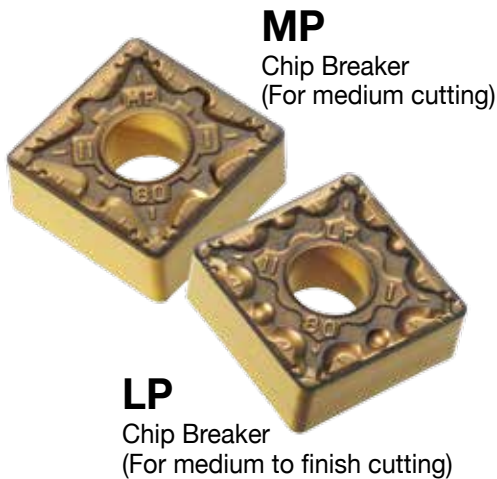


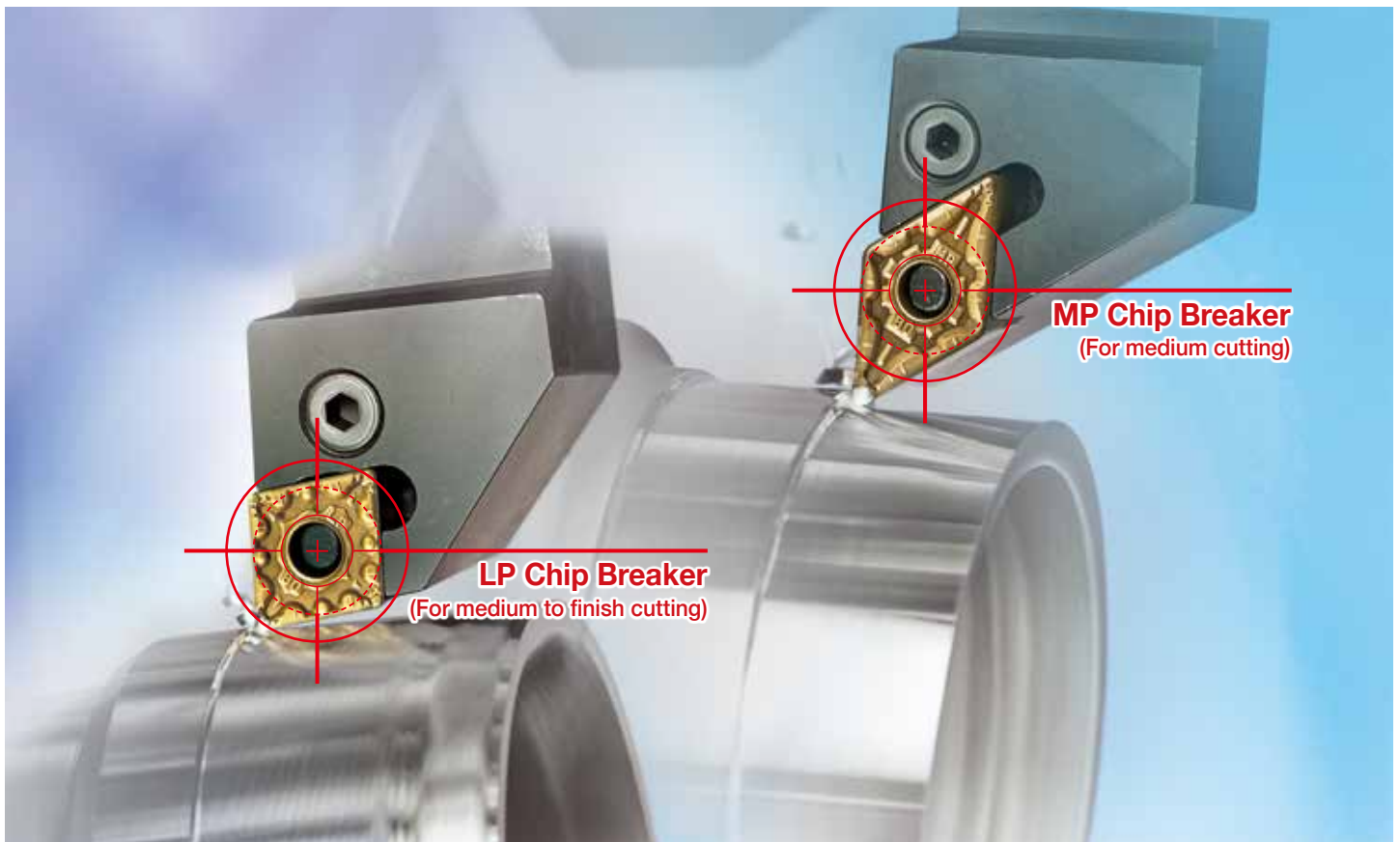
# NC3215 / NC3225



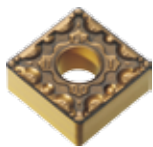
## Turning Insert for Machining Automobile Components

Complete turning solution to increase productivity at a wide range of cutting speed, feed and depth of cut.

- **Universal Chip Control**  
Increased productivity with stable chip control in various machining
- **Stable Tool Life**  
Reduced cutting force brings stable tool life at high speed and high feed



