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

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

Availale for greater depths of cut than many conventional chipbreakers
Achieves high-precision machining in a single pass

LD chipbreaker application map

D type

T type

ap (mm)
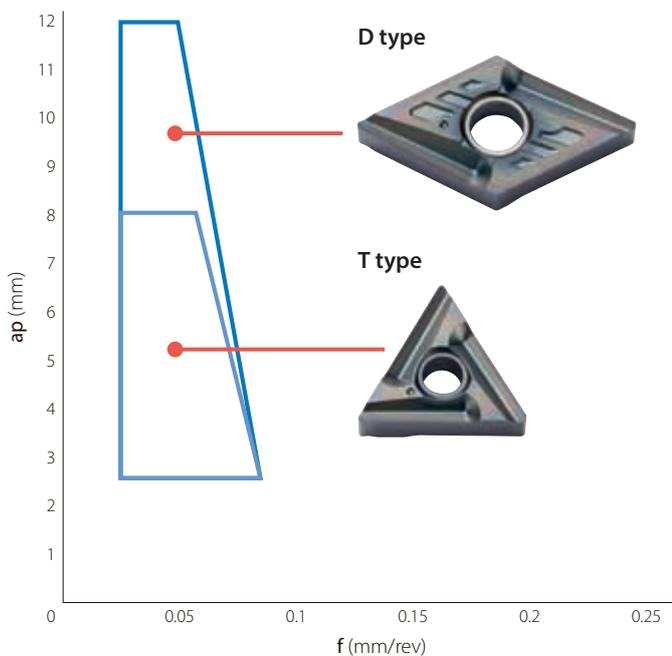
f (mm/rev)

Chattering resistance comparison (In-house evaluation)

D type: Max depth of cut 12 mm

LD chipbreaker	Competitor A

× Chattering

Cutting conditions: Vc = 80 m/min, ap = 12 mm, f = 0.03 mm/rev, wet (Oil-based)
DNMG150404 type / workpiece: X40CrMoV51 (ø25)

T type: Max depth of cut 8 mm

LD chipbreaker	Competitor A

× Chattering

Cutting conditions: Vc = 80 m/min, ap = 8 mm, f = 0.05 mm/rev, wet (Oil-based)
TNMG160404 type / workpiece: X40CrMoV51 (ø25)

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 stabilty

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**

Able to accomplish
single-pass machining
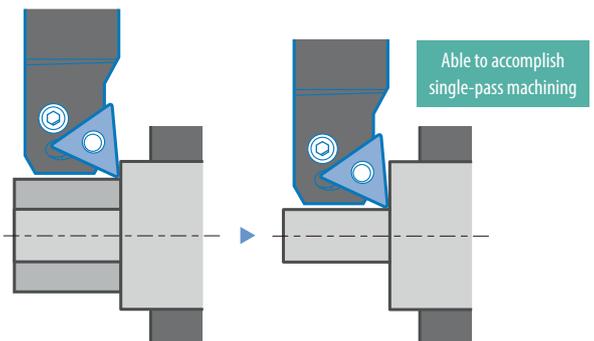
2 Low-resistance cutting edge

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

LD chipbreaker

Rake angle: large

Slanted cutting edge
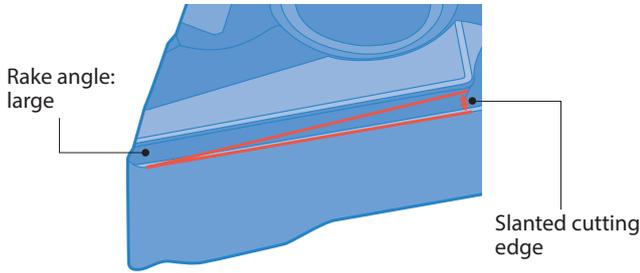
Cutting force comparison (In-house evaluation)

Cutting force (Resultant force) (N)

