

## 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



# Tangen-Pro TP2P

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



**Insert**



**Shank**

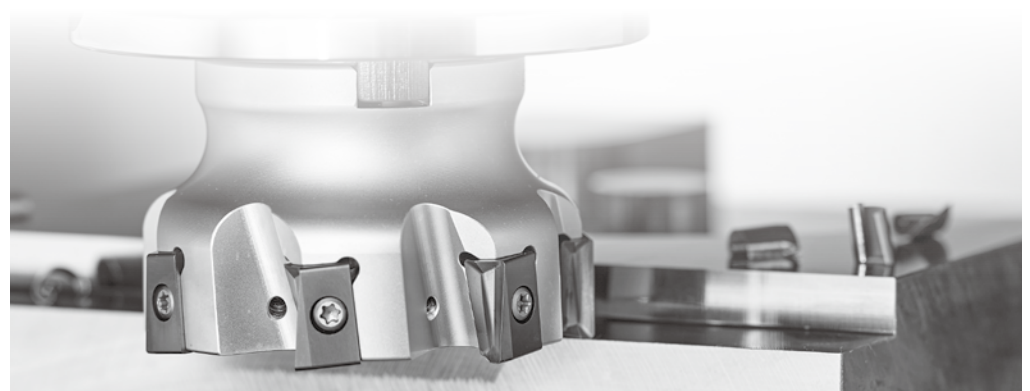
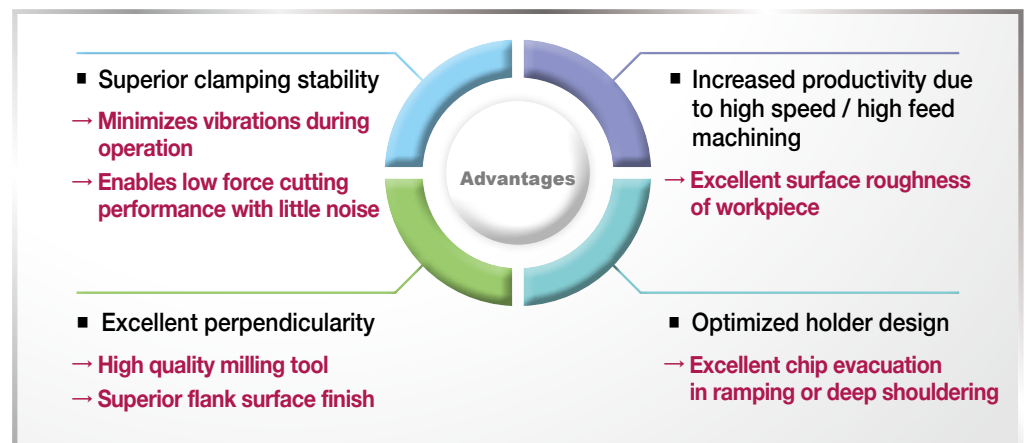


**Cutter**

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.



## Code System

[ Insert ]

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

[ Shank type ]

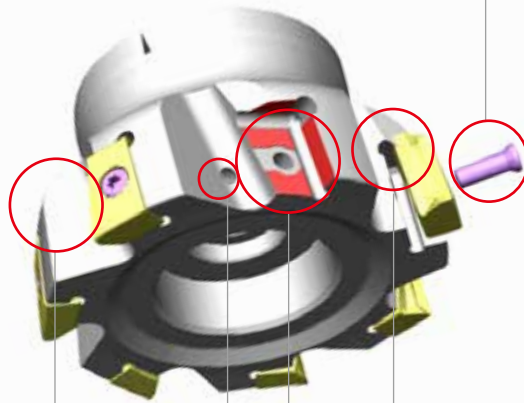
<b>TP</b>	<b>2</b>	<b>P</b>	<b>S</b>	<b>050</b>	<b>R</b>	<b>- 2</b>	<b>W</b>	<b>32</b>	<b>- 130</b>	<b>- LN17</b>
Tangen-Pro	Approach angle P: 90°	Machining diameter 050: Ø50	Oil hole & Hand R: With oil hole, Right-handed NR: Without oil hole, Right-handed	No. of tooth 2: 2 teeth	Shank diameter 032: Ø32	Overall length 130: 130mm	Applicable insert LN17: LNKT17			
No. of corner 2: 2corner	Type S: Shank	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>- 22</b>	<b>- 7</b>	<b>- LN17</b>
Tangen-Pro	Approach angle P: 90°	Arbor type M: Metric A: Inch None: Asia	Machining diameter 080: Ø80	Oil hole & Hand R: With oil hole, Right-handed NR: Without oil hole, Right-handed	No. of tooth 7: 7 teeth	Applicable insert LN17: LNKT17			
No. of corner 2: 2corner	Type C: Cutter	Internal diameter 22: 22mm							