# High Performance CVD Coated Turning Insert For Machining Forged Steel and Bearing Steel



LP Chip Breaker

For medium  
to finish cutting



MP Chip Breaker

For medium  
cutting

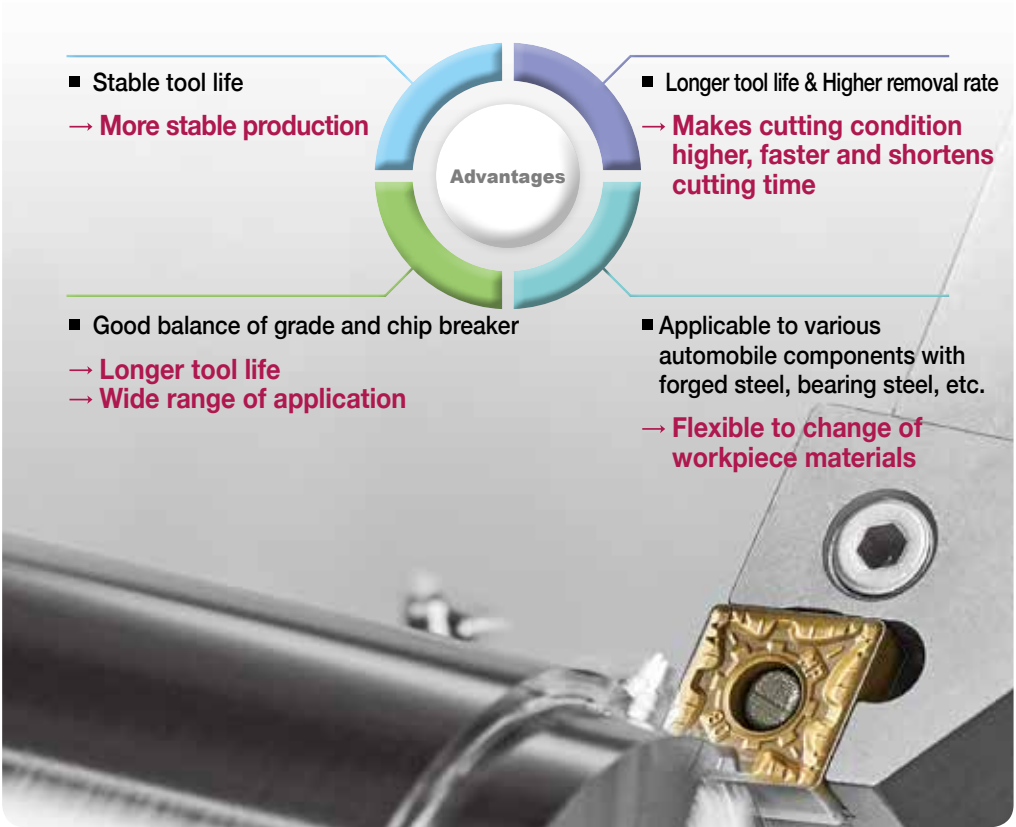
The surface of forged steel that is commonly used for automobile parts is harder and tougher while the inside is soft. Bearing steel also has those characteristics of high toughness and hardness. Machining these kinds of steel repeatedly causes built-up edge on cutting edges and chipping off the edge, which is one of the main reasons of falling productivity and causing unstable tool life.

Mass production of automobile parts requires faster cutting speed and higher feed along with much longer tool life than before.

**NC3215 / NC3225** are a new CVD coated grades for turning application of automobile components, made with forged steel and bearing steel. NC3225 is the first choice of an universal grade for machining forged parts while NC3215 is ideal for high speed and continuous machining. Coating, applied to these inserts, has been much improved than conventional ones with higher wear resistance and stability on cutting edges.

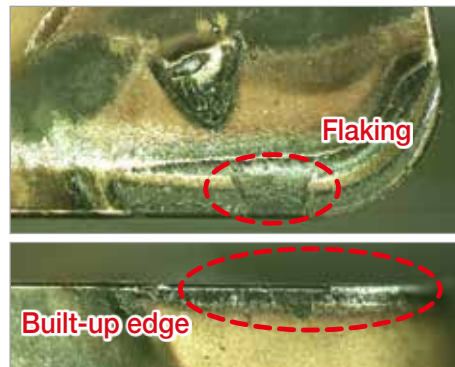
**LP / MP** Chip breakers have two step dots at the corner and bring measurable increase in productivity when machining forged steel at high speed(max. 350m/min) and high feed(max. 0.35mm/rev).

NC3215 / NC3225 in combination with LP / MP ensures a precise cutting action as well as maximum cutting efficiency when machining automobile components.



## ⇒ Existing Troubles When Machining Forged Steel

Unstable tool life



Poor wear resistance

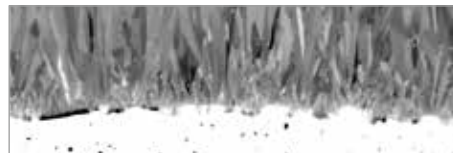


## ⇒ NC3215 / NC3225 Technology

Previous coating



New coating



Disperse cutting force

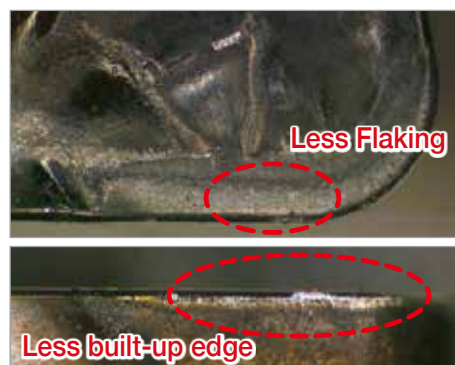
Reduce chipping

Increase tool life

Improved productivity

## ⇒ Troubles Solved with New Technology

Reduced flaking



Increased wear resistance



NC3225 P25 is the first choice in turning application of steel materials. It can be also used for workpieces such as hard to cut materials through post processing, as well as carbon steel, alloy steel and all the other steel materials.

## MP Chip Breaker (For medium cutting)



- Chip breaker for forged steel of automobile parts and normal steel.
- Quad dots improve productivity through efficient chip control at high feed.
- Angle land minimizes cutting force.

### Features of MP Chip Breaker

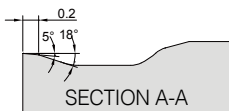
#### Front two step dot

- Higher stability of chip curls at high feed
- Excellent chip control when copying
- Lower cutting force at high depth of cut

