

TurnLine

**TURNTEC**

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Tungaloy Report No. 394-G

TURNTEC

Cutting-edge technology provides  
**maximum productivity**



Member IMC Group  
**Tungaloy**



ACCELERATED MACHINING



TurnLine

**TURNTEC**

TUNGALOY



Tangential insert with tough cutting edge delivers the incredible productivity at high feed!

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## Optimal solution for high productivity rough machining !

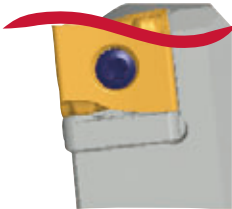
Strong insert for large depth of cut and scaled surface machining

Long curved cutting edge



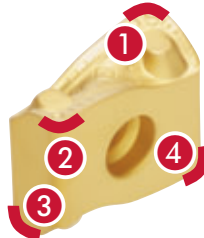
Smooth chip evacuation  
Low cutting force

Large inclination on the cutting edge



Highly economical  
Excellent chipping resistance

4 corners available



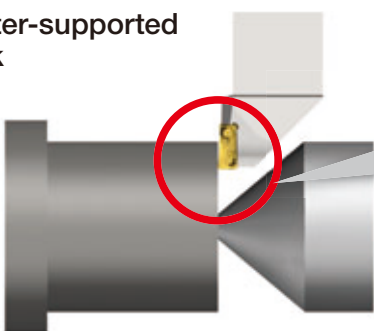
Thick insert that is tangentially clamped



## Suitable for center-supported work

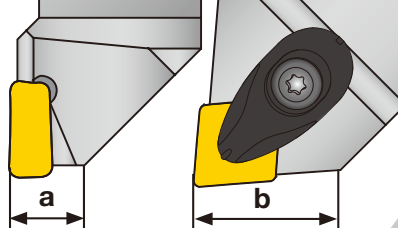
High accessibility to center-supported work compared with conventional toolholders.

Center-supported work



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Conventional toolholder



$$a < b$$

## GRADES

### Special Surface Technology

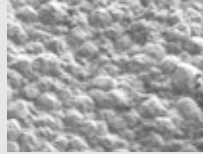
**PREMIUMTEC**  
TUNGALOY

Smooth insert surface prevents chip adhesion and improves chip flow.

#### Comparison of coated surfaces

**T9100 SERIES**

Conventional type



### Columnar Stabilization Technology

#### T9100 SERIES

Crystal structure  
Substrate

Stress  
Disperses the stress

Prevents randomly developed cracks !!  
**Excellent fracture resistance & extended tool life!**

#### Conventional

Growing cracks leads to the peeling off the coating  
Stress  
Chipping

Growing cracks leads to the peeling off the coating

### Adhesion Reinforcement Technology

This specialised treatment enhances the bond between the coating and the substrate.

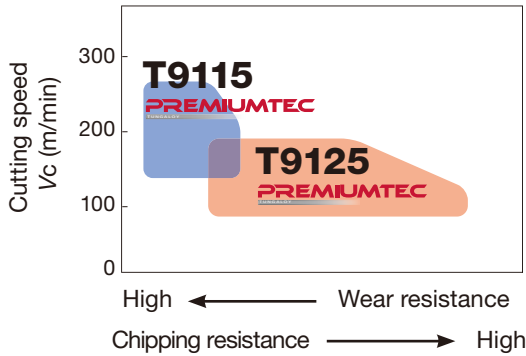
Application	Grade	Substrate			Coating layer		Features
	Application code	Specific gravity	Hardness (HRA)	T.R.S. (GPa)	Main Composition	Thickness (µm)	
<b>P</b> Steel	<b>T9115</b>	13.9	91	2.5	Continuously formed columnar crystal TiCN + Al <sub>2</sub> O <sub>3</sub>	16	<b>Highly stable grade for steel turning</b> <i>Special Surface Technology</i> <b>PREMIUMTEC</b> T9115 demonstrates a good balance of wear and impact resistance. Applicable for continuous to light interrupted cutting. T9125 demonstrates excellent chipping resistance. Applicable for medium to heavy cutting.
	<b>P10-P20</b> <b>M10-M20</b>						
<b>M</b> Stainless	<b>T9125</b>	13.7	90	2.6	Continuously formed columnar crystal TiCN + Al <sub>2</sub> O <sub>3</sub>	16	T9115 demonstrates a good balance of wear and impact resistance. Applicable for continuous to light interrupted cutting. T9125 demonstrates excellent chipping resistance. Applicable for medium to heavy cutting.
	<b>P20-P30</b> <b>M20-M30</b>						
<b>M</b> Stainless	<b>AH725</b>	14.4	91.5	3	"Flash-Coating" (Ti, Al)N base	2	<b>General grade</b> <i>Special Surface Technology</i> <b>PREMIUMTEC</b> General grade that is "Flash-Coating" with a fine grain cemented carbide.
	<b>M20-M30</b>						