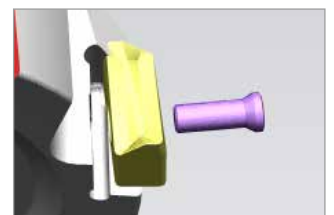
## Cutter Features

- 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**



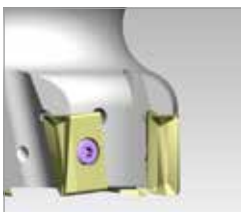
### Tangential clamping

- Multi-corner use  
→ High feed machining availability



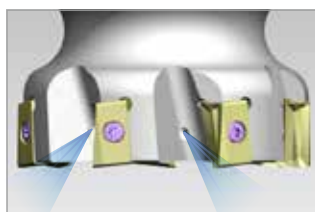
### Efficient holder design

- Smoother chip evacuation in slotting or deep shouldering



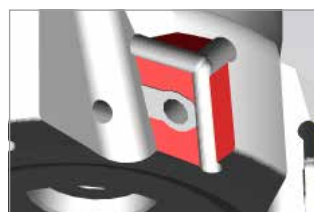
### Through coolant system

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



### Wide seat area

- Strong clamping force



### Wedge type clamping

- Stable insert life

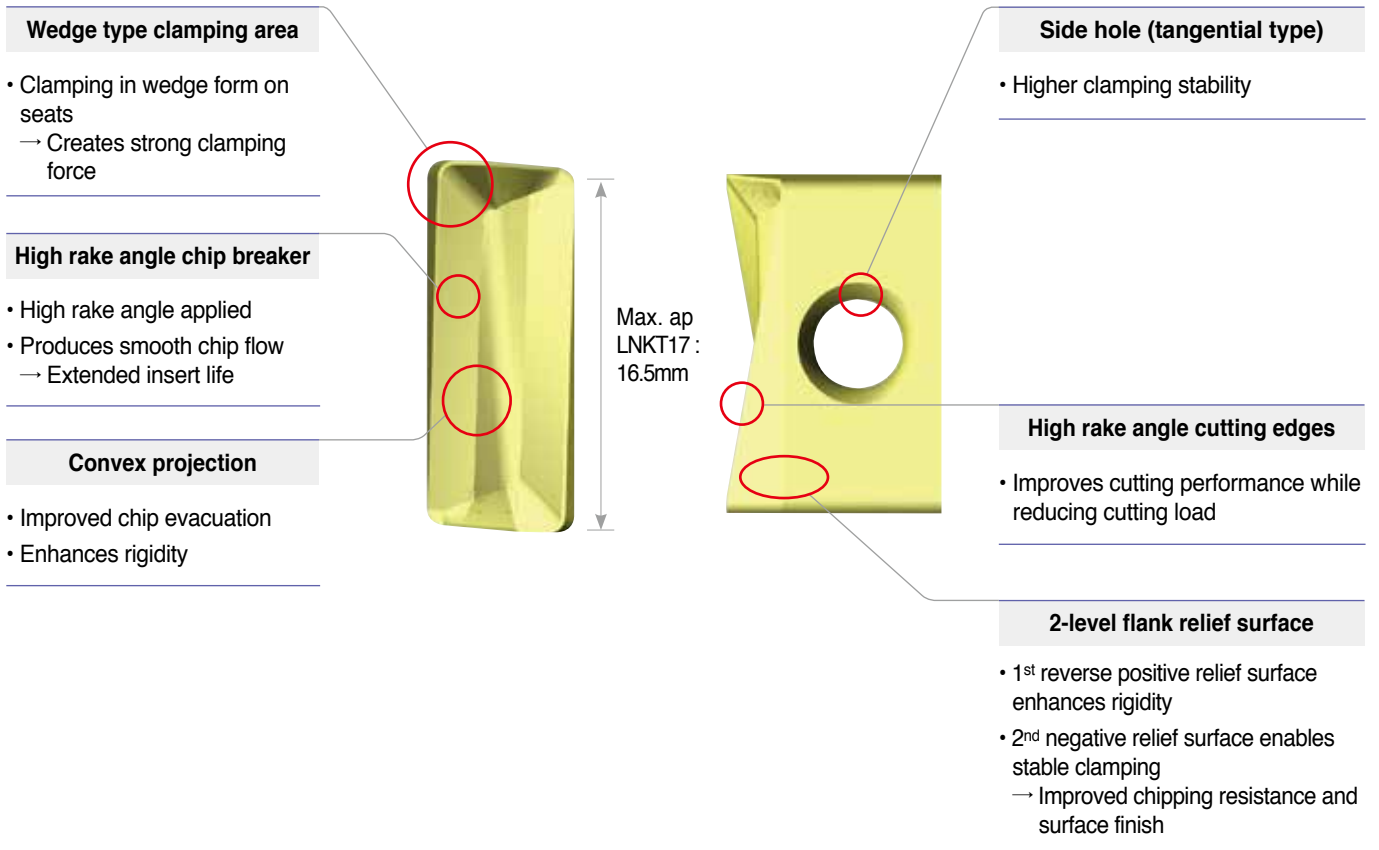


# Tangen-Pro TP2P


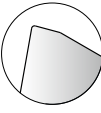

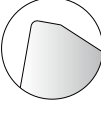
## Features

- **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



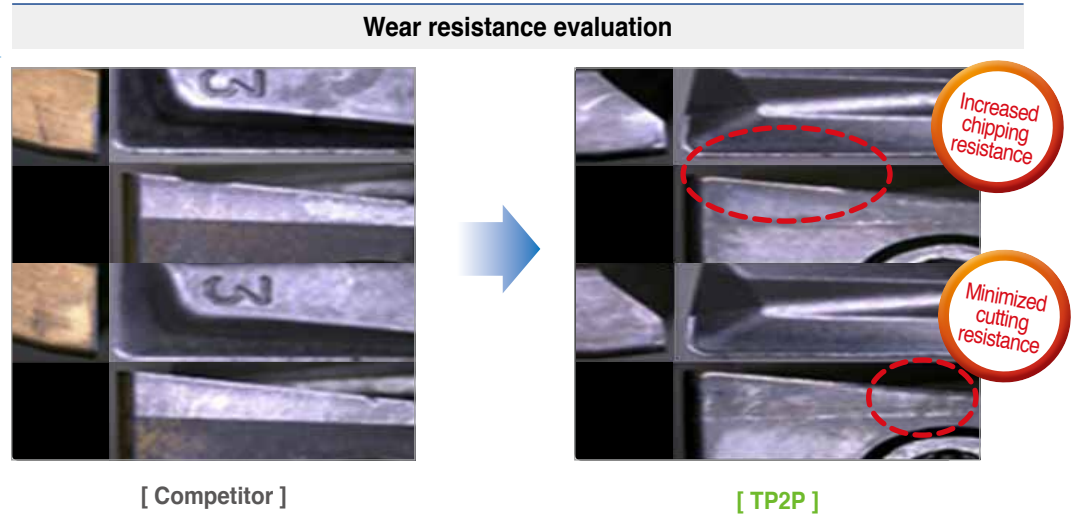
## Chip Breaker Features

Chip breaker	Cutting edge shape	Application	Features
<ul style="list-style-type: none"> <li>• Chip breaker <b>ML</b></li> </ul> 		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>
<ul style="list-style-type: none"> <li>• Chip breaker <b>MM</b></li> </ul> 		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