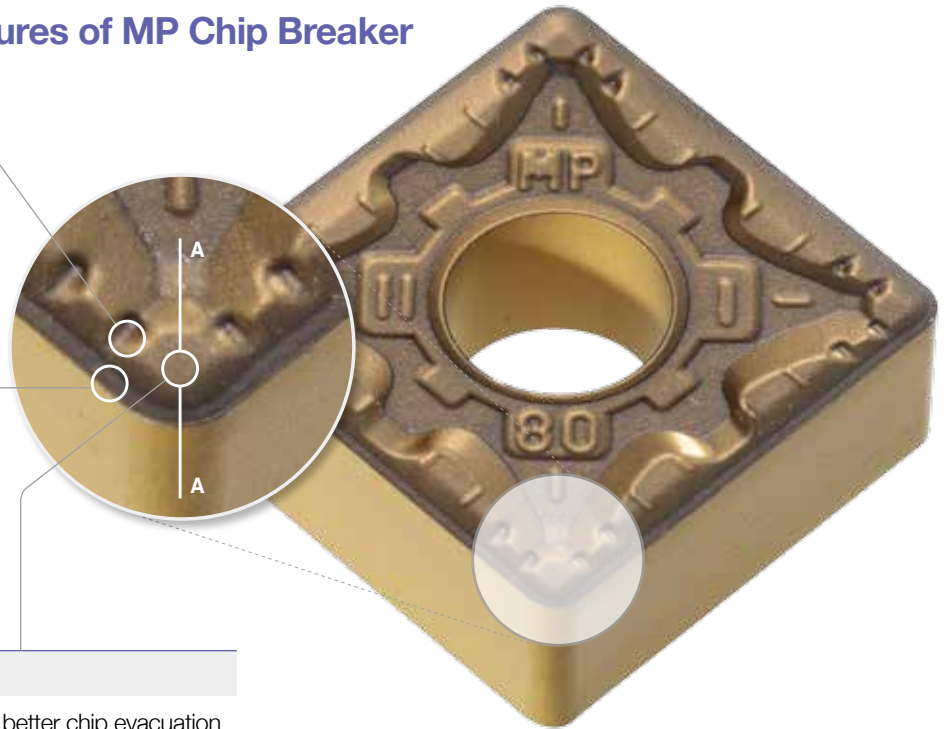
#### Variable land

- Less crater wear
- Prevents chipping on minor cutting edge
- Higher toughness at high depth of cut and interrupted cutting

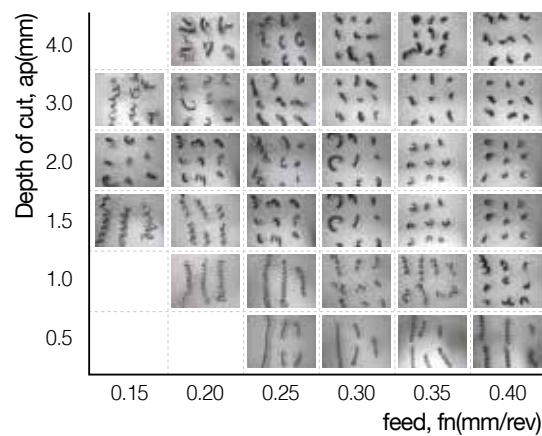
#### Flat zone



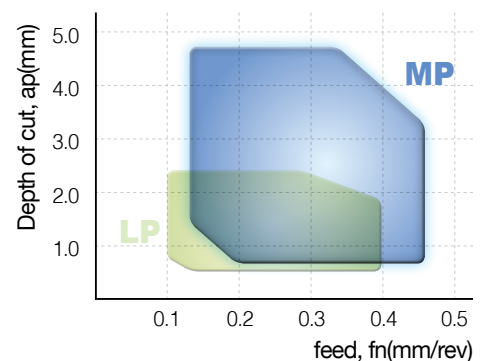
- Larger chip pocket for better chip evacuation at high feed
- Reduced cutting force with larger contact surface of chips



### Cutting Performance (Evaluation of chip map)



### Application Range (Medium cutting)



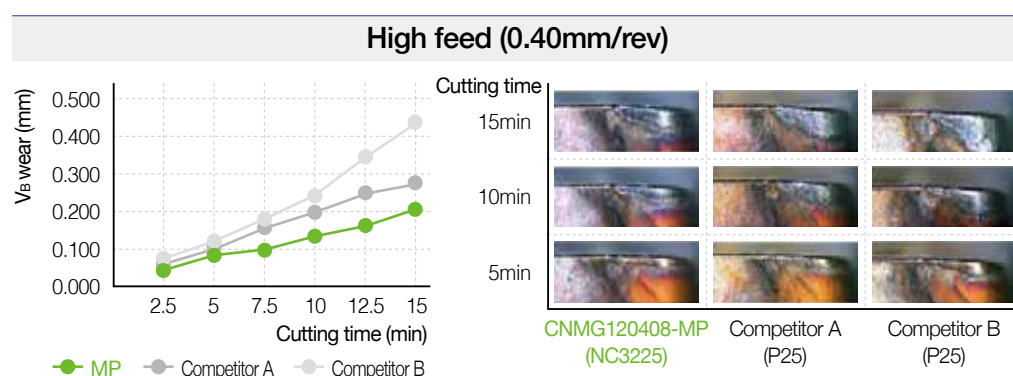
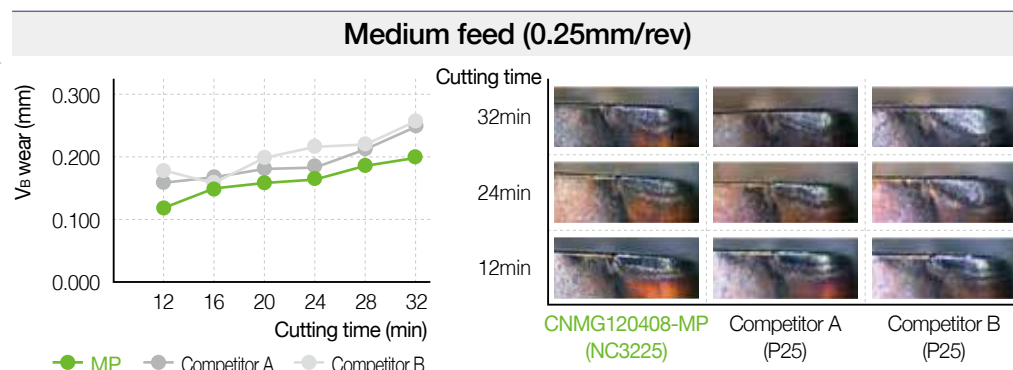
- Workpiece SM50C (Forged steel),  $\varnothing 100$ , External machining
- Cutting conditions  $v_c$ (m/min) = 250,  $a_p$ (mm) = 0.5~5.0,  $f_n$ (mm/rev) = 0.1~0.5, wet
- Tools CNMG120408-MP