## APPLICATION RANGE

**P**

Steel

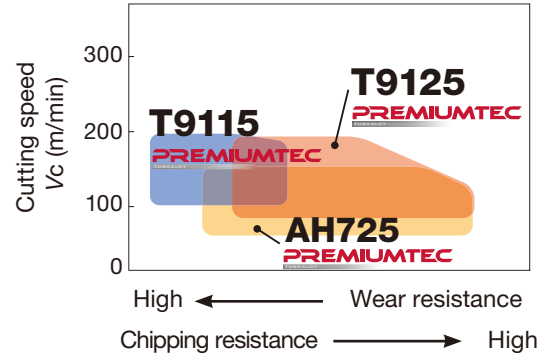
### Steel machining



**M**

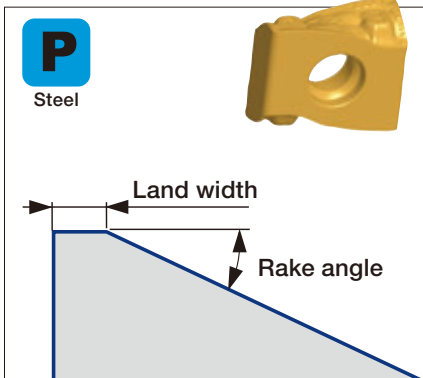
Stainless

### Stainless steel machining



## CHIPBREAKERS

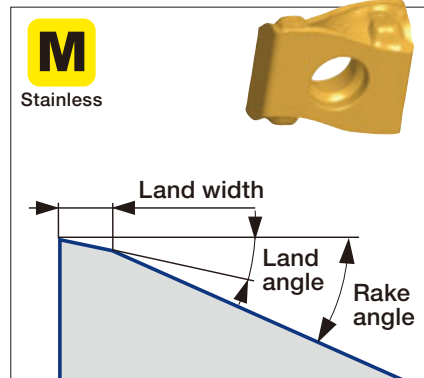
### TDR type



#### For steel turning

Excellent balance of low cutting force and edge strength

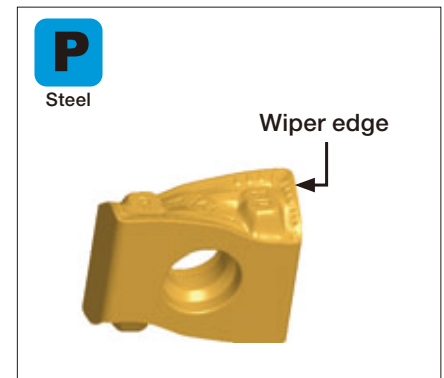
### MDR type



#### For stainless steel turning

Strong for stainless steel machining with sharp cutting edge

### TWR type

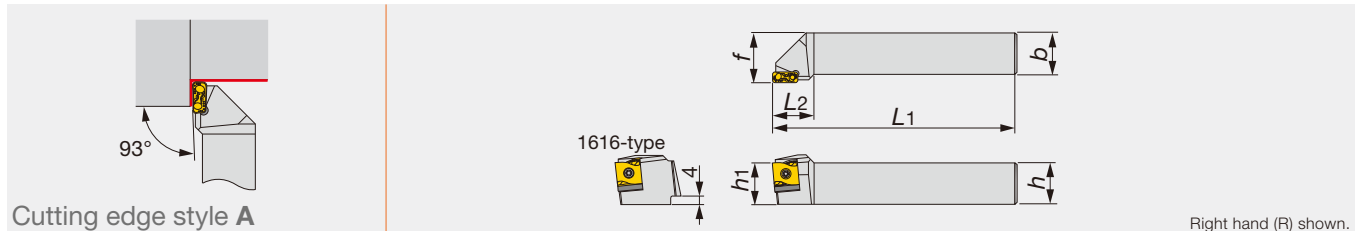


#### With wiper edge

Improves surface finish

## TLANR/L

Screw-on clamp toolholder for roughing operation with 93° approach angle, for negative tangential inserts



Right hand (R) shown.

