

# Tangen-Pro TP2P

## Tangential Shoulder Milling Tool

This milling tool series with its tangential clamping system increases stable machining and productivity, while improving perpendicularity

### Superior Clamping Stability

The tangential clamping system enables high speed and high feed machining with its wedge-shaped inserts

### Improved Perpendicularity

A high quality milling tool and optimized blade design improves surface finish and perpendicularity

### Higher Productivity

High speed and high feed machining result in an exceptional chip removal rate per minute



# Tangential Shoulder Milling Tool **Tangen-Pro TP2P**



**Insert**



**Shank**



**Cutter**

The accelerated development of industrial structures has complicated the forming of the workpiece shapes more than ever before. The clamping area for a jig or a vise becomes narrow and leads to tool vibration and imperfect machining conditions. Workpiece materials are also evolving to hard-to-cut materials and high hardness in order to achieve higher durability for industrial components. This is often said to be the major cause of shortened tool life and unexpected tool breakage in many modern metal cutting applications. So companies dealing with unstable workpiece clamping and hard-to-cut materials has a growing demand for cutting tools that are able to solve these problems.

**TP2P** responds to these demands by using the tangential clamping system and wedge-shaped inserts to improve the clamping stability of the tool itself. Therefore unstable clamping of the workpiece can be off-set by a strong clamping force of the tool. In addition, a sharp chip breaker and high helix angle were applied to the insert design for stable cutting performance in hard-to-cut materials and high hardened workpieces. These design details lead to exceptional increases in tool life.

Additionally, the tangential-type clamping system facilitates securing chip pockets and enables multiple-corner use to boost productivity. TP2P features low force cutting performance even at high speeds and high feeds thanks to its optimized blade design that effectively reduces vibration and cutting resistance during operations. Now productivity can be improved over non-tangential designs by more than 30% due to increases in table feeds, stable clamping, and high speed/high feed rates. The Tangen-Pro TP2P shows excellent performance in P, M, K type materials with its specialized design and grades developed specifically for the most challenging metal cutting applications.

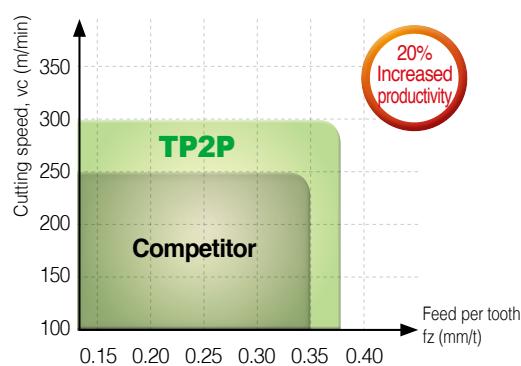
KORLOY's Tangen-Pro TP2P is one of the most advanced tangential type milling tools available to meet the demand of the industrial market today.



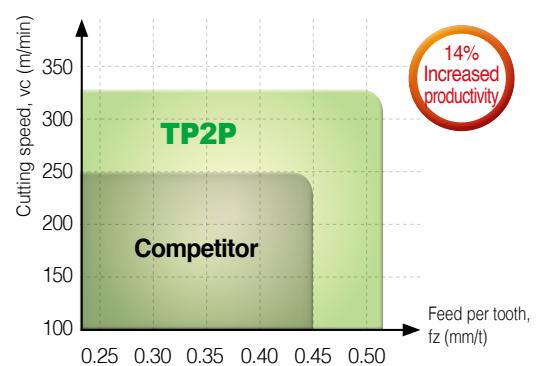
## ➔ Application Range

• High speed / high feed capability improves productivity compared to competitors

• ap (mm) = 14, ae (mm) = 10



• ap (mm) = 8, ae (mm) = 10



## ➡ Code System

[ Insert ]

<b>L</b>	<b>N</b>	<b>K</b>	<b>T</b>	<b>17</b>	<b>07</b>	<b>-</b>	<b>08</b>	<b>P</b>	<b>N</b>	<b>R</b>	<b>MM</b>
Insert shape L : L type		Tolerance K : K Class		Cutting edge length 17: 17 mm	Height of cutting edge 07: 7 mm		Nose R 08: R0.8		Relief angle of minor cutting edge N: 0°		Hand R: Right-handed
Relief angle of major cutting edge N: 0°		Shape of cross section T: T type				-	Approach angle P: 90°				Chip breaker MM: General cutting
											ML: Light cutting

[ Shank type ]

<b>TP</b>	<b>2</b>	<b>P</b>	<b>S</b>	<b>050</b>	<b>R</b>	<b>-</b>	<b>2</b>	<b>W</b>	<b>32</b>	<b>-</b>	<b>130</b>	<b>-</b>	<b>LN17</b>
Tangen-Pro	Approach angle P: 90°		Machining diameter 050: Ø50		Oil hole & Hand R: With oil hole, Right-handed	-	No. of tooth 2: 2 teeth						
No. of corner 2: 2 corner	Type S: Shank				NR: Without oil hole, Right-handed			Shank type W: Weldon C: Cylinder					

