

THE NEW VALUE FRONTIER



For small parts machining  
and large depths of cut

**LD** Chipbreaker

# LD Chipbreaker

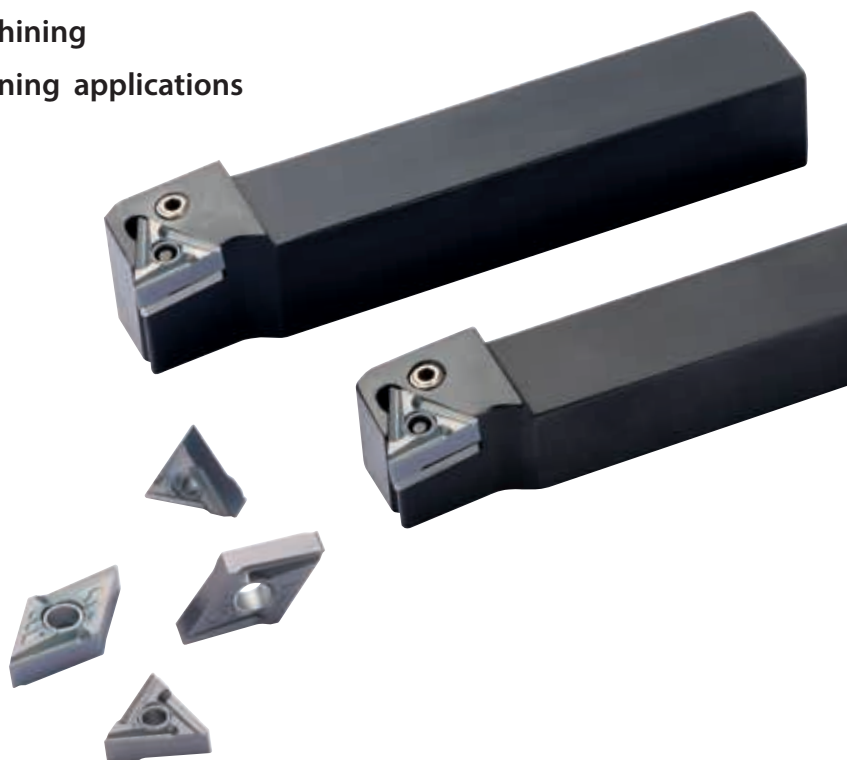


Achieves high-precision machining in a single pass

Low-resistance chipbreaker for smooth machining

Stable chip control in a wide range of machining applications

Max depth of cut: 12 mm



For small parts machining and large depths of cut

# LD Chipbreaker

Max depth of cut: 12 mm / Achieves high-precision machining in a single pass

Low-resistance cutting edge suppresses chattering / stable chip control in a wide range of machining applications

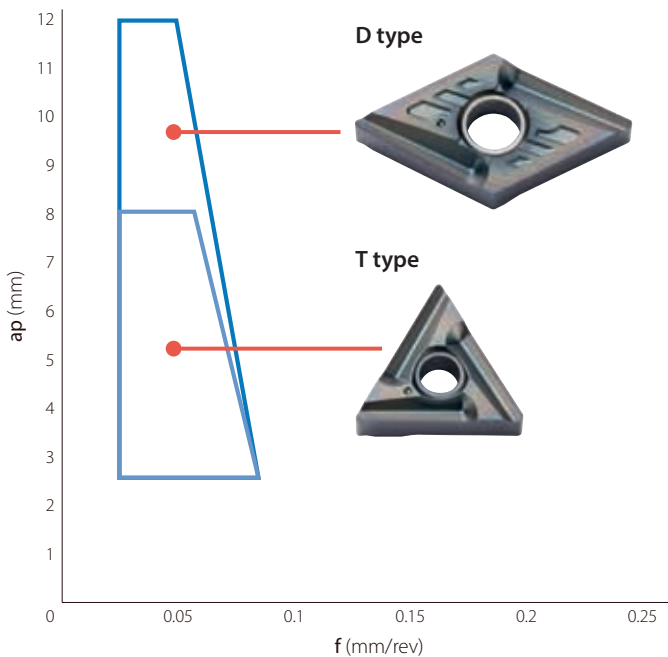
1

Great for large depths of cut with single pass machining

Available for greater depths of cut than many conventional chipbreakers

Achieves high-precision machining in a single pass

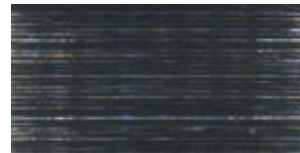
LD chipbreaker application map



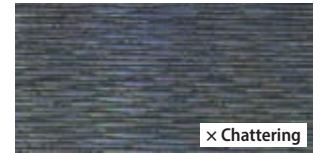
Chattering resistance comparison (In-house evaluation)