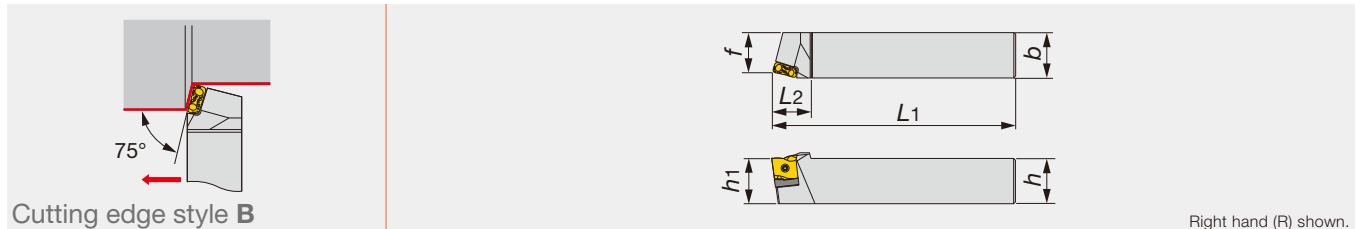
Designation	h	b	L1	L2	h1	f	Insert
TLANR/L1616H12	16	16	100	20	16	20	LNMX1204**R/L...
TLANR/L1616M12S	16	16	150	20	16	20	LNMX1204**R/L...
TLANR/L2020K12	20	20	125	20	20	25	LNMX1204**R/L...
TLANR/L2020K16	20	20	125	25	20	25	LNMX1606**R/L...
TLANR/L2525M12	25	25	150	20	25	30	LNMX1204**R/L...
TLANR/L2525M16	25	25	150	25	25	30	LNMX1606**R/L...
TLANR/L3232P16	32	32	170	35	32	37	LNMX1606**R/L...
TLANR/L3232P24	32	32	170	35	32	38	LNMX2410**R/L...
TLANR/L4040R16	40	40	200	35	40	47	LNMX1606**R/L...
TLANR/L4040R24	40	40	200	40	40	47	LNMX2410**R/L...
TLANR/L5050S24	50	50	250	40	50	57	LNMX2410**R/L...

### SPARE PARTS

Designation	Clamping screw	Shim screw	Shim	Spring	Wrench 1	Wrench 2
TLANR1616H12	CSTB-3.5L115-S	CSTF-2L055-S	TSL12R	-	KEYV-T10	T-6F-S
TLANL1616H12	CSTB-3.5L115-S	CSTF-2L055-S	TSL12L	-	KEYV-T10	T-6F-S
TLANR1616M12S	CSTB-3.5L115-S	CSTF-2L055-S	TSL12R	-	KEYV-T10	T-6F-S
TLANL1616M12S	CSTB-3.5L115-S	CSTF-2L055-S	TSL12L	-	KEYV-T10	T-6F-S
TLANR2020K12	CSTB-3.5L115-S	CSTF-2L055-S	TSL12R	-	KEYV-T10	T-6F-S
TLANL2020K12	CSTB-3.5L115-S	CSTF-2L055-S	TSL12L	-	KEYV-T10	T-6F-S
TLANR2020K16	CSTB-4L115-S	-	TSL16R	PSP-16	KEYV-T15	-
TLANL2020K16	CSTB-4L115-S	-	TSL16L	PSP-16	KEYV-T15	-
TLANR2525M12	CSTB-3.5L115-S	CSTF-2L055-S	TSL12R	-	KEYV-T10	T-6F-S
TLANL2525M12	CSTB-3.5L115-S	CSTF-2L055-S	TSL12L	-	KEYV-T10	T-6F-S
TLANR2525M16	CSTB-4L115-S	-	TSL16R	PSP-16	KEYV-T15	-
TLANL2525M16	CSTB-4L115-S	-	TSL16L	PSP-16	KEYV-T15	-
TLANR3232P16	CSTB-4L115-S	-	TSL16R	PSP-16	KEYV-T15	-
TLANL3232P16	CSTB-4L115-S	-	TSL16L	PSP-16	KEYV-T15	-
TLANR3232P24	CSTB-5L163-S	-	TSL24R	SP 16-L14	KEYV-T20	-
TLANL3232P24	CSTB-5L163-S	-	TSL24L	SP 16-L14	KEYV-T20	-
TLANR4040R16	CSTB-4L115-S	-	TSL16R	PSP-16	KEYV-T15	-
TLANL4040R16	CSTB-4L115-S	-	TSL16L	PSP-16	KEYV-T15	-
TLANR4040R24	CSTB-5L163-S	-	TSL24R	SP 16-L14	KEYV-T20	-
TLANL4040R24	CSTB-5L163-S	-	TSL24L	SP 16-L14	KEYV-T20	-
TLANR5050S24	CSTB-5L163-S	-	TSL24R	SP 16-L14	KEYV-T20	-
TLANL5050S24	CSTB-5L163-S	-	TSL24L	SP 16-L14	KEYV-T20	-