➔ Smooth chip flow and efficient chip control at low feed

## ➤ Cutting Performance(Evaluation of wear resistance)

- Workpiece SCM440 (Alloy steel), Ø100, External machining
- Cutting conditions  $vc(m/min) = 280$ ,  $ap(mm) = 1.5$ ,  $fn(mm/rev) = 0.25 / 0.40$ , wet
- Tools CNMG120408-□□

Longer tool life due to lower cutting force at both medium feed(0.25mm/rev) and high feed(0.40mm/rev)

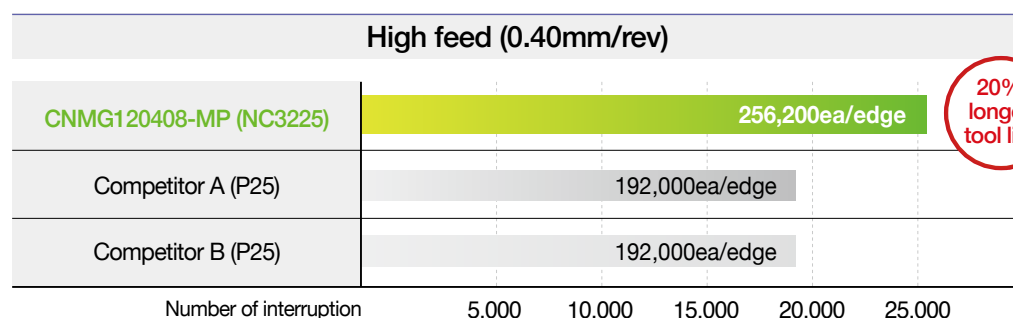
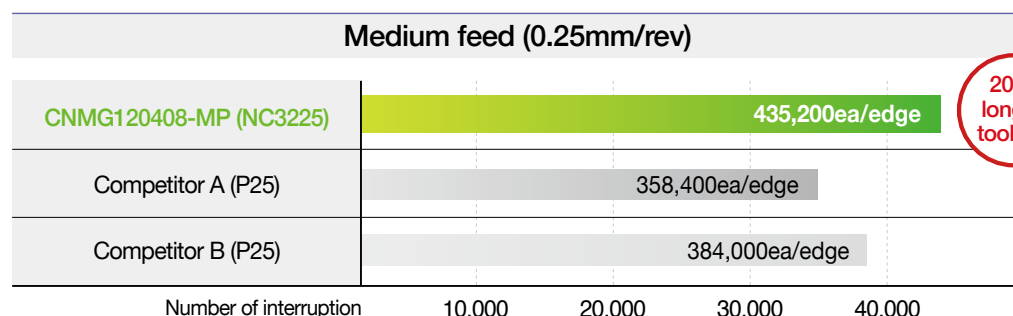


## ➤ Cutting Performance(Evaluation of toughness)

- Workpiece SM45C (Carbon steel), Ø100 (4 Grooves), Facing
- Cutting conditions  $vc(m/min) = 250$ ,  $ap(mm) = 1.5$ ,  $fn(mm/rev) = 0.25 / 0.40$ , wet
- Tools CNMG120408-□□



- NC3225 has **20% longer tool life** than competitor's(P25)
- MP Chip breaker ensures **stable chip control** and minimum burr for **excellent surface roughness**.



LP Chip Breaker (For medium to finish cutting)

P

- Chip breaker for forged steel of automobile parts and normal steel.
- Quad dots improve productivity through efficient chip control at high feed.
- Angle land minimizes cutting force.

Features of LP Chip Breaker

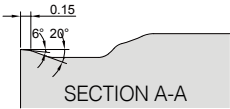
Front dot

- Higher stability of chip curls at high feed
- Excellent chip control when copying
- Lower cutting force at low depth of cut and high feed