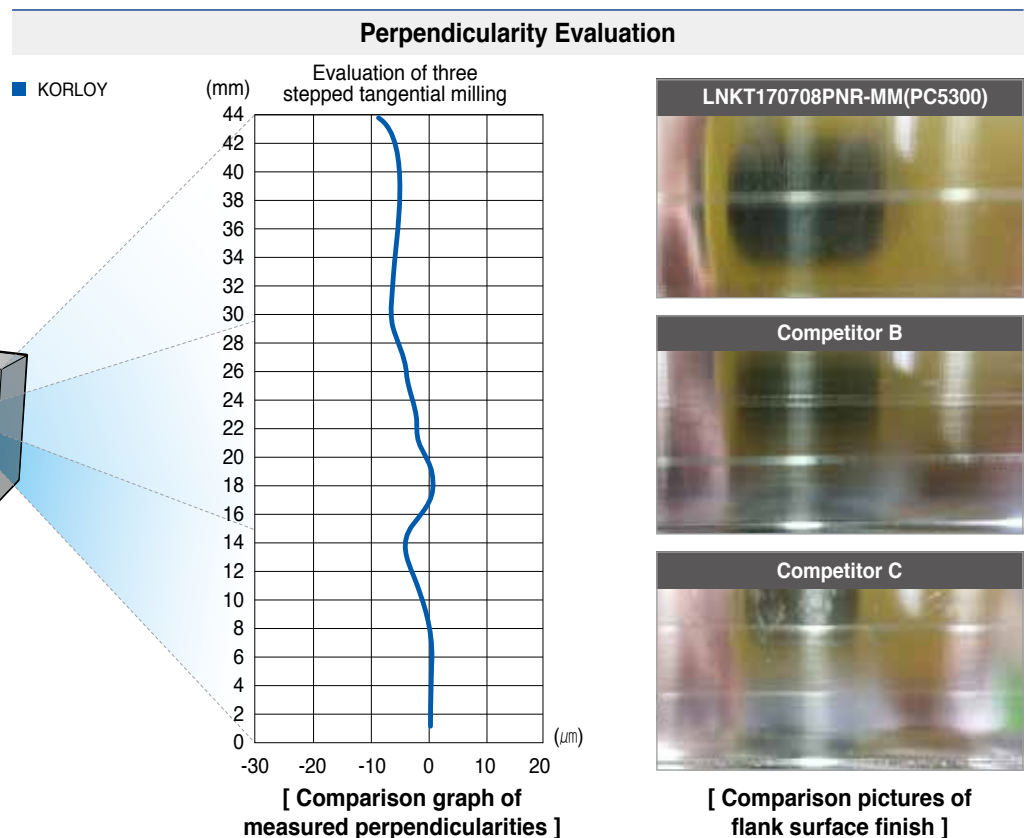
- **Workpiece** 42CrMo4(DIN), SCM440(KS), 4140(AISI), 300(L)x200(W)x100(h), Steel rectangular tube
- **Cutting conditions**  $vc(m/min) = 250$ ,  $fz(mm/t) = 0.2$ ,  $ap(mm) = 14$ ,  $ae(mm) = 10$ , Dry
- **Machining method** Facing
- **Tools** Insert LNKT170708PNR-MM(PC5300) Holder TP2PCM080R-27-7-LN17

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



## ➔ Perpendicularity Evaluation

- **Workpiece** C45(ISO), SM45C(KS), 1045(AISI), 300(L)x200(W)x100(h), Steel rectangular tube
- **Cutting conditions**  $vc(m/min) = 150$ ,  $fz(mm/tooth) = 0.15$ ,  $ap(mm) = 15$ ,  $ae(mm) = 5$ , Dry
- **Machining method** Multiple passes in depth, measured after three passes of 15mm each, in total 45mm (measurement of perpendicularity and flank surface roughness)
- **Tools** Insert LNKT170708PNR-MM(PC5300) Holder TP2PCM080R-27-7-LN17





# Tangen-Pro TP2P

## Grade Guideline by Workpiece Type

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

## Recommended Cutting Conditions

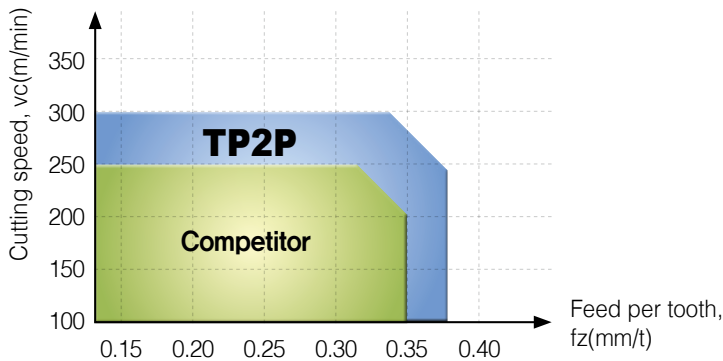
Workpiece	Grade	vc (m/min)	fz (mm/t)	Max. ap (mm)	Applicable insert
P Steel	PC5300	150~240	0.25~0.05	16.5	LNKT170708PNR-MM
	PC5400	130~210	0.25~0.05	16.5	
K Cast iron	PC6510	100~250	0.25~0.05	16.5	LNKT170708PNR-ML

\* 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.

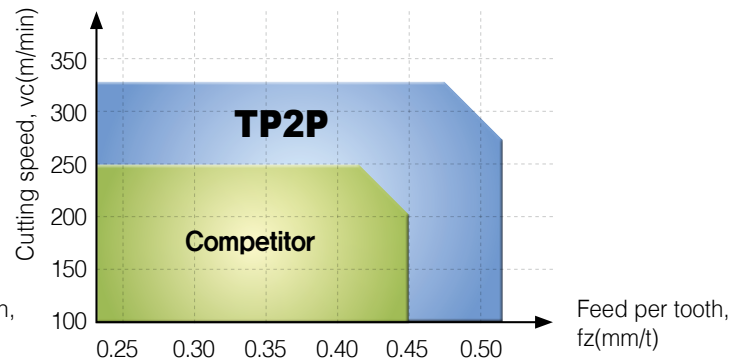
## Application Range

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

• ap(mm) = 14, ae(mm) = 10



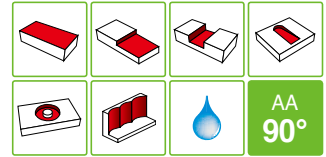
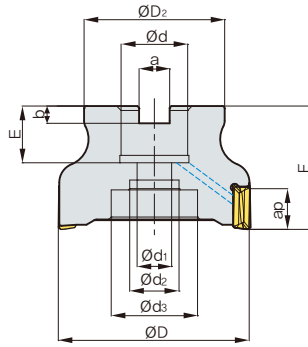
• ap(mm) = 8, ae(mm) = 10



## Applicable Insert

Shape	Designation	Dimensions (mm)				Coated			Figure
		d <sub>1</sub>	ℓ	r	Max. ap	PC5300	PC5400	PC6510	
	LNKT 170708PNR-MM	7.0	11.0	0.8	16.5	●	●		
	170708PNR-ML	7.0	11.0	0.8	16.5	●		●	

## Cutter



(mm)

Designation			ØD	ØD <sub>2</sub>	Ød	Ød <sub>1</sub>	Ød <sub>2</sub>	Ød <sub>3</sub>	a	b	E	F	ap	
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-LM17	6	63	49	22	11	18	-	10.4	6.3	20	40	16.5	0.46
	063R-22-7-LM17	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	7.0	23	50	16.5	0.89
	080R-27-8-LN17	8	80	57	27	14	20	35	12.4	7.0	23	50	16.5	0.91
	100R-32-8-LN17	8	100	67	32	18	28	45	14.4	8.0	25	63	16.5	1.68
	100R-32-9-LN17	9	100	67	32	18	28	45	14.4	8.0	25	63	16.5	1.75
	125R-40-10-LN17	10	125	90	40	22	32	52	16.4	10.0	30	63	16.5	2.88
	125R-40-11-LN17	11	125	90	40	22	32	52	16.4	10.0	30	63	16.5	2.88
TP2PC	080R-25.4-7-LN17	7	80	57	25.4	14	20	35	9.5	6.0	25	50	16.5	0.92
	080R-25.4-8-LN17	8	80	57	25.4	14	20	35	9.5	6.0	25	50	16.5	0.93
	100R-31.75-8-LN17	8	100	67	31.75	18	28	45	12.7	8.0	32	63	16.5	1.73
	100R-31.75-9-LN17	9	100	67	31.75	18	28	45	12.7	8.0	32	63	16.5	1.73
	125R-38.1-10-LN17	10	125	90	38.1	22	32	52	15.9	9.0	35	63	16.5	3.06
	125R-38.1-11-LN17	11	125	90	38.1	22	32	52	15.9	9.0	35	63	16.5	2.91