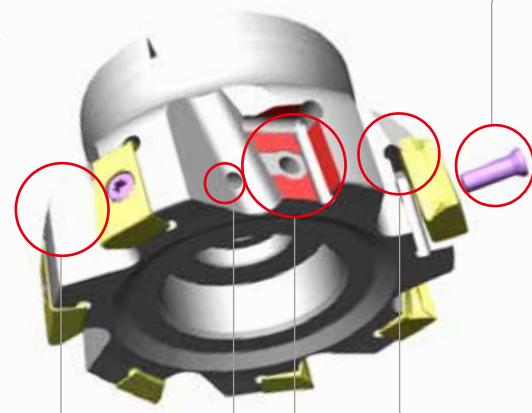
[ Cutter type ]

<b>TP</b>	<b>2</b>	<b>P</b>	<b>C</b>	<b>M</b>	<b>080</b>	<b>R</b>	<b>-</b>	<b>22</b>	<b>-</b>	<b>7</b>	<b>-</b>	<b>LN17</b>
Tangen-Pro	Approach angle P: 90°		Type C: Cutter	Arbor type M: Metric A: Inch None: Asia	Machining diameter 080: Ø80	Oil hole & Hand R: With oil hole, Right-handed	-	No. of tooth 7: 7 teeth				
No. of corner 2: 2 corner						NR: Without oil hole, Right-handed		Internal diameter 22: 22 mm				

## ➡ Cutter Features

- Tangential clamping system, wedge-shaped inserts and wide seat area  
→ **Higher clamping stability**
- **Lower vibrations and cutting resistance during machining**

- Optimized H/D design with curved surface for smooth chip flow  
→ **Excellent chip evacuation in ramping or deep shouldering**



