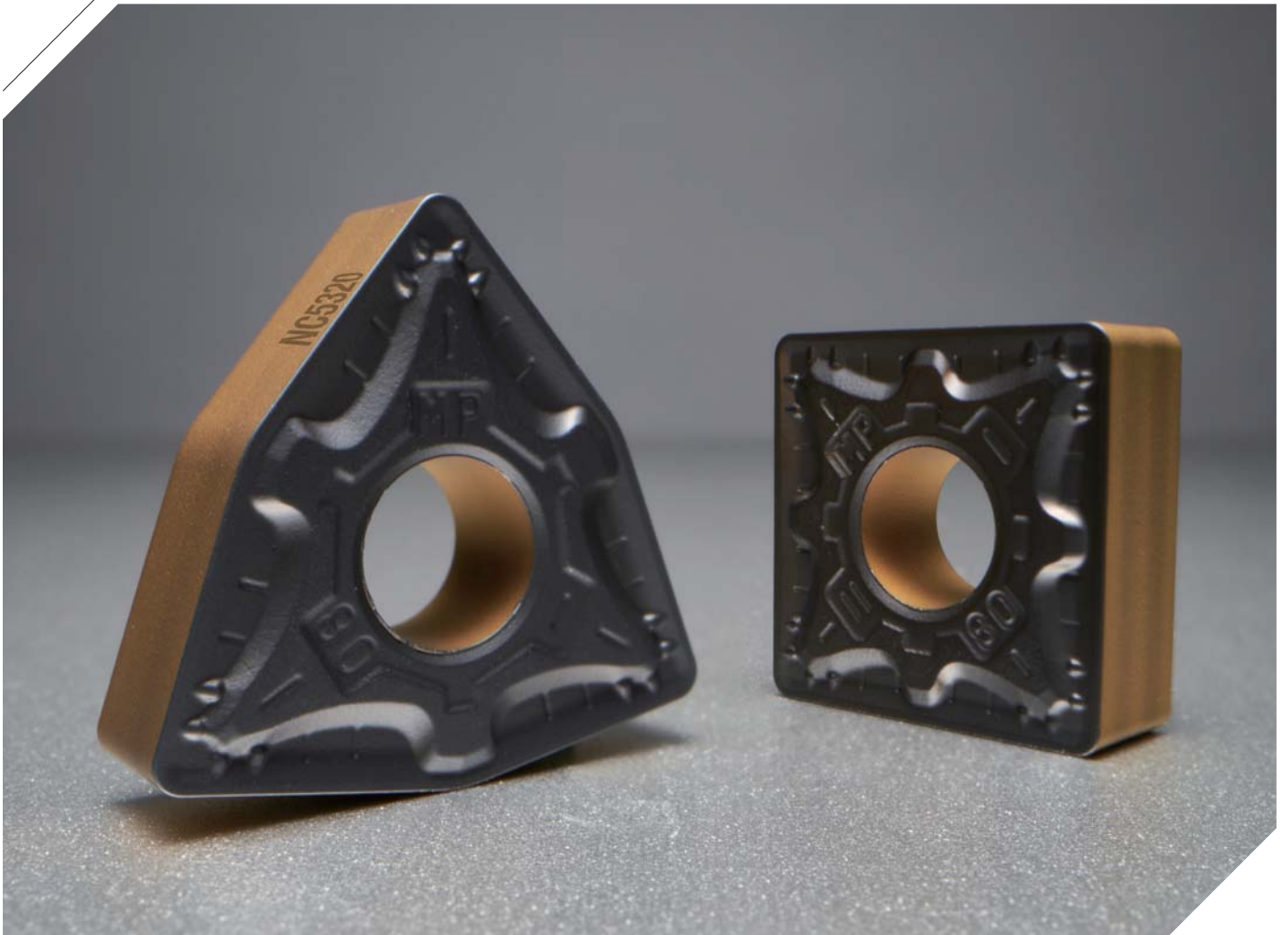


NC5320

Universal insert for Steel and Cast iron cutting

- Increased chipping resistance and stable tool life in Steel and Cast iron cutting
- Applying universal substrate with high adhesion and coating layer with good wear resistance and chipping resistance



NC5320

In recent cutting industries, the demand on high speed machining for productivity improvement is steadily increasing because there are various shapes in workpieces and cutting time is reducing due to less machining allowance from the heat/cold forging technology development. Therefore, universal grade with wear resistance and chipping resistance is necessary for cutting various workpiece in high speed.

KORLOY launches CVD universal grade for Steel and Cast iron cutting for higher productivity according to those changes in market.

NC5320, with the New CVD coating technology application, provides higher productivity by ensuring stable machinability in high temperature due to high cutting speed and providing good surface finish. In addition, applying the exclusive substrate and post treatment ensure versatility with good wear resistance and chipping resistance.

NC5320 enhanced the wear resistance from the conventional grade in Steel and Cast iron Turning and it provides higher productivity and stable machining quality as a KORLOY's next generation grade in high cutting speed.