## Applicable Insert



LNKT-MM



LNKT-ML

Designation	Coated		
	PC5300	PC5400	PC6510
LNKT 170708PNR-MM	●	●	
170708PNR-ML	●		●

## Applicable Arbor

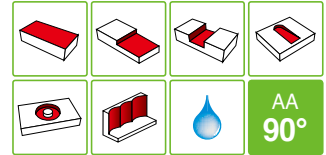
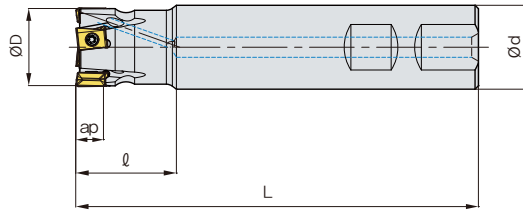
Designation	Applicable arbor	
TP2PCM	040R-16-3-LN17	BT□□-FMC16-□□
	040R-16-4-LN17	
	050R-22-4-LN17	
	050R-22-5-LN17	BT□□-FMC22-□□
	063R-22-6-LN17	
	063R-22-7-LN17	
	080R-27-7-LN17	BT□□-FMC27-□□
	080R-27-8-LN17	
	100R-32-8-LN17	BT□□-FMC32-□□
	100R-32-9-LN17	
	125R-40-10-LN17	BT□□-FMC40-□□
	125R-40-11-LN17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

## Parts

Specification	Screw	Wrench
Ø40 ~ Ø125	FTKA0412B	TW15S

# Tangen-Pro TP2P

## Shank



(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-MM



LNKT-ML

Designation	Coated		
	PC5300	PC5400	PC6510
LNKT 170708PNR-MM	●	●	
170708PNR-ML	●		●

## Coating

Specification	Screw 	Wrench 
Ø32 ~ Ø50	FTKA0412B	TW15S



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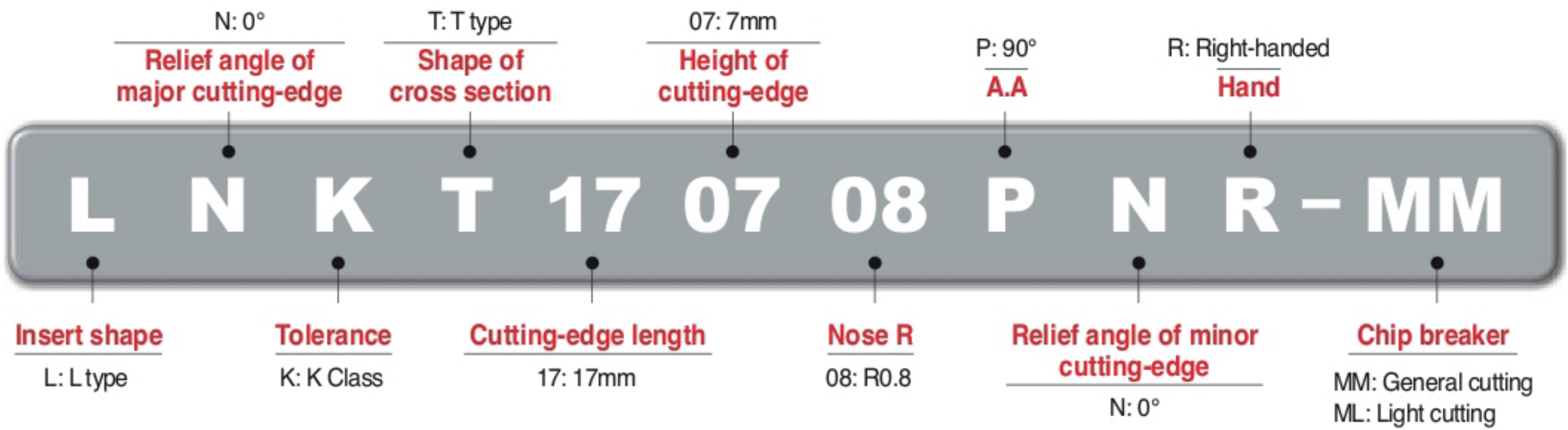
This milling tool series with its tangential clamping system increases stable machining and productivity, while improving perpendicularity

# Tangen-Pro TP2P **new**

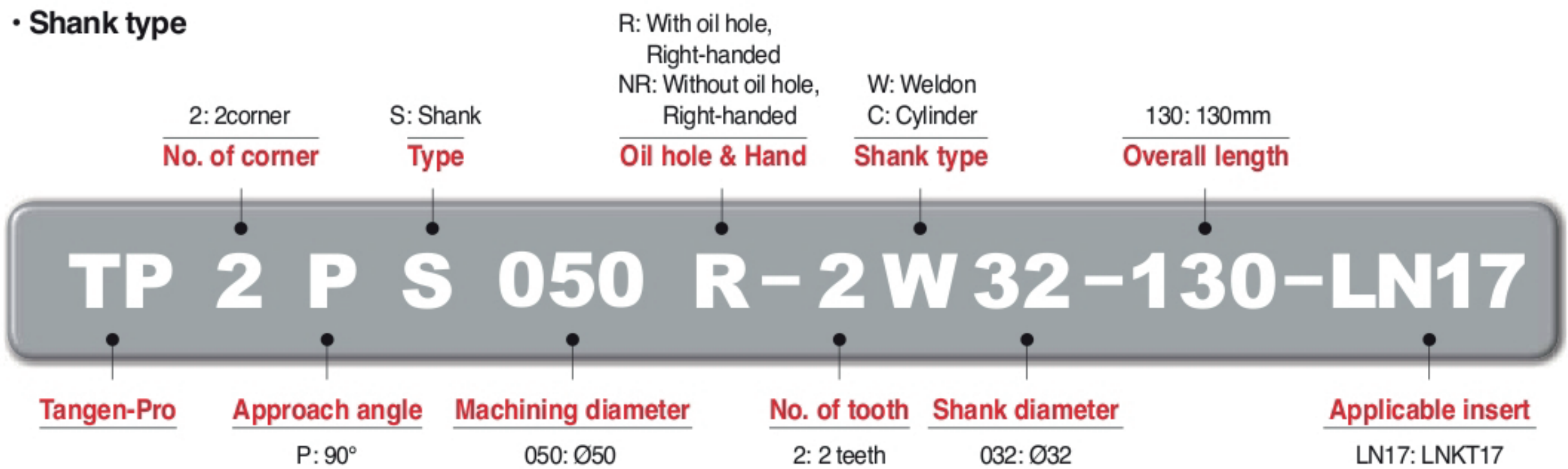
- Clamping stability gained through tangential clamping system and wedge-shaped inserts
- Excellent surface finish nearly perfect perpendicularity, and highly even flank surface compared to competitors' designs
- Improved productivity due to High-rake angles and sharp cutting-edges which lead to lower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