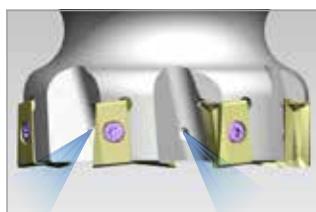
### Efficient holder design

- Smoother chip evacuation in slotting or deep shouldering



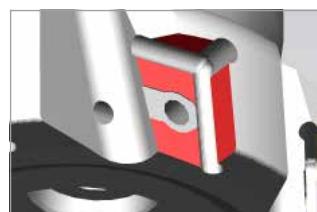
### Through coolant system

- Improved chip evacuation
- Longer tool life due to insert cooling



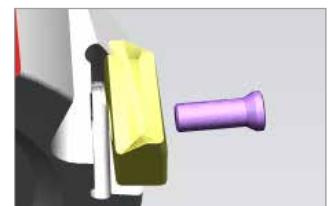
### Wide seat area

- Strong clamping force



### Tangential clamping

- Multi-corner use  
→ High feed machining availability



### Wedge type clamping

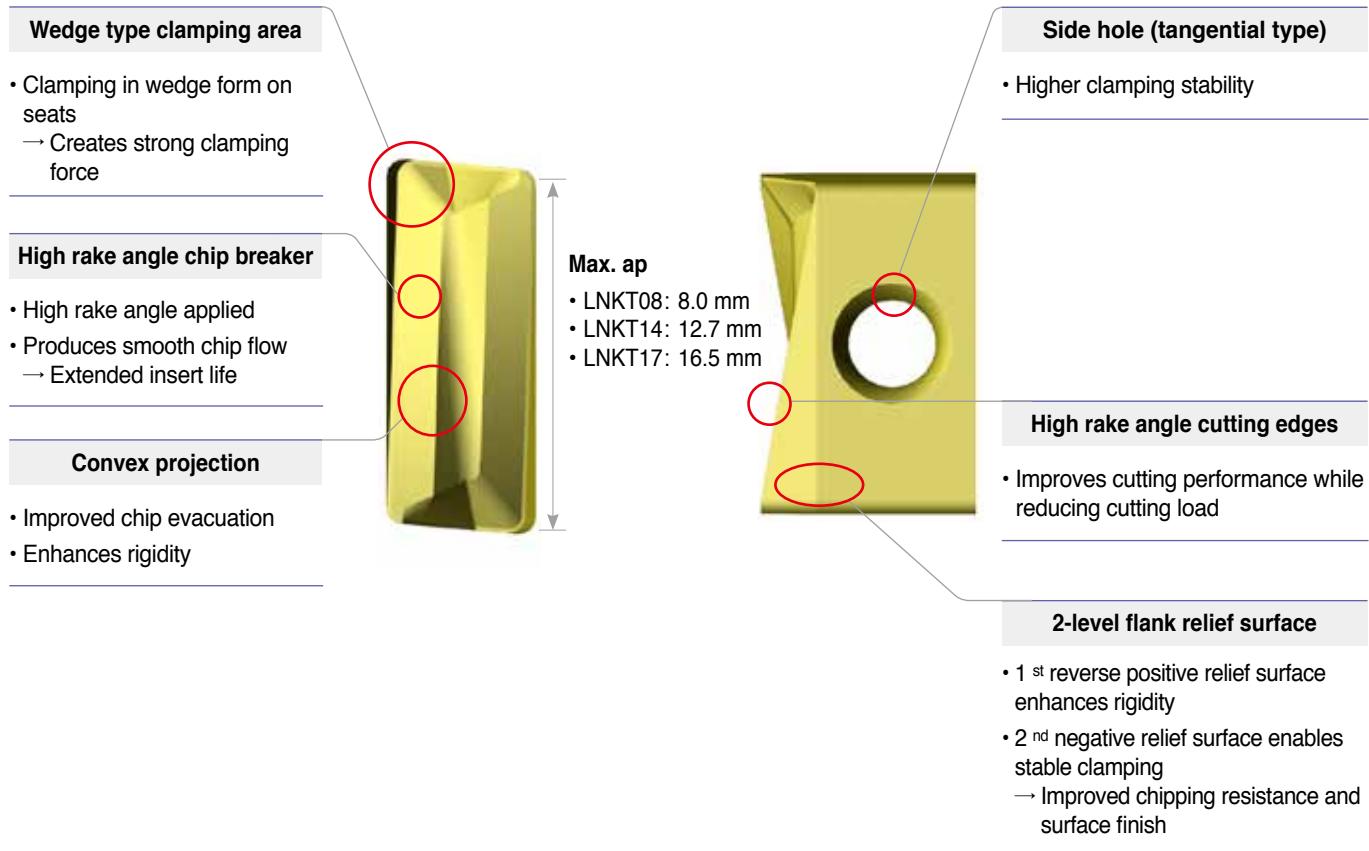
- Stable insert life



## → Features

- **Clamping stability** gained through tangential clamping system and wedge-shaped inserts
- **Excellent surface finish** nearly perfect perpendicularity, and highly even flank surface compared to competitors designs
- **Improved productivity** due to high rake angles and sharp cutting edges which lead to lower cutting resistance → Ideally suited for high speed and high feed machining

## → Insert Features



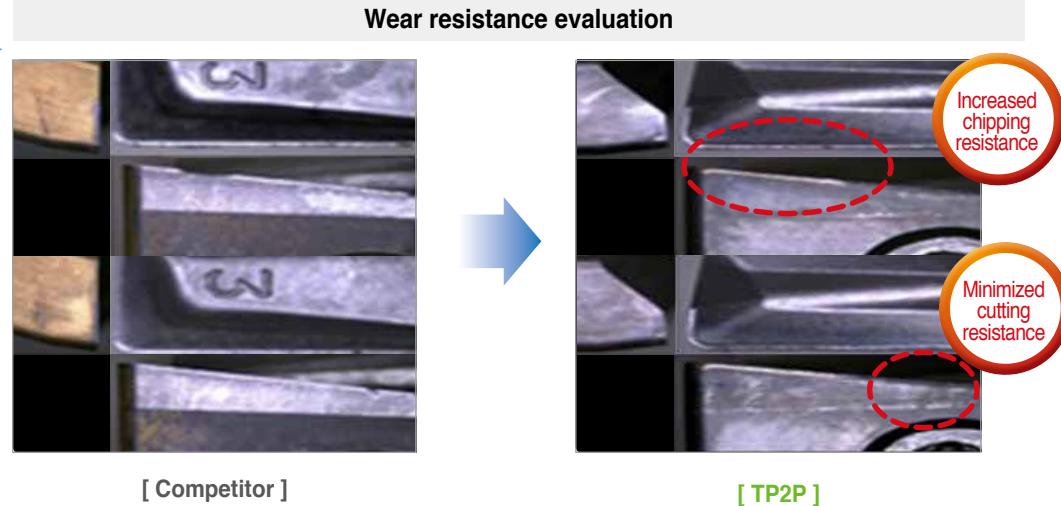
## → Chip Breaker Features

Chip breaker	Cutting edge shape	Application	Features
• Chip breaker <b>MA</b>		For aluminum	<ul style="list-style-type: none"> <li>■ Sharp cutting edges for excellent cutting performance in aluminum machining</li> <li>■ Buffed surface for excellent chip flow and welding resistance</li> </ul>
• Chip breaker <b>ML</b>		For Light cutting	<ul style="list-style-type: none"> <li>■ Chip breaker design for low cutting resistance that provides excellent tool life and quality surface finishes in light cutting and hard-to-cut materials</li> </ul>
• Chip breaker <b>MM</b>		For General cutting	<ul style="list-style-type: none"> <li>■ Universal design for general shoulder milling operations, highly suitable in most applications</li> </ul>