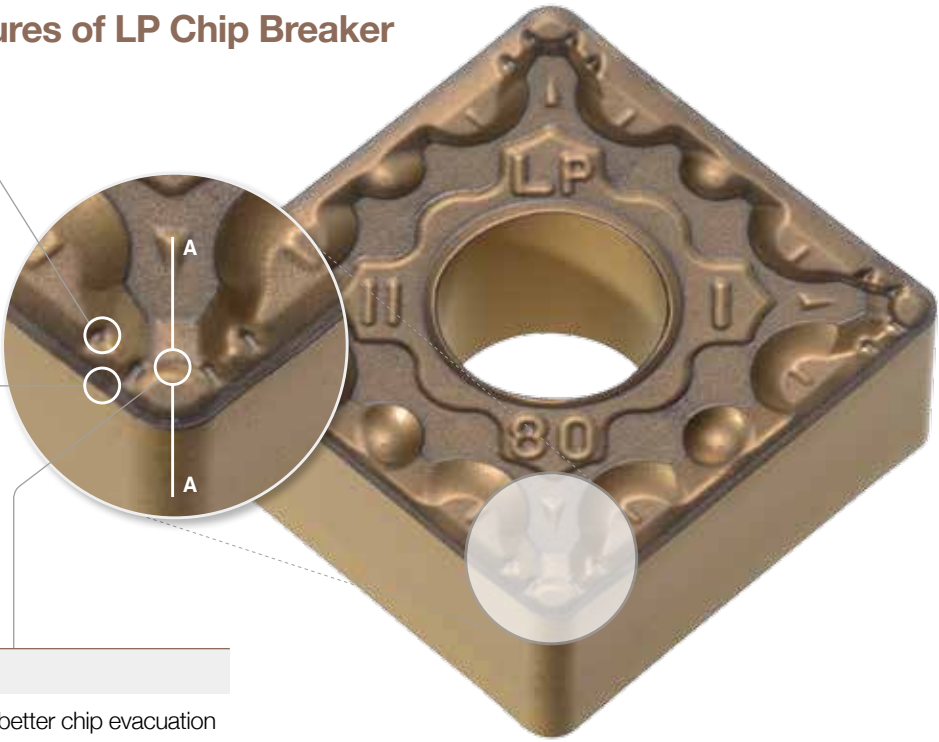
Variable land

- Less crater wear
- Prevents chipping on minor cutting edge

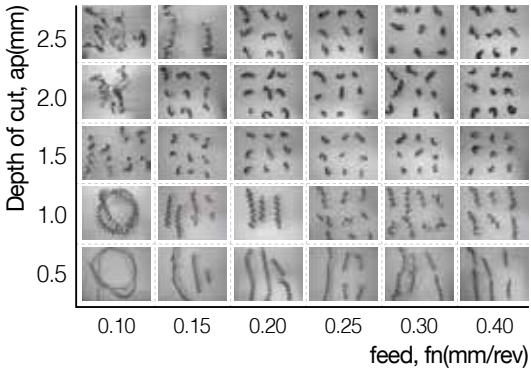
Flat zone



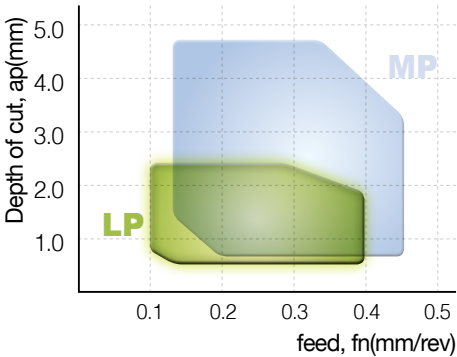
- Larger chip pocket for better chip evacuation at high feed
- Reduced cutting force with larger contact surface of chips



Cutting Performance  
(Evaluation of chip map)



Application Range  
(Medium to finish cutting)



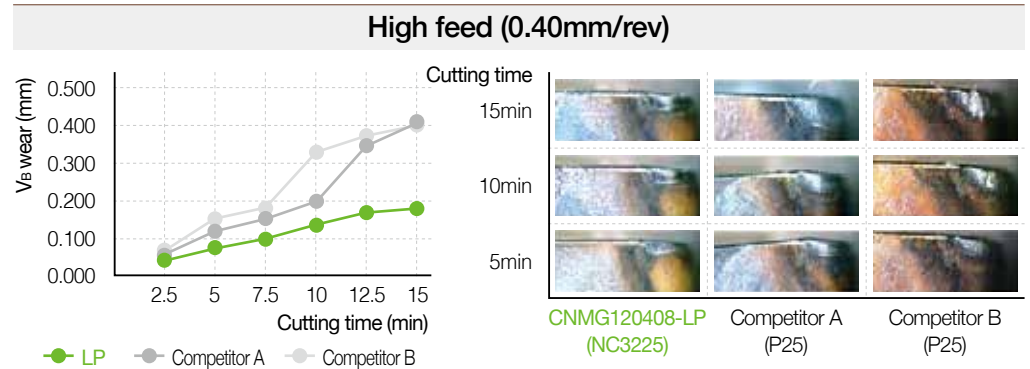
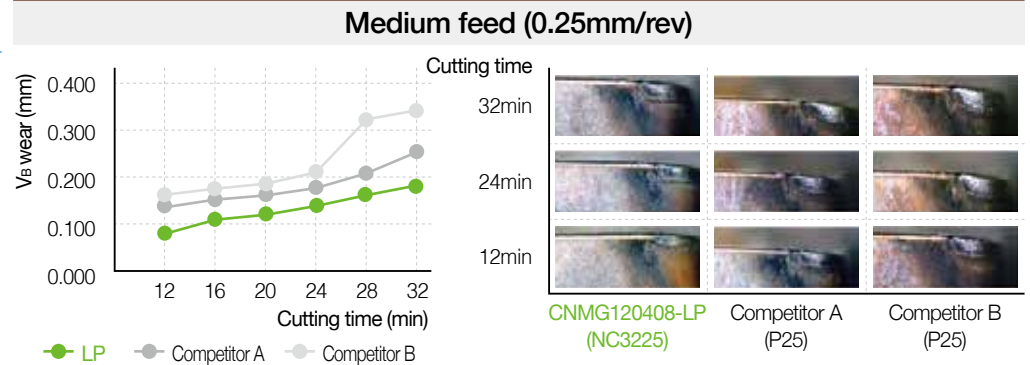
- Workpiece SM50C (Forged steel), Ø100, External machining
- Cutting conditions  $vc(m/min) = 250$ ,  $ap(mm) = 0.5 \sim 2.5$ ,  $fn(mm/rev) = 0.1 \sim 0.4$ , wet
- Tools CNMG120408-LP

➔ Stable chip control is possible even at low depth of cut.

## ➤ Cutting Performance(Evaluation of wear resistance)

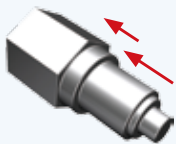
- Workpiece SCM440 (Alloy steel), Ø100, External machining
- Cutting conditions  $vc(m/min) = 280$ ,  $ap(mm) = 1.0$ ,  $fn(mm/rev) = 0.25 / 0.40$ , wet
- Tools CNMG120408-□□

Longer tool life due to lower cutting force at both medium feed(0.25mm/rev) and high feed(0.40mm/rev)