## Code system

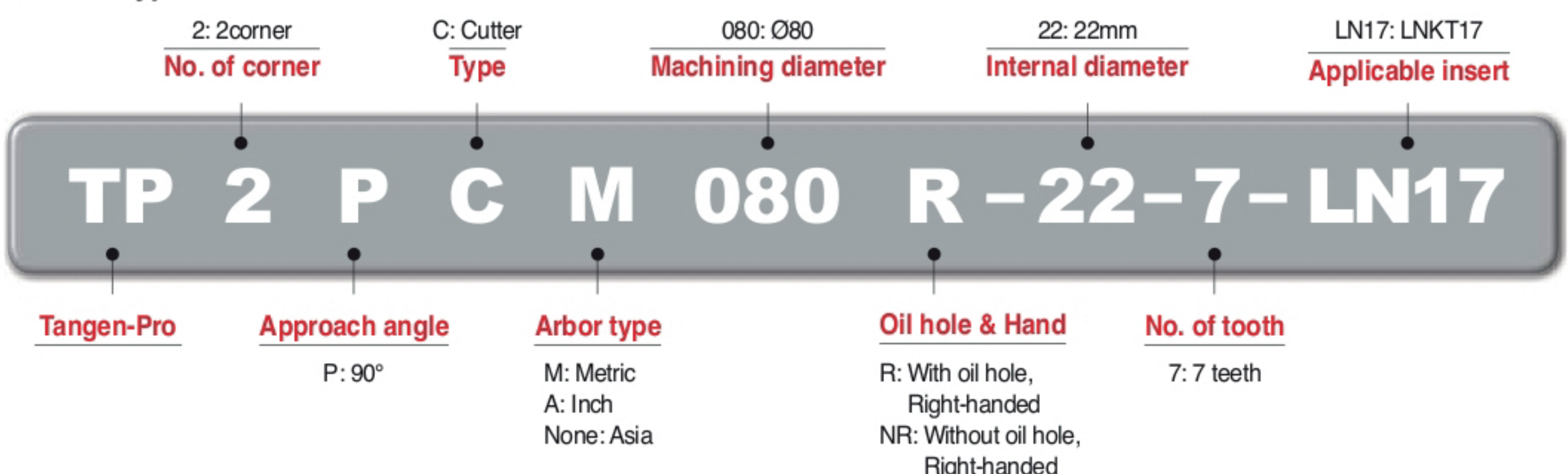
### • Insert



### • Shank type



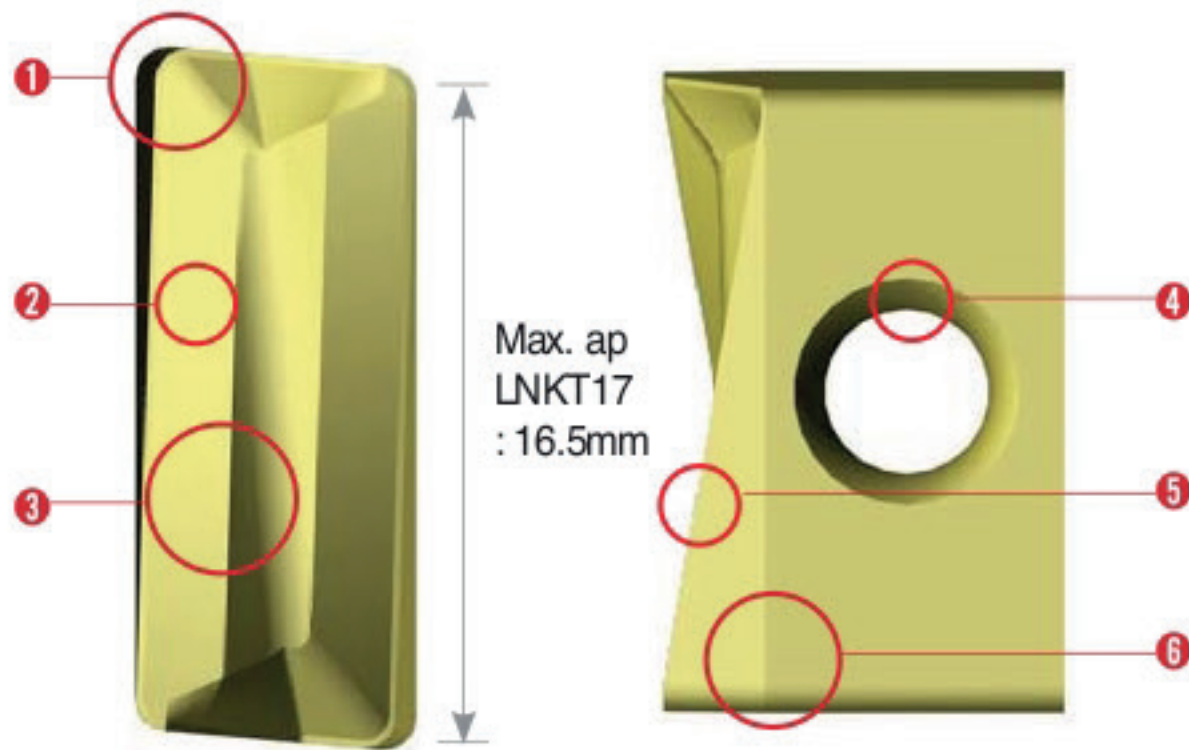
### • Cutter type





# E Technical Information for TP2P

## Features of insert



### 1 Wedge type clamping area

- Clamping in wedge form on seats  
→ Creates strong clamping force

### 2 High-rake angle chip breaker

- High-rake angle applied
- Produces smooth chip flow  
→ Extended insert life

### 3 Convex projection

- Improved chip evacuation
- Enhances rigidity

### 4 Side hole (tangential type)

- Higher clamping stability

### 5 High-rake angle cutting-edges

- Improves cutting performance while reducing cutting load

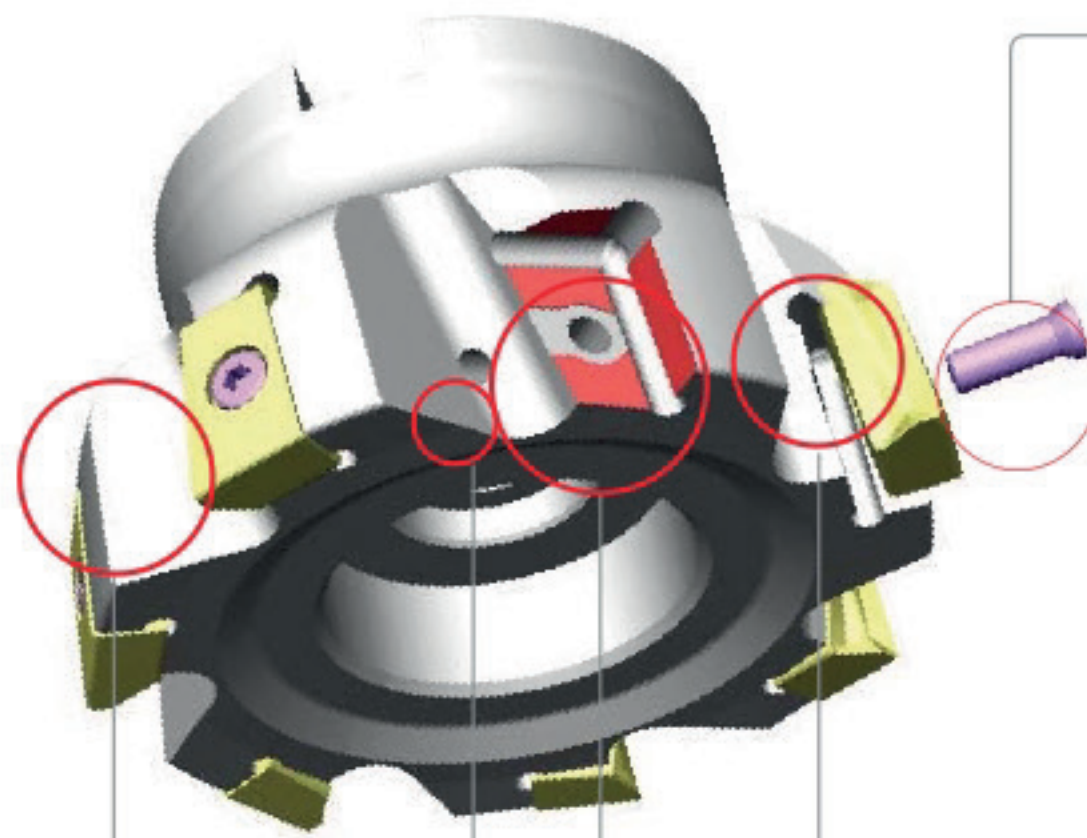
### 6 2-level flank relief surface

- 1st reverse positive relief surface enhances rigidity
- 2nd negative relief surface enables stable clamping  
→ Improved chipping resistance and surface finish

## Features of cutter

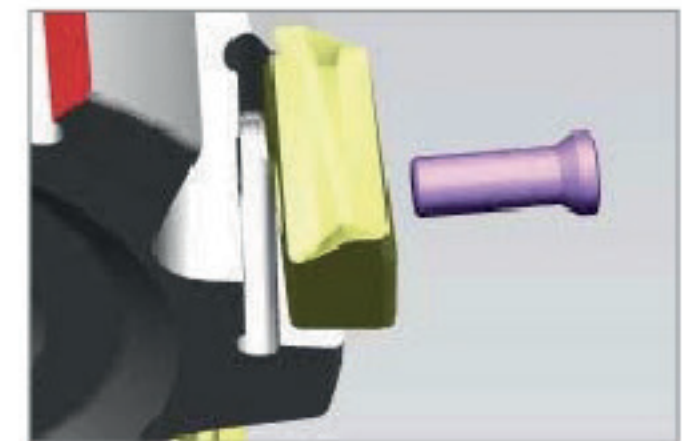
- Tangential clamping system, wedge-shaped inserts and wide seat area  
→ Higher clamping stability  
→ Lower vibrations and cutting resistance during machining