## → Performance Evaluation

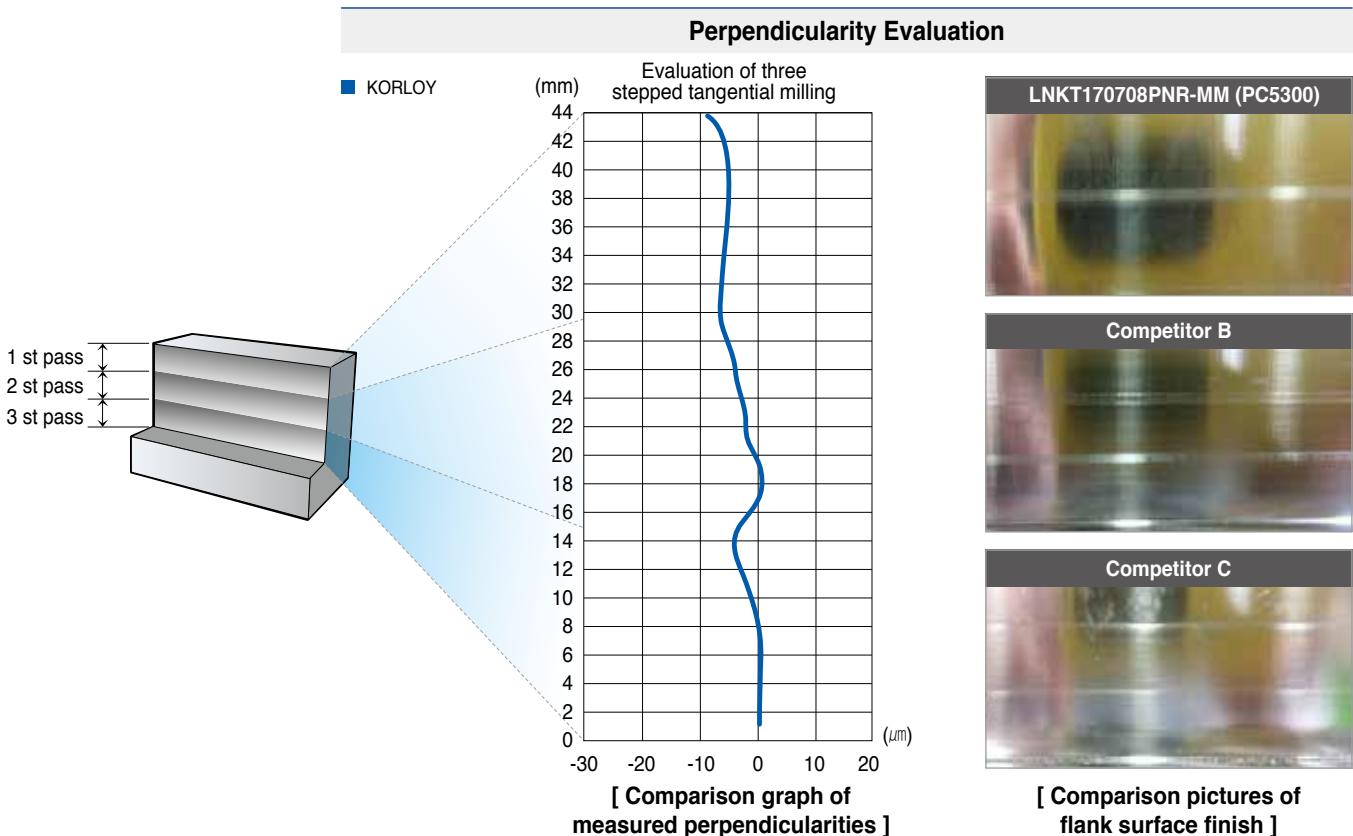
- **Workpiece** 42CrMo4 (DIN), SCM440 (KS), 4140 (AISI), 300 (L) x 200 (W) x 100 (h), Steel rectangular tube
- **Cutting conditions**  $v_c$  (m/min) = 250,  $f_z$  (mm/t) = 0.2,  $a_p$  (mm) = 14,  $a_e$  (mm) = 10, Dry
- **Machining method** Shouldering
- **Tools** Insert LNKT170708PNR-MM (PC5300) Holder TP2PCM080R-27-7-LN17

- Stable clamping improves chipping resistance under high speed cutting conditions over  $v_c$  (m/min) = 250  
→ Minimized unexpected tool breakage
- Optimized cutting edge design  
→ Minimized cutting resistance



## → Perpendicularity Evaluation

- **Workpiece** C45 (ISO), SM45C (KS), 1045 (AISI), 300 (L) x 200 (W) x 100 (h), Steel rectangular tube
- **Cutting conditions**  $v_c$  (m/min) = 150,  $f_z$  (mm/tooth) = 0.15,  $a_p$  (mm) = 15,  $a_e$  (mm) = 5, Dry
- **Machining method** Multiple passes in depth, measured after three passes of 15 mm each, in total 45 mm (measurement of perpendicularity and flank surface roughness)
- **Tools** Insert LNKT170708PNR-MM (PC5300) Holder TP2PCM080R-27-7-LN17



## ➡ Grade Guideline by Workpiece Type

Cutting conditions		P		K	N
		Carbon steel	Alloy steel	Cast iron	Aluminum
Grade	High speed cutting	PC5300	PC5300	PC6510	H01
	General cutting	PC5400	PC5300	PC6510	H01
	Interrupted cutting	PC5400	PC5400	PC5300	H01

## ➡ Recommended Cutting Conditions

### ➤ LNKT08

Workpiece		Grade	vc (m/min)	fz (mm/t)	Max. ap (mm)	Applicable insert
P	Steel	PC5300	150~240	0.25~0.05	8.0	LNKT0804□□PNR-MM
		PC5400	130~210	0.25~0.05	8.0	
K	Cast iron	PC6510	100~250	0.25~0.05	8.0	LNKT0804□□PNR-ML
		PC5300	100~200	0.25~0.05	8.0	
N	Aluminum	H01	500~1000	0.25~0.05	8.0	LNKT0804□□PNR-MA

\* The above data refer to general cutting conditions and can be adjustable to the speed of 300m/min and the feed per tooth of 0.5mm/t depending on user environment.