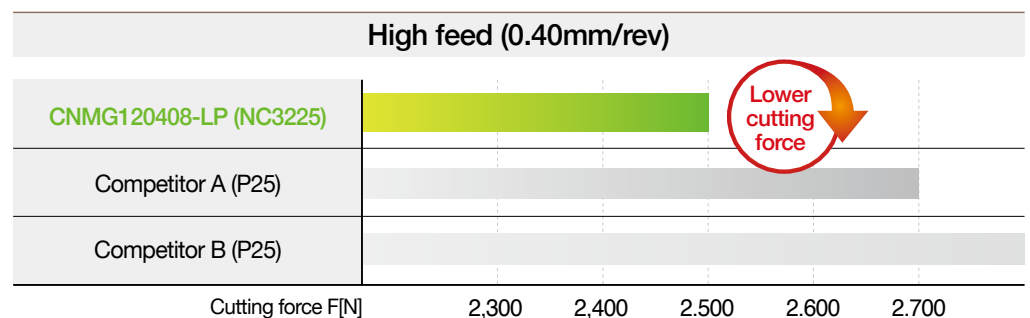
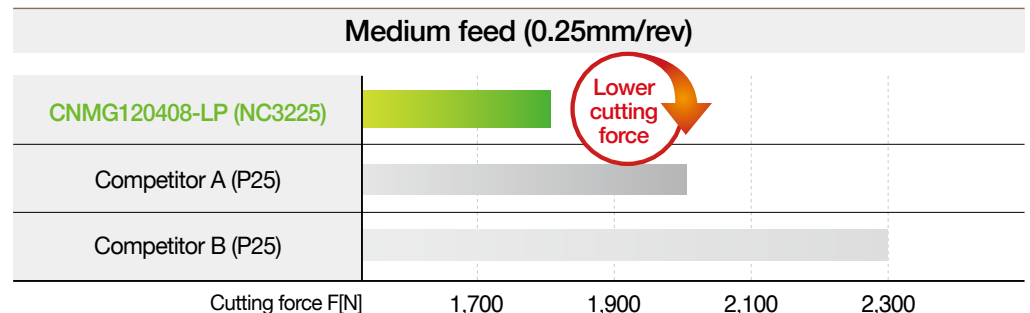


## ➤ Cutting Performance(Evaluation of cutting force)

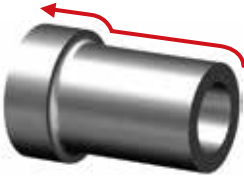
- Workpiece SM45C (Carbon steel), Ø100, External machining
- Cutting conditions  $vc(m/min) = 250$ ,  $ap(mm) = 1.0$ ,  $fn(mm/rev) = 0.25 / 0.40$ , wet
- Tools CNMG120408-□□



Lower cutting force at medium feed(0.25mm/rev) and high feed(0.40mm/rev)



## Application Examples of Automobile Parts (MP)



### Engine parts (Cylinder block part)

- Workpiece SNCM molding
- Cutting conditions  $vc(m/min) = 100$ ,  $ap(mm) = 3.0$ ,  $fn(mm/rev) = 0.15$ , wet
- Tools CNMG120408-MP

MP (NC3225)

60ea/edge

Competitor A (P25)

45ea/edge

30% more

- ➔ 30% longer tool life than competitor A(P25) due to reduced cutting force and smooth chip evacuation when machining outer surface at high depth of cut(3.0mm)



### Engine parts (Nipple)

- Workpiece SM20C
- Cutting conditions  $vc(m/min) = 250 \sim 380$ ,  $ap(mm) = 1.5 \sim 2.0$ ,  $fn(mm/rev) = 0.2 \sim 0.3$ , wet
- Tools CNMG120412-MP

MP (NC3215)

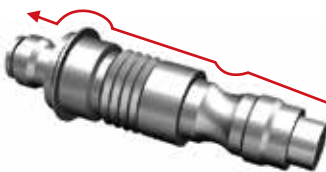
180ea/edge

Competitor B (P15)

150ea/edge

20% more

- ➔ Smooth chip evacuation and stable tool life in different cutting conditions and workpieces  
20% longer tool life than competitor B(P15)



### Steering system (Output shaft)

- Workpiece SM40C cold forging
- Cutting conditions  $vc(m/min) = 170$ ,  $ap(mm) = 2.7 \sim 3.0$ ,  $fn(mm/rev) = 0.3$ , wet
- Tools DNMG150408-MP

MP (NC3215)

180ea/edge

Competitor C (P15)

150ea/edge

Higher stability

- ➔ Higher stability than competitor C(P15) by preventing chip curls of cold forged steel to interfere cutting operation



### Steering system (Wheel bearing)

- Workpiece S55CR hot forging
- Cutting conditions  $vc(m/min) = 230$ ,  $ap(mm) = 0.5 \sim 1.5$ ,  $fn(mm/rev) = 0.3$ , wet
- Tools CNMG120408-MP

MP (NC3225)

100ea/edge

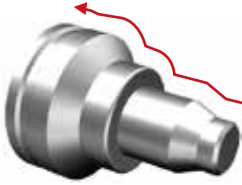
Competitor D (P30)

80ea/edge

20% more

- ➔ Stable tool life in interrupted cutting and high hardness forged steel machining  
20% longer tool life than competitor D(P30)

## Application Examples of Automobile Parts (LP)



### Steering system (BJ case)

- Workpiece SM45C cold forging
- Cutting conditions  $vc(m/min) = 200 \sim 250$ ,  $ap(mm) = 1.0 \sim 2.0$ ,  $fn(mm/rev) = 0.25 \sim 0.35$ , wet
- Tools DNMG150612-LP

LP (NC3215)

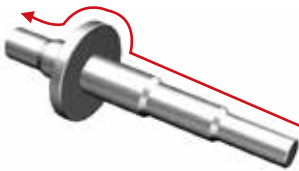
120ea/edge

Competitor E (P15)

90ea/edge

30%  
more

- ➔ Wide chip pockets improve chip evacuation and lower cutting force to avoid wear  
30% longer tool life than competitor E(P15)



### Transmission parts (Input shaft)

- Workpiece SCR420 cold forging
- Cutting conditions  $vc(m/min) = 160$ ,  $ap(mm) = 1.0$ ,  $fn(mm/rev) = 0.13$ , wet
- Tools DNMG150608-LP

LP (NC3225)