D type: Max depth of cut 12 mm

LD chipbreaker



Competitor A

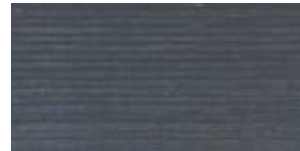


× Chattering

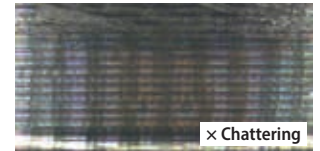
Cutting conditions:  $V_c = 80$  m/min,  $a_p = 12$  mm,  $f = 0.03$  mm/rev, wet (Oil-based)  
DNMG150404 type / workpiece: X40CrMoV51 ( $\phi 25$ )

T type: Max depth of cut 8 mm

LD chipbreaker



Competitor A



× Chattering

Cutting conditions:  $V_c = 80$  m/min,  $a_p = 8$  mm,  $f = 0.05$  mm/rev, wet (Oil-based)  
TNMG160404 type / workpiece: X40CrMoV51 ( $\phi 25$ )

## Single-Pass machining advantages

Example 1: Conventional tooling requires larger metal removal volume to be machined in multiple passes

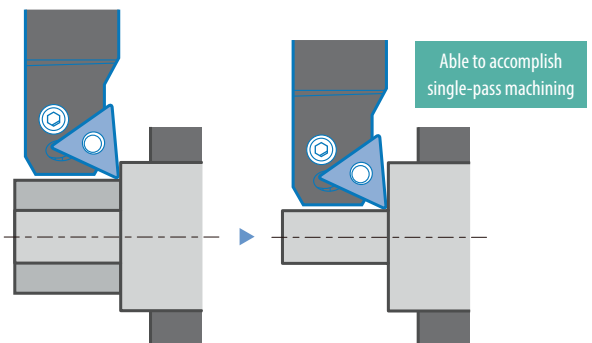
→ Single-Pass machining prevents chip problems and maintains stability

Example 2: Long workpieces that can not be machined in multiple passes

→ Single-Pass machining suppresses chattering with high precision & high efficiency

Conventional chipbreaker

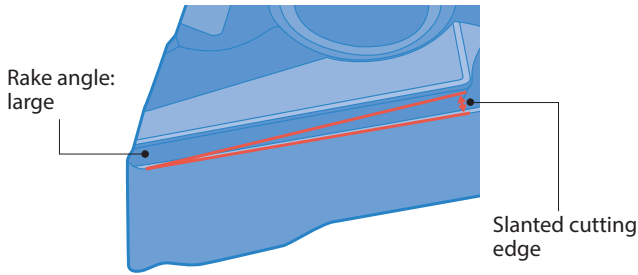
LD chipbreaker



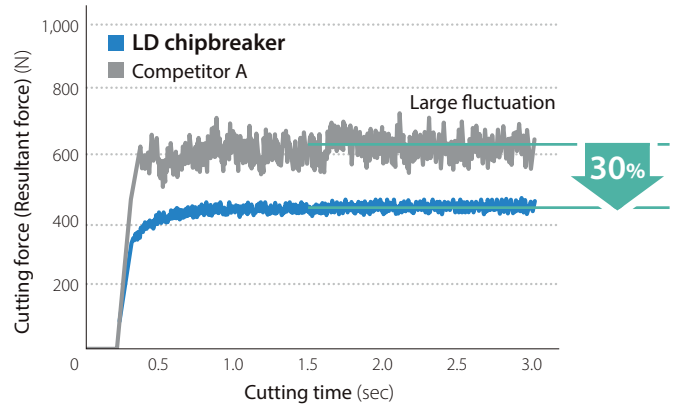
## 2 Low-resistance cutting edge

Large rake angle and slanted cutting edge for low-resistance and smooth machining

LD chipbreaker



Cutting force comparison (In-house evaluation)

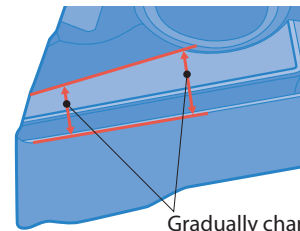


Cutting conditions:  $V_c = 80$  m/min,  $a_p = 3$  mm,  $f = 0.07$  mm/rev, TNMG160404 Type  
Workpiece: 15CrMo4