### ➤ LNKT14

Workpiece		Grade	vc (m/min)	fz (mm/t)	Max. ap (mm)	Applicable insert
P	Steel	PC5300	150~240	0.25~0.05	12.7	LNKT1406□□PNR-MM
		PC5400	130~210	0.25~0.05	12.7	
K	Cast iron	PC6510	100~250	0.25~0.05	12.7	LNKT1406□□PNR-ML
		PC5300	100~200	0.25~0.05	12.7	
N	Aluminum	H01	500~1000	0.25~0.05	12.7	LNKT1406□□PNR-MA

\* The above data refer to general cutting conditions and can be adjustable to the speed of 300m/min and the feed per tooth of 0.5mm/t depending on user environment.

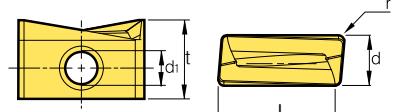
### ➤ LNKT17

Workpiece		Grade	vc (m/min)	fz (mm/t)	Max. ap (mm)	Applicable insert
P	Steel	PC5300	150~240	0.25~0.05	16.5	LNKT1707□□PNR-MM
		PC5400	130~210	0.25~0.05	16.5	
K	Cast iron	PC6510	100~250	0.25~0.05	16.5	LNKT1707□□PNR-ML
		PC5300	100~200	0.25~0.05	16.5	
N	Aluminum	H01	500~1000	0.25~0.05	16.5	LNKT1707□□PNR-MA

\* The above data refer to general cutting conditions and can be adjustable to the speed of 300m/min and the feed per tooth of 0.5mm/t depending on user environment.

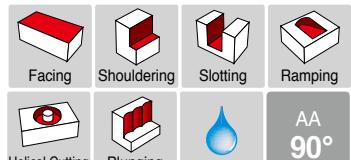
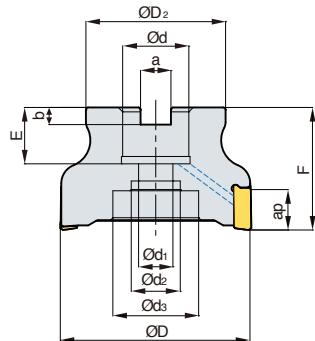
## Applicable Insert

(mm)

Shape	Designation	Coated			H01	Dimensions (mm)					Figure
		PC5300	PC5400	PC6510		I	d	t	r	d <sub>1</sub>	
	LNKT	080404PNR-MA				8.0	4.2	6.6	0.4	2.8	
		080408PNR-MA				8.0	4.2	6.6	0.8	2.8	
		140608PNR-MA				12.7	6.65	10.0	0.8	4.0	
		170704PNR-MA				16.5	7.0	11.0	0.4	4.5	
		170708PNR-MA				16.5	7.0	11.0	0.8	4.5	
		170712PNR-MA				16.5	7.0	11.0	1.2	4.5	
		170716PNR-MA				16.5	7.0	11.0	1.6	4.5	
		170720PNR-MA				16.5	7.0	11.0	2.0	4.5	
	LNKT	080404PNR-ML				8.0	4.2	6.6	0.4	2.8	
		080408PNR-ML				8.0	4.2	6.6	0.8	2.8	
		140608PNR-ML				12.7	6.65	10.0	0.8	4.0	
		170704PNR-ML				16.5	7.0	11.0	0.4	4.5	
		170708PNR-ML	● ● ●			16.5	7.0	11.0	0.8	4.5	
		170712PNR-ML				16.5	7.0	11.0	1.2	4.5	
		170716PNR-ML				16.5	7.0	11.0	1.6	4.5	
		170720PNR-ML				16.5	7.0	11.0	2.0	4.5	
	LNKT	080404PNR-MM				8.0	4.2	6.6	0.4	2.8	
		080408PNR-MM				8.0	4.2	6.6	0.8	2.8	
		140608PNR-MM				12.7	6.65	10.0	0.8	4.0	
		170704PNR-MM				16.5	7.0	11.0	0.4	4.5	
		170708PNR-MM	● ●			16.5	7.0	11.0	0.8	4.5	
		170712PNR-MM				16.5	7.0	11.0	1.2	4.5	
		170716PNR-MM				16.5	7.0	11.0	1.6	4.5	
		170720PNR-MM				16.5	7.0	11.0	2.0	4.5	



## TP2PCM-LN08



• AR: -6°  
• RR: -26°~ -22°

(mm)

