Grade | ACK300 | — |
| | Chipbreaker | G | — |
| | Cutter Dia. (mm) | 50 | 50 |
| | Number of Teeth | 5 | 5 |
| | vc (m/min) | 240 | 240 |
| | vf (mm/min) | 1,150 | 1,150 |
| | fz (mm/t) | 0.13 | 0.13 |
| | ap (mm) | 1.0 | 1.0 |
| | ae (mm) | 30.0 | 30.0 |
| | Coolant | Dry | Dry |
| | Results | Tool life extension of 131% achieved. | |

| SCM430 Bearing Cover | | Sumitomo | Competitor's Product |
|---|---|---|---|
| Horizontal Machining Centre: BT50 | Tool | TSXM 13080RS | — |
|  | Grade | ACP200 | — |
| | Chipbreaker | H | — |
| | Cutter Dia. (mm) | 80 | 80 |
| | Number of Teeth | 7 | 6 |
| | vc (m/min) | 180 | 180 |
| | vf (mm/min) | 950 | 950 |
| | fz (mm/t) | 0.2 | 0.2 |
| | ap (mm) | 3.8 | 3.8 |
| | ae (mm) | 50.0 | 50.0 |
| | Coolant | Dry | Dry |
| | Results | Tool life extension of 333% achieved. | |

| Mixed SC460 and FCD450 Machine Component | | Sumitomo | Conventional Tool |
|---|---|---|---|
| SC460 Connection Rod | Tool | TSX13100R | Vertical type 4 Corners |
|  | Grade | ACU2500 | — |
| | Chipbreaker | G | — |
| | Cutter Dia. (mm) | 100 | 100 |
| | Number of Teeth | 6 | 6 |
| | vc (m/min) | 180 | 180 |
| | vf (mm/min) | 860 | 860 |
| FCD450 Bracket | fz (mm/t) | 0.25 | 0.25 |
|  | ap (mm) | 3 | 3 |
| | ae (mm) | — | — |
| | Coolant | Wet | Wet |
| | Results | Suppresses cutting edge damage and realises stable long tool life even in mixed lines of steel and cast iron | |

### < SAFETY NOTES >

- Very hot or lengthy chips may be discharged while the machine is in operation. Therefore, machine guards, safety goggles or other protective covers must be used. Fire safety precautions must also be considered.
- Please handle with care as this product has sharp edges.
- Improper cutting conditions or mis-handling of the tool may result in breakages or projectiles. Therefore, please use the tool within its recommended conditions.
- When using non-water soluble cutting oil, precautions against fire must be taken and please ensure that a fire extinguisher is placed near the machine.


Sumitomo Electric Industries, Ltd.

Hardmetal Division

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https://www.sumitool.com/global


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