## 3 Superior chip control in a wide range of machining applications

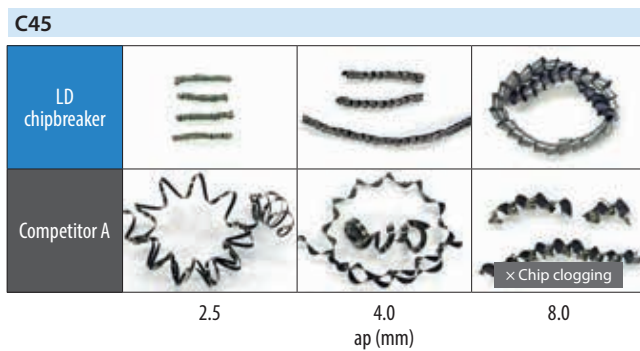
Chipbreaker shape optimized for various depths of cut

Stable chip control in a wide range of machining applications

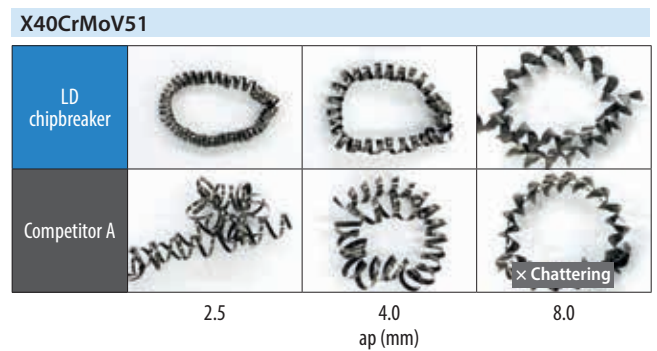


Chip control comparison (In-house evaluation)

T type (Workpiece diameter:  $\varnothing 25$ )



Cutting conditions:  $V_c = 80$  m/min,  $f = 0.05$  mm/rev, wet (Oil-based), TNMG160404 type



Cutting conditions:  $V_c = 80$  m/min,  $f = 0.05$  mm/rev, wet (Oil-based), TNMG160404 type



Cutting conditions:  $V_c = 60$  m/min,  $f = 0.03$  mm/rev, wet (Oil-based), TNMG160404 type

# MEGACOAT NANO PR1535

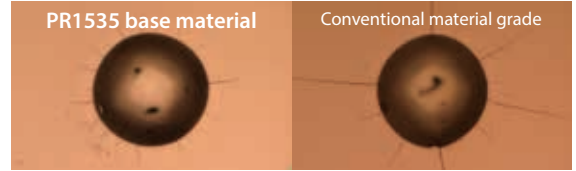
The combination of a high-toughness base material and a special nano layer coating maintains long tool life and stable machining of stainless steel

- 1 An increase in cobalt content yields a substrate with greater toughness  
\* in comparison to our conventional material grade
- 2 Improved stability by optimization and homogenization of grains in the base material
- 3 MEGACOAT NANO coating technology for long tool life and stable machining

↑  
23%  
Fracture toughness\*

Cracking comparison by diamond indenter (In-house evaluation)

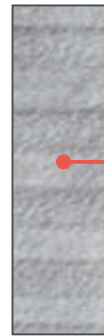
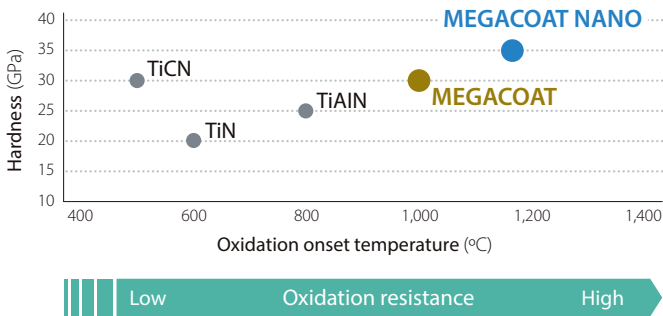
↑  
Impact resistance



Short cracks

Long cracks

## Coating properties



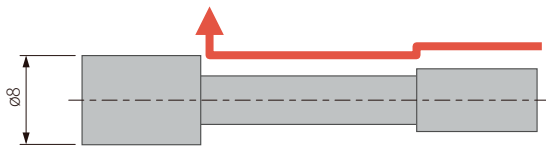
MEGACOAT base layer structure

### Note

PR1535 also shows superior performance in steel machining under unstable conditions