Designation			$\text{ØD}$	$\text{ØD}_2$	$\text{Ød}$	$\text{Ød}_1$	$\text{Ød}_2$	$\text{Ød}_3$	$a$	$b$	$E$	$F$	$ap$	
<b>TP2PCM</b>	<b>040R-16-6-LN08</b>	6	40	35	16	9	14	-	8.4	5.6	16	40	8.0	0.19
	<b>040R-16-7-LN08</b>	7	40	35	16	9	14	-	8.4	5.6	16	40	8.0	0.19
	<b>050R-22-7-LN08</b>	7	50	41	22	11	18	-	10.4	6.3	20	40	8.0	0.31
	<b>050R-22-10-LN08</b>	10	50	41	22	11	18	-	10.4	6.3	20	40	8.0	0.31
	<b>063R-22-10-LN08</b>	10	63	49	22	11	18	-	10.4	6.3	20	40	8.0	0.49
	<b>063R-22-11-LN08</b>	11	63	49	22	11	18	-	10.4	6.3	20	40	8.0	0.49

### Applicable Insert



LNKT-MA



LNKT-ML



LNKT-MM

Designation	Coated			Uncoated
	PC5300	PC5400	PC6510	H01
<b>LNKT</b>	080404PNR-MA			
	080408PNR-MA			
	080404PNR-ML			
	080408PNR-ML			
	080404PNR-MM			
	080408PNR-MM			

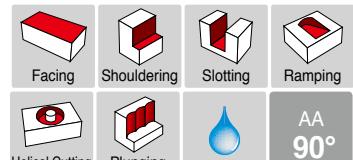
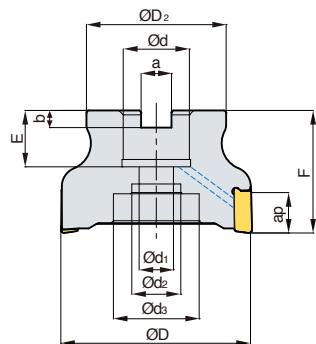
### Applicable Arbor

Designation	Applicable arbor
<b>TP2PCM</b>	
040R-16-6-LN08	BT□□-FMC16-□□
040R-16-7-LN08	
050R-22-7-LN08	
050R-22-10-LN08	BT□□-FMC22-□□
063R-22-10-LN08	
063R-22-11-LN08	

### Parts

Specification	Screw	Wrench
Ø40~Ø63	FTKA02565S	TW08S

## TP2PCM-LN14



• AR: -6°  
• RR: -22° ~ -12°

(mm)

Designation			$\text{ØD}$	$\text{ØD}_2$	$\text{Ød}$	$\text{Ød}_1$	$\text{Ød}_2$	$\text{Ød}_3$	$a$	$b$	$E$	$F$	$ap$	
TP2PCM	040R-16-4-LN14	4	40	35	16	9	14	-	8.4	5.6	19	40	12.7	0.19
	040R-16-5-LN14	5	40	35	16	9	14	-	8.4	5.6	19	40	12.7	0.19
	050R-22-5-LN14	5	50	42	22	11	18	-	10.4	6.3	20	40	12.7	0.29
	050R-22-6-LN14	6	50	42	22	11	18	-	10.4	6.3	20	40	12.7	0.29
	063R-22-6-LN14	6	63	49	22	11	18	-	10.4	6.3	20	40	12.7	0.49
	063R-22-8-LN14	8	63	49	22	11	18	-	10.4	6.3	20	40	12.7	0.49
	080R-27-7-LN14	7	80	57	27	14	20	35	12.4	7	23	50	12.7	0.94
	080R-27-10-LN14	10	80	57	27	14	20	35	12.4	7	23	50	12.7	0.94
	100R-32-8-LN14	8	100	70	32	18	28	45	14.4	8	28	63	12.7	1.73
	100R-32-13-LN14	13	100	70	32	18	28	45	14.4	8	28	63	12.7	1.73
	125R-40-9-LN14	9	125	90	40	22	32	54	16.4	9	30	63	12.7	2.98
	125R-40-17-LN14	17	125	90	40	22	32	54	16.4	9	30	63	12.7	3.04
TP2PC	080R-25.4-7-LN14	7	80	57	25.4	14	25	38	9.5	6	25	50	12.7	0.95
	080R-25.4-10-LN14	10	80	57	25.4	14	25	38	9.5	6	25	50	12.7	0.96
	100R-31.75-8-LN14	8	100	70	31.75	18	28	45	12.7	8	32	63	12.7	1.76
	100R-31.75-13-LN14	13	100	70	31.75	18	28	45	12.7	8	32	63	12.7	1.81
	125R-38.1-9-LN14	9	125	90	38.1	22	32	54	15.9	10	35	63	12.7	2.99
	125R-38.1-17-LN14	17	125	90	38.1	22	32	54	15.9	10	35	63	12.7	3.07

## Applicable Insert



LNKT-MA



LNKT-ML



LNKT-MM

Designation	Coated			Uncoated
	PC5300	PC5400	PC6510	H01
LNKT 140608PNR-MA				
140608PNR-ML				
140608PNR-MM				