## TLBNR/L

Screw-on clamp toolholder for roughing operation with 75° approach angle, for negative tangential inserts

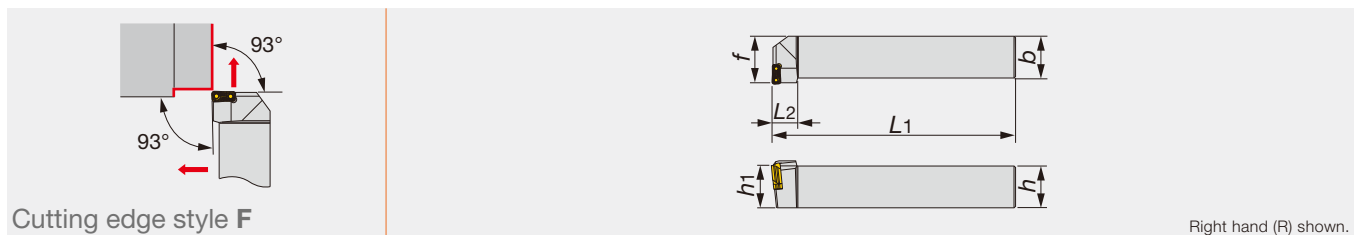


Designation	<i>h</i>	<i>b</i>	<i>L1</i>	<i>L2</i>	<i>h1</i>	<i>f</i>	Insert
TLBNR/L4040R24	40	40	200	35	40	35	LNMX2410**R/L...

SPARE PARTS				
Designation	Clamping screw	Shim	Spring pin	Wrench
TLBNR4040R24	CSTB-5L163-S	TSL24R	PSP-16	KEYV-T20
TLBNL4040R24	CSTB-5L163-S	TSL24L	PSP-16	KEYV-T20

## TLFNR/L

Screw-on clamp toolholder for roughing operation with 93° approach angle, for negative tangential inserts



Designation	<i>h</i>	<i>b</i>	<i>L1</i>	<i>L2</i>	<i>h1</i>	<i>f</i>	Insert
TLFNR/L2525M16	25	25	150	20	25	30	LNMX1606**L/R...
TLFNR/L3232P16	32	32	170	20	32	37	LNMX1606**L/R...

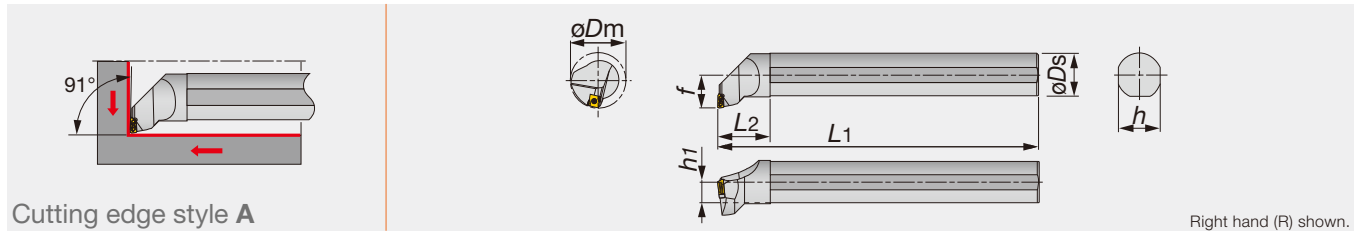
Note: The right hand insert (R) is used for the left hand toolholders (TLFNL\*\* type), and the left hand insert (L) is used for the right hand toolholders (TLFNR\*\* type).