- **LD chipbreaker**
- Competitor A

Large fluctuation

30%

Cutting time (sec)
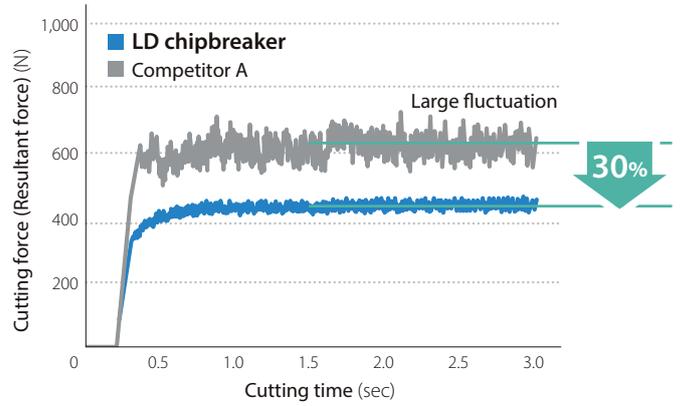
Cutting conditions: Vc = 80 m/min, ap = 3 mm, f = 0.07 mm/rev, TNMG160404 Type
Workpiece: 15CrMo4

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

Gradually changing chipbreaker width
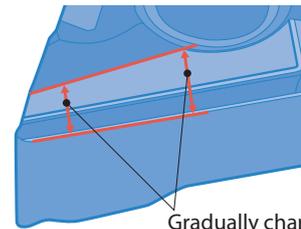
Chip control comparison (In-house evaluation)

T type (Workpiece diameter: ø25)
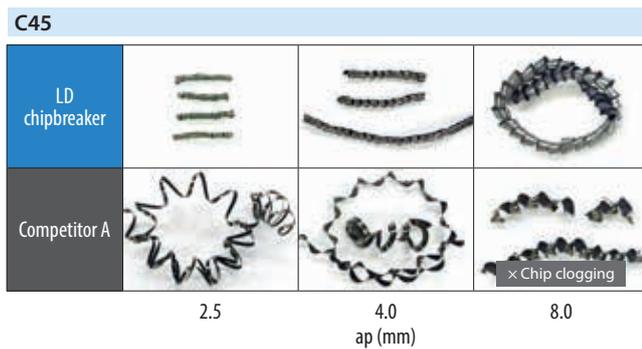
C45

LD chipbreaker			
Competitor A			× Chip clogging
	2.5	4.0	8.0
		ap (mm)	

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

X40CrMoV51

LD chipbreaker			
Competitor A			× Chattering
	2.5	4.0	8.0
		ap (mm)	

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

X5CrNi1810

LD chipbreaker			
Competitor A			× Chip clogging
	2.5	4.0	8.0
		ap (mm)	
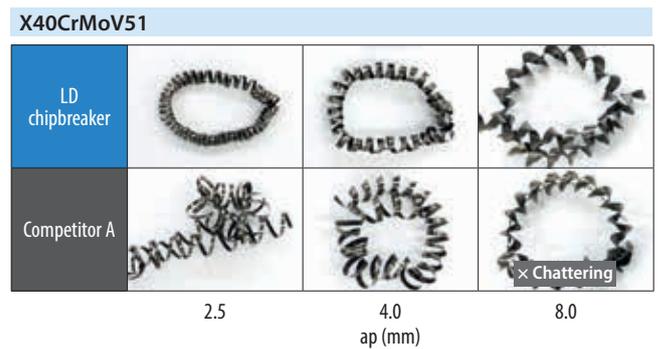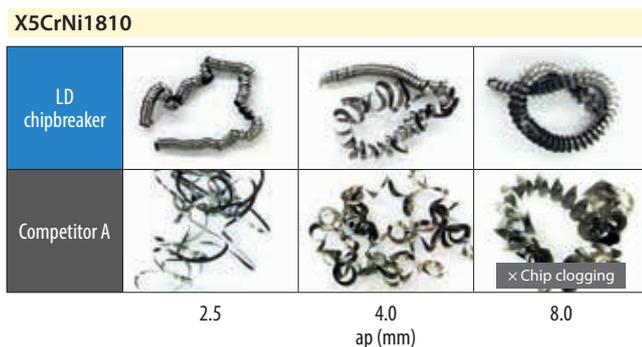
Cutting conditions: Vc = 60 m/min, f = 0.03 mm/rev, wet (Oil-based), TNMG160404 type

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 indentor (In-house evaluation)

Impact resistance
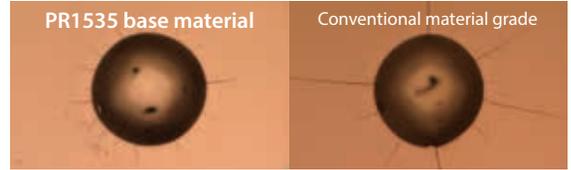
PR1535 base material	Conventional material grade
Short cracks	Long cracks