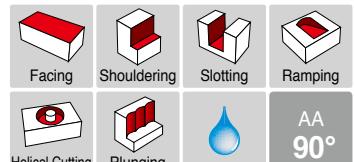
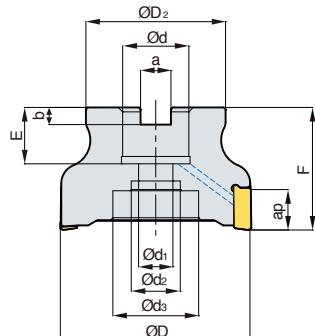
## Applicable Arbor

Designation		Applicable arbor	Designation	Applicable arbor
TP2PCM	040R-16-4-LN14	BT□□-FMC16-□□	TP2PCM	100R-32-13-LN14
	040R-16-5-LN14			125R-40-9-LN14
	050R-22-5-LN14			125R-40-17-LN14
	050R-22-6-LN14	BT□□-FMC22-□□	TP2PC	080R-25.4-7-LN14
	063R-22-6-LN14			080R-25.4-10-LN14
	063R-22-8-LN14			100R-31.75-8-LN14
	080R-27-7-LN14	BT□□-FMC27-□□		100R-31.75-13-LN14
	080R-27-10-LN14			125R-38.1-9-LN14
	100R-32-8-LN14	BT□□-FMC32-□□		125R-38.1-17-LN14

## Parts

Specification	Screw	Wrench
Ø40~Ø125	FTKA03510	TW15S

## TP2PCM-LN17



• AR: -6°  
• RR: -21° ~ -15°

(mm)

Designation			$\text{ØD}$	$\text{ØD}_2$	$\text{Ød}$	$\text{Ød}_1$	$\text{Ød}_2$	$\text{Ød}_3$	$a$	$b$	$E$	$F$	$ap$	$\text{kg}$
TP2PCM	040R-16-3-LN17	3	40	35	16	9	14	-	8.4	5.6	16	40	16.5	0.17
	040R-16-4-LN17	4	40	35	16	9	14	-	8.4	5.6	16	40	16.5	0.17
	050R-22-4-LN17	4	50	41	22	11	18	-	10.4	6.3	20	40	16.5	0.27
	050R-22-5-LN17	5	50	41	22	11	18	-	10.4	6.3	20	40	16.5	0.26
	063R-22-6-LN17	6	63	49	22	11	18	-	10.4	6.3	20	40	16.5	0.46
	063R-22-7-LN17	7	63	49	22	11	18	-	10.4	6.3	20	40	16.5	0.47
	080R-27-7-LN17	7	80	57	27	14	20	35	12.4	7	23	50	16.5	0.89
	080R-27-8-LN17	8	80	57	27	14	20	35	12.4	7	23	50	16.5	0.91
	100R-32-8-LN17	8	100	67	32	18	28	45	14.4	8	25	63	16.5	1.68
	100R-32-9-LN17	9	100	67	32	18	28	45	14.4	8	25	63	16.5	1.75
	125R-40-10-LN17	10	125	90	40	22	32	52	16.4	10	30	63	16.5	2.88
	125R-40-11-LN17	11	125	90	40	22	32	52	16.4	10	30	63	16.5	2.88
TP2PC	080R-25.4-7-LN17	7	80	57	25.4	14	20	35	9.5	6	25	50	16.5	0.92
	080R-25.4-8-LN17	8	80	57	25.4	14	20	35	9.5	6	25	50	16.5	0.93
	100R-31.75-8-LN17	8	100	67	31.75	18	28	45	12.7	8	32	63	16.5	1.73
	100R-31.75-9-LN17	9	100	67	31.75	18	28	45	12.7	8	32	63	16.5	1.73
	125R-38.1-10-LN17	10	125	90	38.1	22	32	52	15.9	9	35	63	16.5	3.06
	125R-38.1-11-LN17	11	125	90	38.1	22	32	52	15.9	9	35	63	16.5	2.91

## Applicable Insert



LNKT-MA



LNKT-ML



LNKT-MM

Designation	Coated			H01	Designation	Coated			Uncoated
	PC5300	PC5400	PC6510			PC5300	PC5400	PC6510	
LNKT	170704PNR-MA				LNKT	170716PNR-ML			
	170708PNR-MA					170720PNR-ML			
	170712PNR-MA					170704PNR-MM			
	170716PNR-MA					170708PNR-MM	●	●	
	170720PNR-MA					170712PNR-MM			
	170704PNR-ML					170716PNR-MM			
	170708PNR-ML	●	●	●		170720PNR-MM			
	170712PNR-ML								

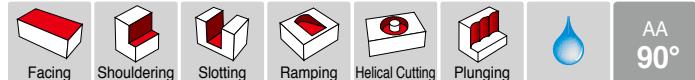
## Applicable Arbor

Designation	Applicable arbor	Designation	Applicable arbor		
TP2PCM	040R-16-3-LN17	BT□□-FMC16-□□	TP2PCM	100R-32-9-LN17	BT□□-FMC32-□□
	040R-16-4-LN17			125R-40-10-LN17	BT□□-FMC40-□□
	050R-22-4-LN17			125R-40-11-LN17	
	050R-22-5-LN17	BT□□-FMC22-□□	TP2PC	080R-25.4-7-LN17	BT□□-FMA25.4-□□
	063R-22-6-LN17			080R-25.4-8-LN17	BT□□-FMA25.4-□□
	063R-22-7-LN17			100R-31.75-8-LN17	BT□□-FMA31.75-□□
	080R-27-7-LN17	BT□□-FMC27-□□		100R-31.75-9-LN17	BT□□-FMA31.75-□□
	080R-27-8-LN17			125R-38.1-10-LN17	BT□□-FMA38.1-□□
	100R-32-8-LN17	BT□□-FMC32-□□		125R-38.1-11-LN17	