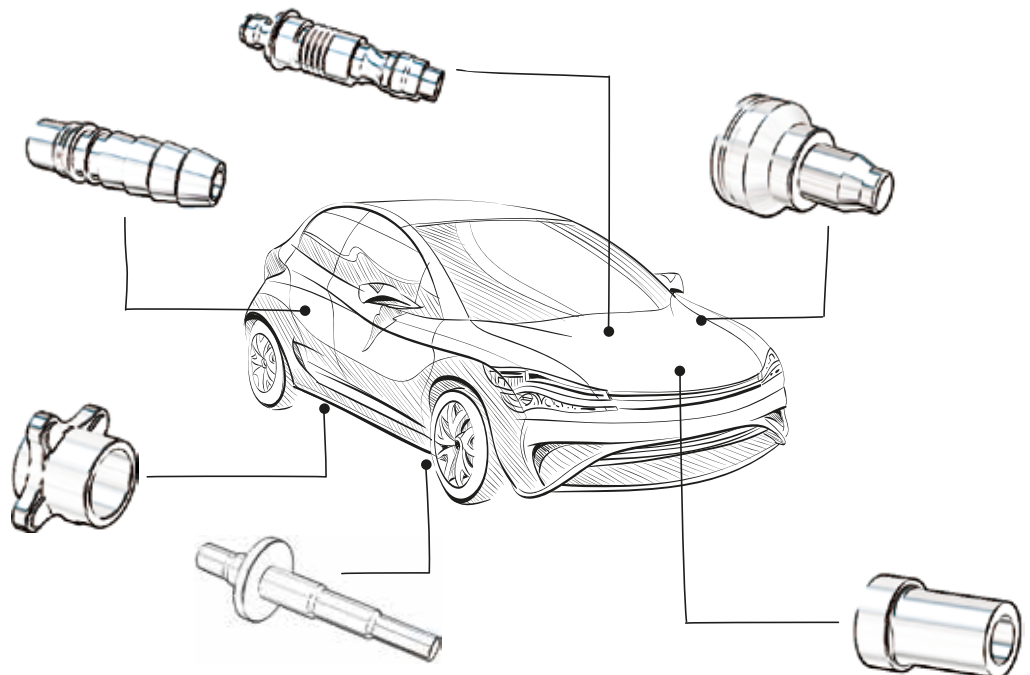
110ea/edge

Competitor F (P25)

80ea/edge

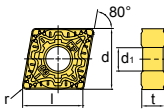
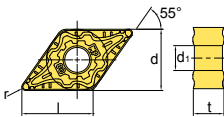
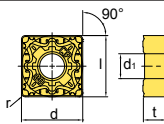
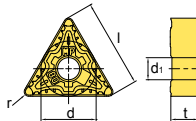
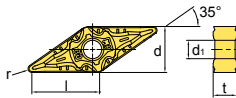
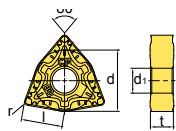
35%  
more

- ➔ Stability in combination of interrupted and continuous machining  
30% longer tool life than competitor F(P25)

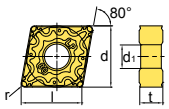
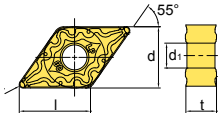
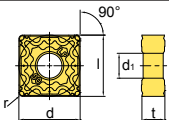
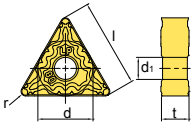
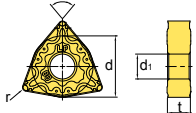


NC3215 / NC3225

➔ Available Stock (MP Chip Breaker)

| Type   | Insert shape                                                                        | Designation | Stock     |        | Dimensions (mm) |      |       |      |                | Cutting conditions     |                    | Figure      |                                                                                       |
|--------|-------------------------------------------------------------------------------------|-------------|-----------|--------|-----------------|------|-------|------|----------------|------------------------|--------------------|-------------|---------------------------------------------------------------------------------------|
|        |                                                                                     |             | NC3215    | NC3225 | l               | d    | t     | r    | d <sub>1</sub> | Depth of cut<br>ap(mm) | Feed<br>fn(mm/rev) |             |                                                                                       |
| C TYPE |    | CNMG        | 120404-MP | ●      | ●               | 12.4 | 12.7  | 4.76 | 0.4            | 5.16                   | 0.40 ~ 4.00        | 0.10 ~ 0.40 |    |
|        |                                                                                     |             | 120408-MP | ●      | ●               | 12.0 | 12.7  | 4.76 | 0.8            | 5.16                   | 0.50 ~ 4.50        | 0.15 ~ 0.45 |                                                                                       |
|        |                                                                                     |             | 120412-MP | ●      | ●               | 11.6 | 12.7  | 4.76 | 1.2            | 5.16                   | 0.80 ~ 5.00        | 0.15 ~ 0.50 |                                                                                       |
|        |                                                                                     |             |           |        |                 |      |       |      |                |                        |                    |             |                                                                                       |
| D TYPE |   | DNMG        | 150404-MP | ●      | ●               | 15.1 | 12.7  | 4.76 | 0.4            | 5.16                   | 0.40 ~ 4.00        | 0.10 ~ 0.40 |   |
|        |                                                                                     |             | 150408-MP | ●      | ●               | 14.7 | 12.7  | 4.76 | 0.8            | 5.16                   | 0.50 ~ 4.50        | 0.15 ~ 0.45 |                                                                                       |
|        |                                                                                     |             | 150412-MP | ●      | ●               | 14.4 | 12.7  | 4.76 | 1.2            | 5.16                   | 0.80 ~ 5.00        | 0.15 ~ 0.50 |                                                                                       |
|        |                                                                                     |             | 150604-MP | ●      | ●               | 15.1 | 12.7  | 6.35 | 0.4            | 5.16                   | 0.40 ~ 4.00        | 0.10 ~ 0.40 |                                                                                       |
|        |                                                                                     |             | 150608-MP | ●      | ●               | 14.7 | 12.7  | 6.35 | 0.8            | 5.16                   | 0.50 ~ 4.50        | 0.15 ~ 0.45 |                                                                                       |
|        |                                                                                     |             | 150612-MP | ●      | ●               | 14.4 | 12.7  | 6.35 | 1.2            | 5.16                   | 0.80 ~ 5.00        | 0.15 ~ 0.50 |                                                                                       |
| S TYPE |  | SNMG        | 120404-MP | ●      | ●               | 12.3 | 12.7  | 4.76 | 0.4            | 5.16                   | 0.40 ~ 4.00        | 0.10 ~ 0.40 |  |
|        |                                                                                     |             | 120408-MP | ●      | ●               | 11.9 | 12.7  | 4.76 | 0.8            | 5.16                   | 0.50 ~ 4.50        | 0.15 ~ 0.45 |                                                                                       |
| T TYPE |  | TNMG        | 160404-MP | ●      | ●               | 15.5 | 9.525 | 4.76 | 0.4            | 3.81                   | 0.40 ~ 3.50        | 0.10 ~ 0.35 |  |
|        |                                                                                     |             | 160408-MP | ●      | ●               | 14.5 | 9.525 | 4.76 | 0.8            | 3.81                   | 0.50 ~ 4.00        | 0.15 ~ 0.45 |                                                                                       |
|        |                                                                                     |             | 160412-MP | ●      | ●               | 13.5 | 9.525 | 4.76 | 1.2            | 3.81                   | 0.80 ~ 4.50        | 0.15 ~ 0.50 |                                                                                       |
| V TYPE |  | VNMG        | 160404-MP | ●      | ●               | 15.6 | 9.525 | 4.76 | 0.4            | 3.81                   | 0.40 ~ 3.50        | 0.10 ~ 0.40 |  |
|        |                                                                                     |             | 160408-MP | ●      | ●               | 14.6 | 9.525 | 4.76 | 0.8            | 3.81                   | 0.50 ~ 4.00        | 0.15 ~ 0.45 |                                                                                       |
| W TYPE |  | WNMG        | 080404-MP | ●      | ●               | 8.4  | 12.7  | 4.76 | 0.4            | 5.16                   | 0.40 ~ 4.00        | 0.10 ~ 0.40 |  |
|        |                                                                                     |             | 080408-MP | ●      | ●               | 8.3  | 12.7  | 4.76 | 0.8            | 5.16                   | 0.50 ~ 4.50        | 0.15 ~ 0.45 |                                                                                       |
|        |                                                                                     |             | 080412-MP | ●      | ●               | 8.2  | 12.7  | 4.76 | 1.2            | 5.16                   | 0.80 ~ 5.00        | 0.15 ~ 0.50 |                                                                                       |