» **Long tool life in high cutting speed**

- Exclusive substrate with great wear resistance and New CVD coating

» **Increased chipping resistance**

- New CVD coating with improved adhesion
- Exclusive post treatment application

» **Grade for general use**

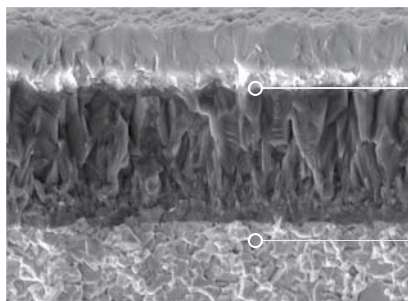
- Long tool life in Steel and Cast iron cutting



Features

- Applying exclusive substrate for Steel and Cast iron and New CVD coating with great wear resistance
- Applying New CVD coating technology with better BUE resistance and chipping resistance than existing grades

New CVD coating with increased wear resistance and chipping resistance



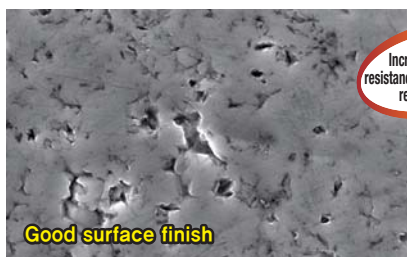
Applying α -phase alumina coating, optimal structured universal CVD coating

Increased chipping resistance

Optimal substrate for Steel and Cast iron cutting with good wear resistance

Increased wear resistance

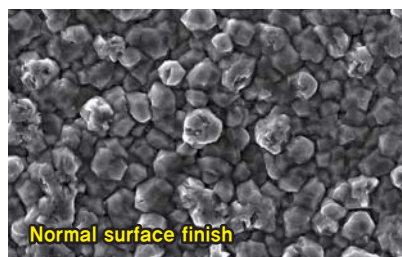
Increased surface finish due to applying New CVD coating



Good surface finish

[NC5320]

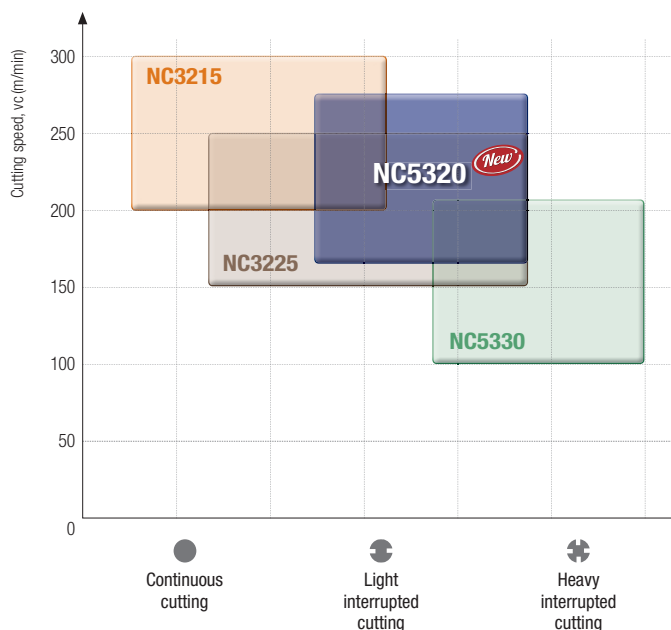
Increased BUE resistance and chipping resistance



Normal surface finish

[Existing grade]