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



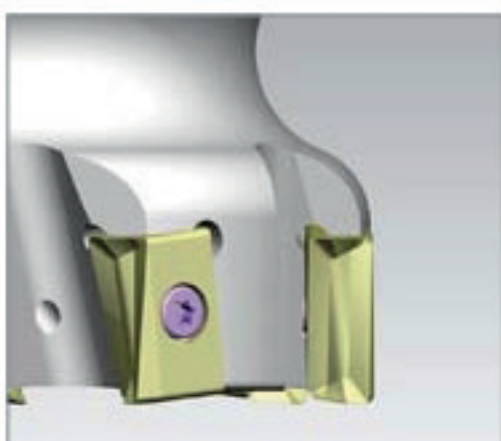
### Tangential clamping

- Multi-corner use  
→ High feed machining availability



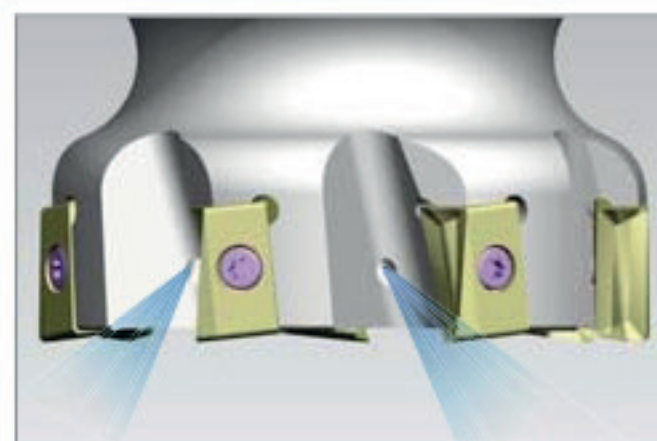
### Efficient holder design

- Smoother chip evacuation in slotting or deep shouldering



### Through coolant system

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



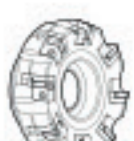
### Wide seat area

- Strong clamping force





### Wedge type clamping

- Stable insert life





➤ Features of chip breaker

Chip breaker	Cutting-edge	Application	Features
ML		Light cutting	Chip breaker design for low cutting resistance that provides excellent tool life and quality surface finishes in light cutting and hard-to-cut materials
MM		General cutting	Universal design for general shoulder milling operations, highly suitable in most applications

➤ Application guideline for grade

Workpiece		P		K
		Carbon steel	Alloy steel	Cast iron
Grades	High speed cutting	PC5300	PC5300	PC6510
	General cutting	PC5400	PC5300	PC6510
	Interrupted cutting	PC5400	PC5400	PC5300