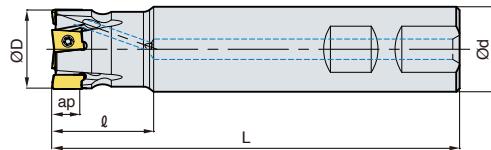
## Parts

Specification	Screw	Wrench
Ø40~Ø125	FTKA0412B	TW15S

# TP2PCS-LN08



• AR: -6°  
• RR: -35°~ -26°



(mm)

Designation			ØD	Ød	l	L	ap	
TP2PS	020R-2W20-120-LN08	2	20	20	30	120	8.0	0.25
	020R-3W20-120-LN08	3	20	20	30	120	8.0	0.25
	025R-3W25-120-LN08	3	25	25	30	120	8.0	0.39
	025R-4W25-120-LN08	4	25	25	30	120	8.0	0.39

## Applicable Insert



LNKT-MA



LNKT-ML



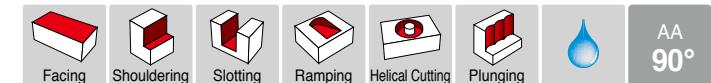
LNKT-MM

Designation	Coated			Uncoated
	PC5300	PC5400	PC6510	H01
LNKT	080404PNR-MA			
	080408PNR-MA			
	080404PNR-ML			
	080408PNR-ML			
	080404PNR-MM			
	080408PNR-MM			

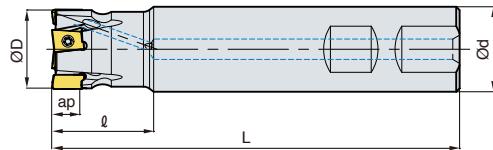
## Parts

Specification	Screw	Wrench
Ø16~Ø25	FTKA02565S	TW08S

# TP2PS-LN14



• AR: -6°  
• RR: -21°~ -18°



(mm)

Designation			ØD	Ød	l	L	ap	
TP2PS	025R-2W25-130-LN14	2	25	25	40	130	12.7	0.41
	032R-3W32-130-LN14	3	32	32	40	130	12.7	0.69
	040R-3W32-130-LN14	3	40	32	40	130	12.7	0.75
	040R-4W32-130-LN14	4	40	32	40	130	12.7	0.76
	050R-4W32-130-LN14	4	50	32	40	130	12.7	0.85
	050R-5W32-130-LN14	5	50	32	40	130	12.7	0.84

## ➤ Applicable Insert



LNKT-MA



LNKT-ML



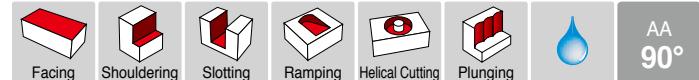
LNKT-MM

Designation	Coated			Uncoated
	PC5300	PC5400	PC6510	H01
LNKT 140608PNR-MA				
140608PNR-ML				
140608PNR-MM				

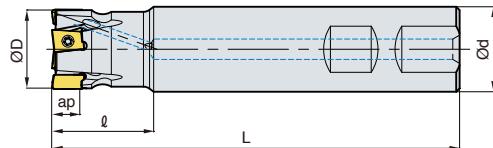
## ➤ Parts

Specification	Screw	Wrench
Ø25~Ø50	FTKA03510	TW15S

# TP2PS-LN17



• AR: -6°  
• RR: -26°~ -18°



(mm)

Designation			ØD	Ød	l	L	ap	
TP2PS	032R-2W32-130-LN17	2	32	32	40	130	16.5	0.68
	032R-3W32-130-LN17	3	32	32	40	130	16.5	0.67
	040R-3W32-130-LN17	3	40	32	40	130	16.5	0.73
	040R-4W32-130-LN17	4	40	32	40	130	16.5	0.73
	050R-4W32-130-LN17	4	50	32	40	130	16.5	0.83
	050R-5W32-130-LN17	5	50	32	40	130	16.5	0.83

## Applicable Insert



LNKT-MA



LNKT-ML



LNKT-MM

Designation		Coated			Uncoated
		PC5300	PC5400	PC6510	H01
LNKT	170704PNR-MA				
	170708PNR-MA				
	170712PNR-MA				
	170716PNR-MA				
	170720PNR-MA				
	170704PNR-ML				
	170708PNR-ML	●	●	●	
	170712PNR-ML				
	170716PNR-ML				
	170720PNR-ML				
	170704PNR-MM				
	170708PNR-MM	●	●		
	170712PNR-MM				
	170716PNR-MM				
	170720PNR-MM				

## Parts

Specification	Screw	Wrench
Ø32~Ø50	FTKA0412B	TW15S

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