SPARE PARTS				
Designation	Clamping screw	Shim	Spring pin	Wrench
TLFNR2525M16	CSTB-4L115-S	TSL16L	PSP-16	KEYV-T15
TLFNL2525M16	CSTB-4L115-S	TSL16R	PSP-16	KEYV-T15
TLFNR3232P16	CSTB-4L115-S	TSL16L	PSP-16	KEYV-T15
TLFNL3232P16	CSTB-4L115-S	TSL16R	PSP-16	KEYV-T15



## S-TLANR/L

Screw-on clamp internal toolholder for roughing operation with 91° approach angle, for negative tangential inserts



Designation	Material	$\phi D_m$	$\phi D_s$	$f$	$L_1$	$L_2$	$h$	$h_1$	Insert
S25T-TLANR/L12-D530	Steel	53	25	17	300	40	23	11.5	LNMX1204**L/R...
S32U-TLANR/L12-D530	Steel	53	32	22	350	45	29	14.5	LNMX1204**L/R...
S40V-TLANR/L12-D530	Steel	53	40	27	400	53	36	18	LNMX1204**L/R...
S50U-TLANR/L16-D850	Steel	85	50	37	350	63	46	23	LNMX1606**L/R...

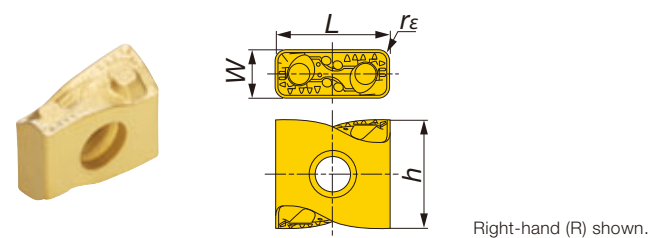
Note: The right hand insert (R) is used for the left hand toolholders (TLANL\*\* type), and the left hand insert (L) is used for the right hand toolholders (TLANR\*\* type).

### SPARE PARTS

Designation	Clamping screw	Shim screw	Shim	Spring pin	Wrench 1	Wrench 2
S**-TLANR/L12-D530	CSTB-3.5L115-S	CSTF-2L055-S	TSL12L/RI	-	KEYV-T10	T-6F-S
S50U-TLANR16-D850	CSTB-4L115-S	-	TSL16LI	PSP-16	KEYV-T15	-
S50U-TLANL16-D850	CSTB-4L115-S	-	TSL16RI	PSP-16	KEYV-T15	-

## INSERT

### LNMX12/16/24



Designation	$r_\epsilon$	Coating						$W$	$L$	$h$
		T9115		T9125		AH725				
		R	L	R	L	R	L			
LNMX120408R/L-TDR	0.8	●	●	●	●			4.8	12	11.6
LNMX120412R/L-TDR	1.2	●	●	●	●			4.8	12	11.6
LNMX160608R/L-TDR	0.8	●	●	●	●			6.4	16.2	13.5
LNMX160612R/L-TDR	1.2	●	●	●	●			6.4	16.2	13.5
LNMX160616R/L-TDR	1.6	●	●	●	●			6.4	16.2	13.5
LNMX241016R/L-TDR	1.6	●	●	●	●			9.4	24	20.5
LNMX241024R/L-TDR	2.4	●	●	●	●			9.4	24	20.5
LNMX160608R/L-MDR	0.8	●	●			●	●	6.4	16.2	13.5
LNMX160612R/L-MDR	1.2	●	●			●	●	6.4	16.2	13.5
LNMX160608R/L-TWR	0.8	●	●	●	●			6.4	16.2	13.5
LNMX160612R/L-TWR	1.2	●	●	●	●			6.4	16.2	13.5

● : Line-up

## STANDARD CUTTING CONDITIONS

### LNMX1204

\* Values in red shows the condition for facing

ISO	Workpiece material	Chip-breaker	Grade	Cutting speed Vc (m/min)	Depth of cut: ap (mm)		Feed: f (mm/rev)	
					re : 0.8	re : 1.2	re : 0.8	re : 1.2
P	Steels S45C, SCM415, etc. C45, 18CrMo4, etc.	TDR	T9115	120 - 250	0.5 - 5 0.5 - 2.2	0.8 - 5 0.8 - 2.2	0.15 - 0.6	0.25 - 0.8
		TDR	T9125	80 - 180	0.5 - 5 0.5 - 2.2	0.8 - 5 0.8 - 2.2	0.15 - 0.6	0.25 - 0.8
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.	TDR	T9115	100 - 180	0.5 - 5 0.5 - 2.2	0.8 - 5 0.8 - 2.2	0.15 - 0.6	0.25 - 0.8
		TDR	T9125	80 - 180	0.5 - 5 0.5 - 2.2	0.8 - 5 0.8 - 2.2	0.15 - 0.6	0.25 - 0.8