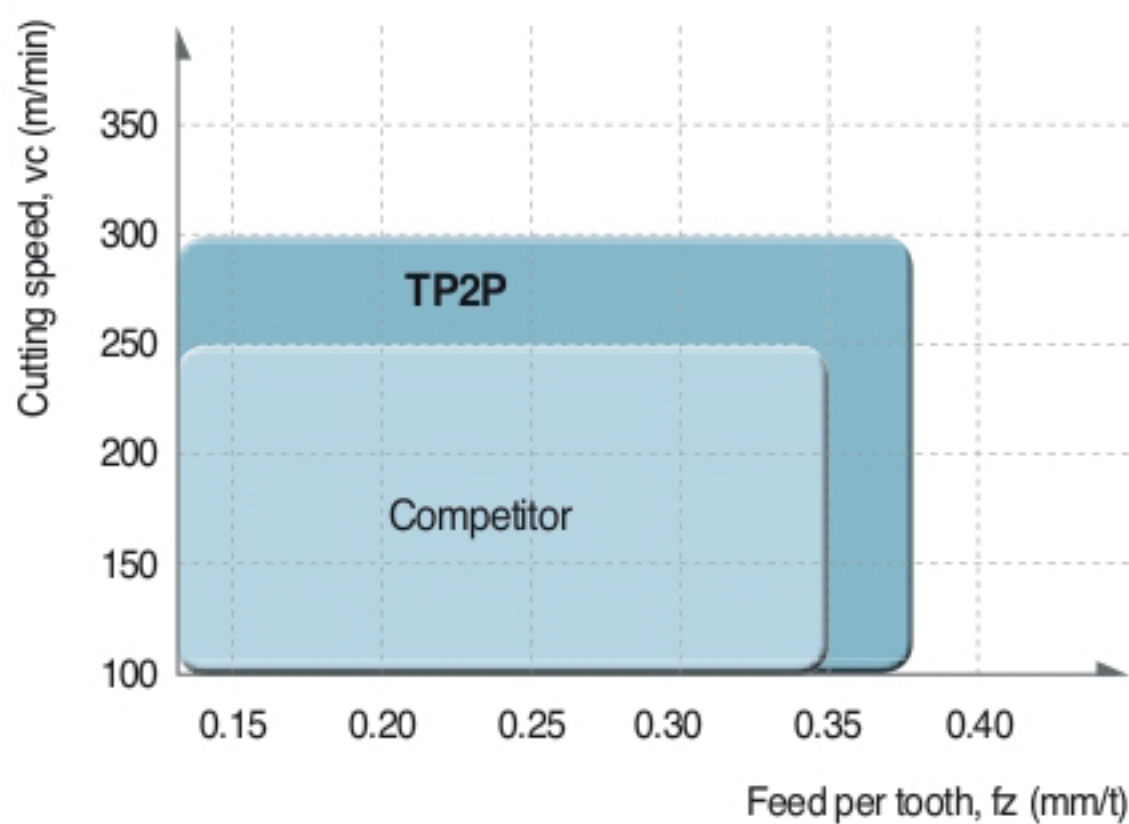
➤ Recommended cutting condition

Workpiece	Grades	vc (m/min)	fz (mm/t)	Max. ap (mm)	Applicable insert
P Steel	PC5300	150~240	0.25~0.05	16.5	LNKT170708PNR-MM
	PC5400	130~210	0.25~0.05	16.5	
K Cast iron	PC6510	100~250	0.25~0.05	16.5	LNKT170708PNR-ML

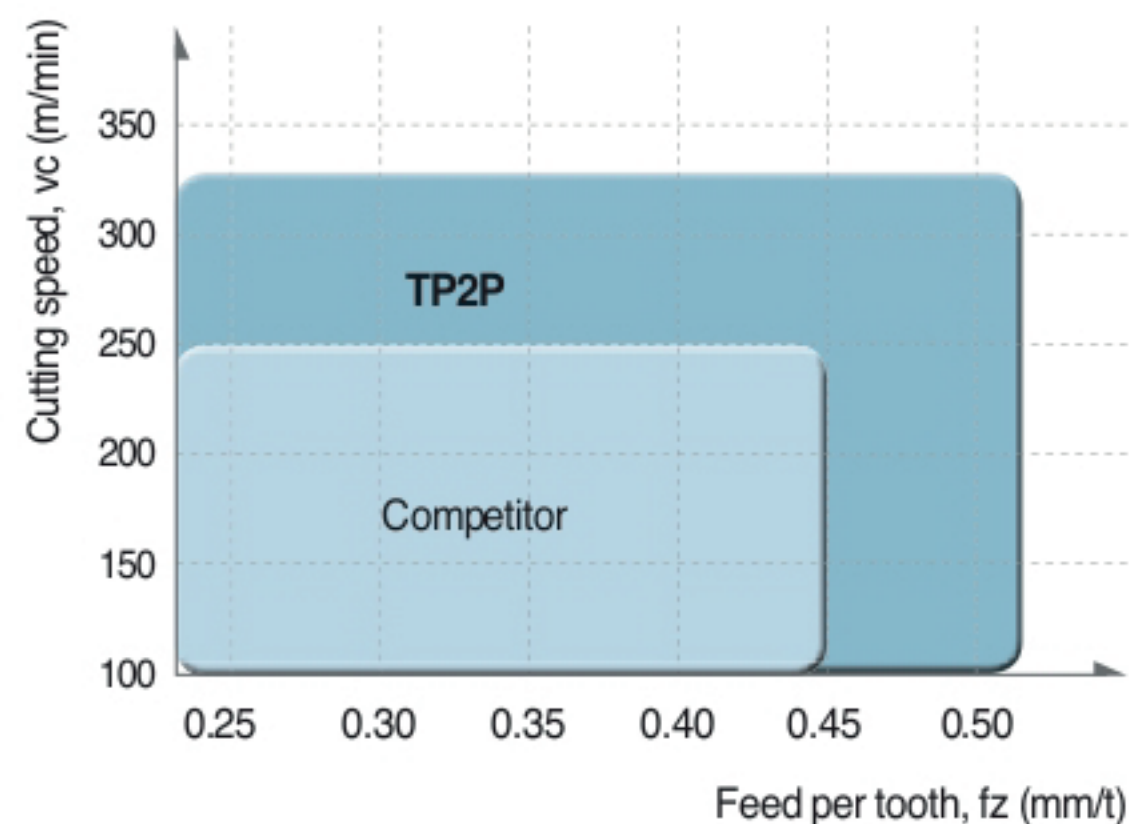
※ The above data refer to general cutting conditions and can be adjustable to the speed of 300m/min and the feed per tooth of 0.5mm/t depending on user environment.