## Available Stock (LP Chip Breaker)

| Type   | Insert shape                                                                        | Designation | Stock     |        | Dimensions (mm) |      |       |      |                | Cutting conditions     |                    | Figure      |                                                                                       |
|--------|-------------------------------------------------------------------------------------|-------------|-----------|--------|-----------------|------|-------|------|----------------|------------------------|--------------------|-------------|---------------------------------------------------------------------------------------|
|        |                                                                                     |             | NC3215    | NC3225 | l               | d    | t     | r    | d <sub>1</sub> | Depth of cut<br>ap(mm) | Feed<br>fn(mm/rev) |             |                                                                                       |
| C TYPE |    | CNMG        | 120404-LP | ●      | ●               | 12.4 | 12.7  | 4.76 | 0.4            | 5.16                   | 0.30 ~ 2.00        | 0.10 ~ 0.35 |    |
|        |                                                                                     |             | 120408-LP | ●      | ●               | 12.0 | 12.7  | 4.76 | 0.8            | 5.16                   | 0.50 ~ 2.50        | 0.10 ~ 0.40 |                                                                                       |
|        |                                                                                     |             | 120412-LP | ●      | ●               | 11.6 | 12.7  | 4.76 | 1.2            | 5.16                   | 0.80 ~ 3.00        | 0.13 ~ 0.45 |                                                                                       |
| D TYPE |   | DNMG        | 150404-LP | ●      | ●               | 15.1 | 12.7  | 4.76 | 0.4            | 5.16                   | 0.30 ~ 2.00        | 0.10 ~ 0.35 |   |
|        |                                                                                     |             | 150408-LP | ●      | ●               | 14.7 | 12.7  | 4.76 | 0.8            | 5.16                   | 0.50 ~ 2.50        | 0.10 ~ 0.40 |                                                                                       |
|        |                                                                                     |             | 150412-LP | ●      | ●               | 14.4 | 12.7  | 4.76 | 1.2            | 5.16                   | 0.80 ~ 3.00        | 0.13 ~ 0.45 |                                                                                       |
|        |                                                                                     |             | 150604-LP | ●      | ●               | 15.1 | 12.7  | 6.35 | 0.4            | 5.16                   | 0.30 ~ 2.00        | 0.10 ~ 0.35 |                                                                                       |
|        |                                                                                     |             | 150608-LP | ●      | ●               | 14.7 | 12.7  | 6.35 | 0.8            | 5.16                   | 0.50 ~ 2.50        | 0.10 ~ 0.40 |                                                                                       |
|        |                                                                                     |             | 150612-LP | ●      | ●               | 14.4 | 12.7  | 6.35 | 1.2            | 5.16                   | 0.80 ~ 3.00        | 0.13 ~ 0.45 |                                                                                       |
| S TYPE |  | SNMG        | 120404-LP | ●      | ●               | 12.3 | 12.7  | 4.76 | 0.4            | 5.16                   | 0.30 ~ 2.00        | 0.10 ~ 0.35 |  |
|        |                                                                                     |             | 120408-LP | ●      | ●               | 11.9 | 12.7  | 4.76 | 0.8            | 5.16                   | 0.50 ~ 2.50        | 0.10 ~ 0.40 |                                                                                       |
| T TYPE |  | TNMG        | 160404-LP | ●      | ●               | 15.5 | 9.525 | 4.76 | 0.4            | 3.81                   | 0.30 ~ 2.00        | 0.10 ~ 0.35 |  |
|        |                                                                                     |             | 160408-LP | ●      | ●               | 14.5 | 9.525 | 4.76 | 0.8            | 3.81                   | 0.50 ~ 2.50        | 0.10 ~ 0.40 |                                                                                       |
| W TYPE |  | WNMG        | 160404-LP | ●      | ●               | 8.4  | 12.7  | 4.76 | 0.4            | 5.16                   | 0.30 ~ 2.00        | 0.10 ~ 0.35 |  |
|        |                                                                                     |             | 160408-LP | ●      | ●               | 8.3  | 12.7  | 4.76 | 0.8            | 5.16                   | 0.50 ~ 2.50        | 0.10 ~ 0.40 |                                                                                       |
|        |                                                                                     |             | 080412-LP | ●      | ●               | 8.2  | 12.7  | 4.76 | 1.2            | 5.16                   | 0.80 ~ 3.00        | 0.13 ~ 0.45 |                                                                                       |

● : Managed item

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