## Machining example

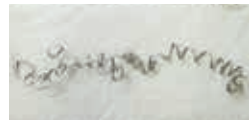
Pin: X40CrMoV51-equivalent



$V_c = 45 \text{ m/min}$  ( $n = 1,800 \text{ min}^{-1}$ )  
 $a_p = 1.5 - 1.6 \text{ mm}$ ,  $f = 0.03 \text{ mm/rev}$   
 Wet (Oil-based)  
 TNMG160404R-LD PR1535

Chip control

LD chipbreaker





Competitor B



LD chipbreaker shows more stable chip control than competitor B

(User evaluation)

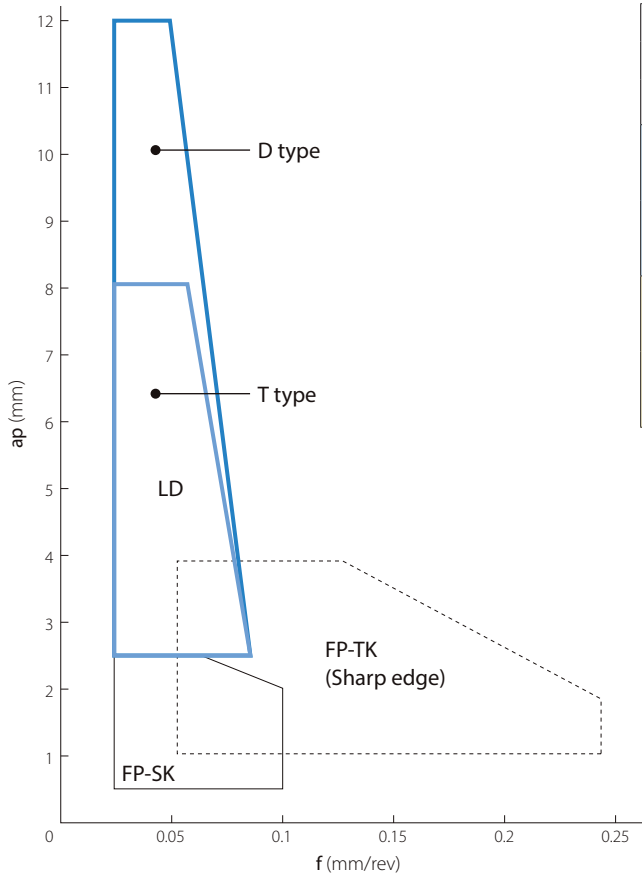
## Negative type inserts

Shape	Description	Dimensions (mm)				MEGACOAT NANO	
		I.C.	Thickness	Hole diameter	Corner R (r <sub>c</sub> )	PR1425	PR1535
	DNMG150402R-LD	12.70	4.76	5.16	0.2	R	R
	DNMG150404R-LD				0.4	R	R
	TNMG160402R-LD	9.525	4.76	3.81	0.2	R	R
	TNMG160404R-LD				0.4	R	R

R: Only R-hand available

## Recommended cutting conditions

### LD chipbreaker application map



### Recommended cutting conditions ★: 1st recommendation ☆: 2nd recommendation

Workpiece		Recommended insert grade		Notes
		MEGACOAT NANO		
		PR1425	PR1535	
Carbon steel, alloy steel	Vc (m/min)	★ 60 – 200	☆ 60 – 160	Wet
	f (mm/rev)	0.02 – 0.08	0.02 – 0.08	
Stainless steel	Vc (m/min)	☆ 60 – 160	★ 60 – 140	
	f (mm/rev)	0.02 – 0.07	0.02 – 0.07	

Adjust cutting conditions according to machine/workpiece rigidity

Chipbreaker for copying

# VC Chipbreaker

- High productivity for machining various shapes / contours
- Excellent chip control in a wide range of machining applications
- Strong edge design



Negative wiper insert

# WE / WF Chipbreaker

High productivity with newly designed wiper edge geometry

## Finishing-Medium

- WE chipbreaker (For high machining efficiency)
- High productivity by reducing cutting time during higher feed machining
- Stable chip control in a wide range of applications

## Finishing

- WF chipbreaker (For excellent surface roughness)
- High productivity with smooth chip control in finishing operations
- Excellent surface roughness by controlling adhesion