➤ Application area

Application area: ap (mm) = 14, ae (mm) = 10

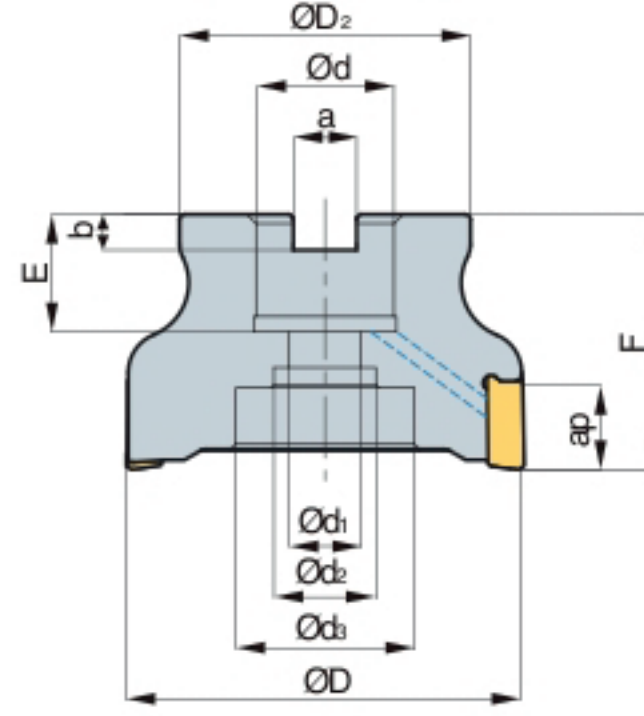


Application area: ap (mm) = 8, ae (mm) = 10





## TP2PC(M) new



AA  
90°  
• AR: -6°  
• RR: -21° ~ -14°

(mm)

Designation	⊙	ØD	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	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	7.0	23	50	16.5	0.89
	080R-27-8-LN17	8	80	57	27	14	20	35	12.4	7.0	23	50	16.5	0.91
	100R-32-8-LN17	8	100	67	32	18	28	45	14.4	8.0	25	63	16.5	1.68
	100R-32-9-LN17	9	100	67	32	18	28	45	14.4	8.0	25	63	16.5	1.75
	125R-40-10-LN17	10	125	90	40	22	32	52	16.4	10.0	30	63	16.5	2.88
125R-40-11-LN17	11	125	90	40	22	32	52	16.4	10.0	30	63	16.5	2.88	
TP2PC	080R-25.4-7-LN17	7	80	57	25.4	14	20	35	9.5	6.0	25	50	16.5	0.92
	080R-25.4-8-LN17	8	80	57	25.4	14	20	35	9.5	6.0	25	50	16.5	0.93
	100R-31.75-8-LN17	8	100	67	31.75	18	28	45	12.7	8.0	32	63	16.5	1.73
	100R-31.75-9-LN17	9	100	67	31.75	18	28	45	12.7	8.0	32	63	16.5	1.73
	125R-38.1-10-LN17	10	125	90	38.1	22	32	52	15.9	9.0	35	63	16.5	3.06
	125R-38.1-11-LN17	11	125	90	38.1	22	32	52	15.9	9.0	35	63	16.5	2.91

### Available inserts

LNKT-MM LNKT-ML



Designation	Cermet		Coated										Uncoated			page	
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC3530	PC6510	PC5300	PC5400	ST30A	G10		H01
LNKT 170708PNR-MM												●	●				E10
170708PNR-ML												●	●	●			

### Available arbors

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

### Parts

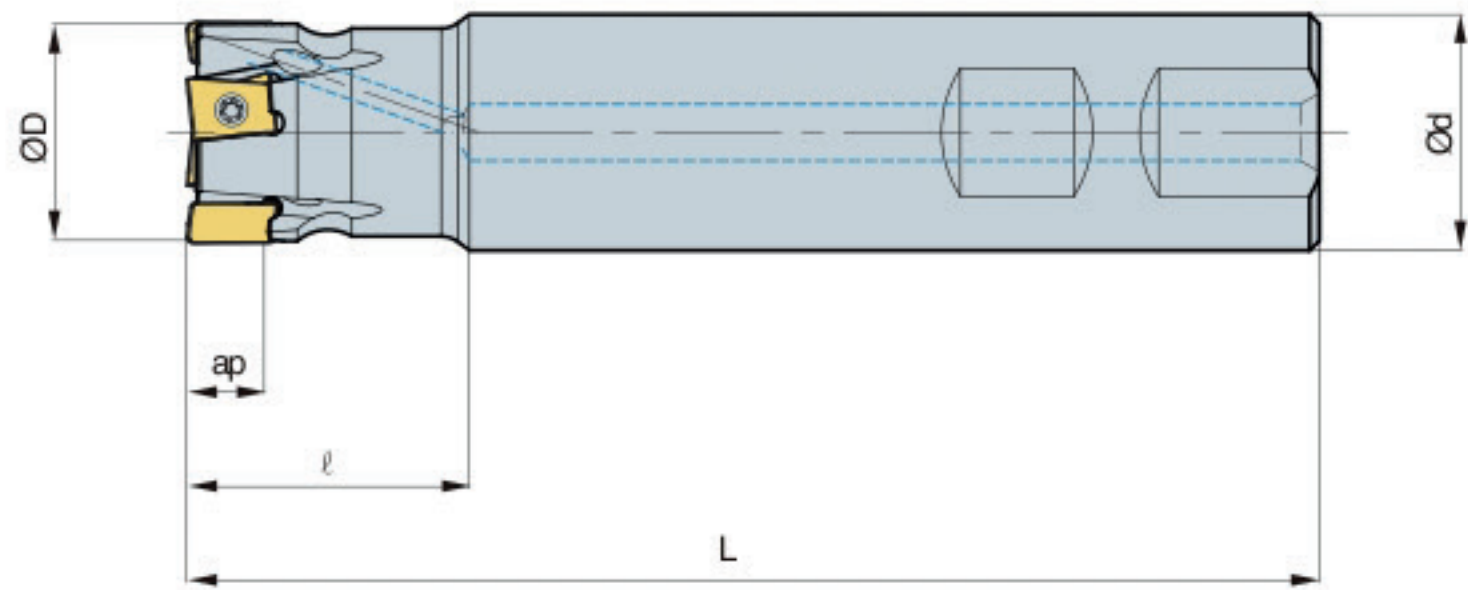
Specification	Screw	Wrench
Ø40~Ø125	FTKA0412B	TW15S

Available inserts E10 Available arbors and bolt E371~E373





**TP2PS** new



• AR: -6°  
• RR: -32°~ -21°

(mm)

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

**Available inserts**

LNKT-MM      LNKT-ML



Designation	Cermet		Coated										Uncoated			page	
	CN2000	CN30	NC5330	NC5340	NC5350	PC2505	PC2510	PC3500	PC3600	PC3530	PC3510	PC5300	PC5400	ST30A	G10		H01
LNKT	170708PNR-MM											●	●				E10
	170708PNR-ML										●	●	●				

**Parts**

Specification		
Ø32~Ø50	FTKA0412B	TW15S

Available inserts E10