Coating properties

Hardness (GPa) vs Oxidation onset temperature (°C)

- TiCN
- TiN
- TiAlN
- MEGACOAT
- MEGACOAT NANO

Low — Oxidation resistance — High
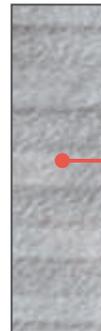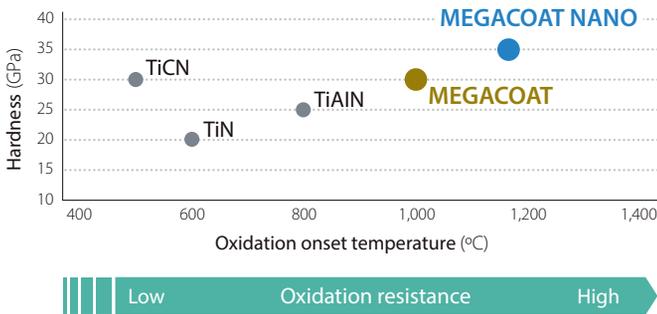
MEGACOAT base layer structure

Note

PR1535 also shows superior performance in steel machining under unstable conditions

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Machining example

Pin: X40CrMoV51-equivalent

∅8
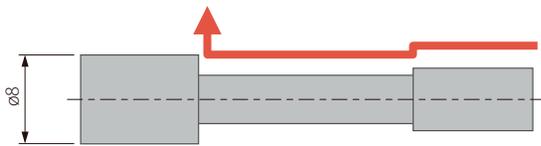
Vc = 45 m/min (n = 1,800 min⁻¹)
ap = 1.5 - 1.6 mm, f = 0.03 mm/rev
Wet (Oil-based)
TNMG160404R-LD PR1535

Chip control

LD chipbreaker
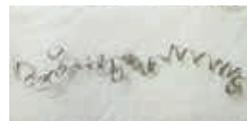
Competitor B

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 (rε)	PR1425	PR1535
	DNMG150402R-LD	12.70	4.76	5.16	0.2	R	R
	DNMG150404R-LD				0.4	R	R
	TNMG160402R-LD	9.525		3.81	0.2	R	R
	TNMG160404R-LD				0.4	R	R

R: Only R-hand available

Recommended cutting conditions

LD chipbreaker application map

Adjust cutting conditions according to machine/workpiece rigidity
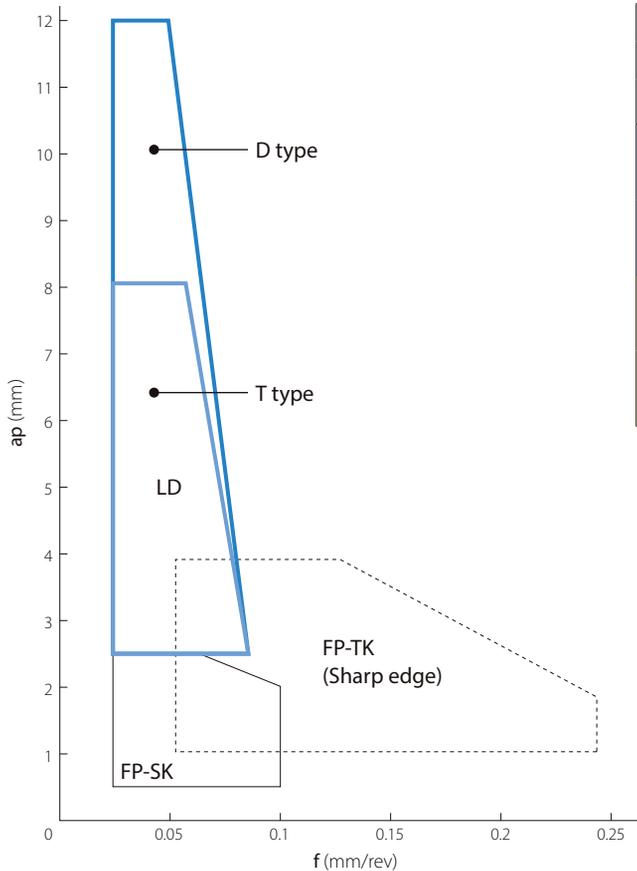
Recommended cutting conditions ★: 1st recommendation ☆: 2nd recommendation

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	

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 maching 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

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