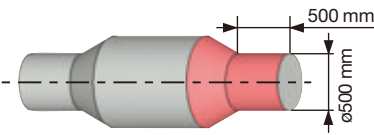
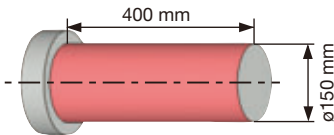
### LNMX1606

ISO	Workpiece material	Chip-breaker	Grade	Cutting speed Vc (m/min)	Depth of cut: ap (mm)			Feed: f (mm/rev)		
					re : 0.8	re : 1.2	re : 1.6	re : 0.8	re : 1.2	re : 1.6
P	Steels S45C, SCM415, etc. C45, 18CrMo4, etc.	TDR	T9115	120 - 250	0.5 - 5 0.5 - 3.2	0.8 - 6 0.8 - 3.2	1 - 8 1 - 3.2	0.15 - 0.6	0.25 - 0.8	0.3 - 1
		TDR	T9125	80 - 180	0.5 - 5 0.5 - 3.2	0.8 - 6 0.8 - 3.2	1 - 8 1 - 3.2	0.15 - 0.6	0.25 - 0.8	0.3 - 1
		TWR	T9115	120 - 250	1 - 8 1 - 3.2	0.8 - 6 0.8 - 3.2	-	0.15 - 0.6	0.25 - 0.8	-
		TWR	T9125	80 - 180	1 - 8 1 - 3.2	0.8 - 6 0.8 - 3.2	-	0.15 - 0.6	0.25 - 0.8	-
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.	TDR	T9115	100 - 180	0.5 - 5 0.5 - 3.2	0.8 - 6 0.8 - 3.2	1 - 8 1 - 3.2	0.15 - 0.6	0.25 - 0.8	0.3 - 1
		TDR	T9125	80 - 180	0.5 - 5 0.5 - 3.2	0.8 - 6 0.8 - 3.2	1 - 8 1 - 3.2	0.15 - 0.6	0.25 - 0.8	0.3 - 1
		MDR	T9115	100 - 150	1.5 - 6 0.5 - 3.2	1.5 - 7 0.8 - 3.2	-	0.1 - 0.5	0.15 - 0.7	-
		MDR	AH725	50 - 150	1.5 - 6 0.5 - 3.2	1.5 - 7 0.8 - 3.2	-	0.1 - 0.5	0.15 - 0.7	-
		TWR	T9115	100 - 180	0.5 - 5 0.5 - 3.2	0.8 - 6 0.8 - 3.2	-	0.15 - 0.6	0.25 - 0.8	-
		TWR	T9125	80 - 180	0.5 - 5 0.5 - 3.2	0.8 - 6 0.8 - 3.2	-	0.15 - 0.6	0.25 - 0.8	-

### LNMX2410

ISO	Workpiece material	Chip-breaker	Grade	Cutting speed Vc (m/min)	Depth of cut: ap (mm)		Feed: f (mm/rev)	
					re : 1.6	re : 2.4	re : 1.6	re : 2.4
P	Steels S45C, SCM415, etc. C45, 18CrMo4, etc.	TDR	T9115	120 - 250	4 - 15 1 - 4.5	5 - 15 1 - 4.5	0.3 - 1	0.3 - 1.1
		TDR	T9125	80 - 150	4 - 15 1 - 4.5	5 - 15 1 - 4.5	0.3 - 1	0.3 - 1.1
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.	TDR	T9115	100 - 180	4 - 15 1 - 4.5	5 - 15 1 - 4.5	0.3 - 1	0.3 - 1.1
		TDR	T9125	80 - 150	4 - 15 1 - 4.5	5 - 15 1 - 4.5	0.3 - 1	0.3 - 1.1

## PRACTICAL EXAMPLES

Workpiece type	Shaft	Shaft
Toolholder	TLANR3232P16	TLANR3232P16
Insert	LNMX160612R-TDR	LNMX160616R-TDR
Grade	T9125	T9125
Workpiece material	Alloy steel	S45C / C45 (200HB)
Cutting conditions		
Cutting speed: $V_c$ (m/min)	80	150
Feed : $f$ (mm/rev)	0.6	0.6
Depth of cut : $a_p$ (mm)	5	8
Machining	External roughing operation	External roughing operation
Coolant	Dry	Dry
Results	 <p><b>Productivity Doubled!</b></p> <p>The TDR insert with a deep inclination provides stable machining without chattering, even when feed is increased by 1.5 times.</p>	 <p><b>Machining time reduced 50%</b></p> <p>Even with a large DoC, the TDR insert enables higher feed machining compared to conventional ISO inserts with pressed chipbreakers.</p>

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