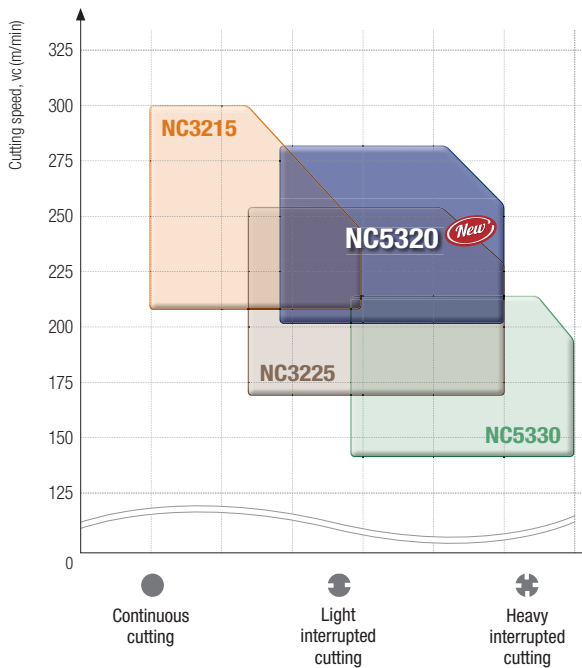
Application range



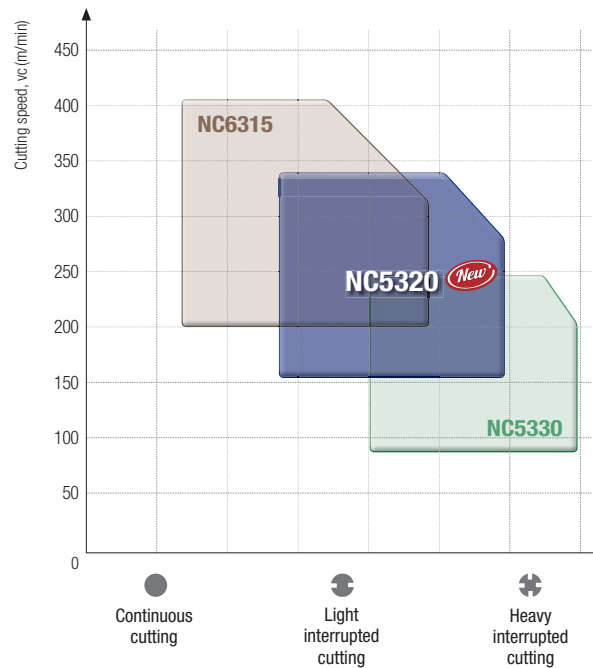
| Cutting Range | Grade | vc (m/min) |
|---------------------------------|--------------|------------|
| Continuous, high speed | NC3215 | 200 ~ 300 |
| Light interrupted, medium speed | NC3225 | 150 ~ 250 |
| Interrupted, high speed | NC5320 (New) | 160 ~ 280 |
| Heavy interrupted, low speed | NC5330 | 100 ~ 200 |

Application range

P Steel



K Cast iron

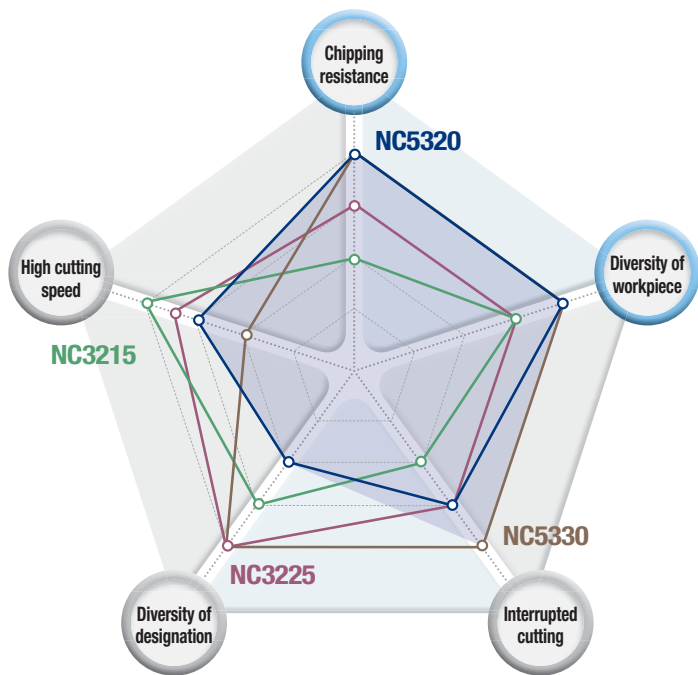


Recommend cutting conditions

* Quenching + tempering heat treatment

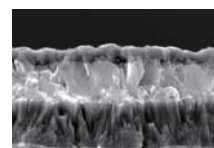
| ISO | Workpiece | | | Specific cutting force (N/mm ²) | Brinell hardness (HB) | Recommended cutting condition | |
|-------------------------------------|--------------------|-----------|---------------|---|-------------------------------------|-------------------------------|-------------------|
| | Workpiece material | ISO (DIN) | AISI | | | NC5320 | NC5330 |
| | | | | | | vc (m/min) | |
| P | Low carbon steel | C15 | 1015 | 1500 | 120 ~ 210 | 280 | 245 |
| | | C25 | 1025 | | | 310 | 275 |
| | | C35 | 1035 | | | 310 | 275 |
| | High carbon steel | C45 | 1045 | 1700 1820* | 140 ~ 250 200 ~ 290* | 270 (220*) | 235 (190*) |
| | | C53 | 1050 | | | 280 (230*) | 245 (200*) |
| | | C55 | 1055 | | | 280 (230*) | 245 (200*) |
| | Low alloy steel | 20Cr4 | 5120 | 1700 2000* | 170 ~ 270 220 ~ 360* | 140 (110*) | 120 (95*) |
| | | 42CrMo4 | 4140 | | | 180 (140*) | 155 (120*) |
| 21NiCrMo2 | | 8615 | 210 (170*) | | | 185 (150*) | |
| High alloy steel (Alloy tool steel) | (X100CrMoV5 1) | D2 | 1950 3100* | 200 ~ 320 480 ~ 650* | 160 (130*) | 140 (110*) | |
| | X40CrMoV5-1 | H13 | | | 160 (130*) | 140 (110*) | |
| | HS6-5-2 | M2 | | | 180 (140*) | 155 (120*) | |
| K | Gray cast iron | 150 | No25B | 900 1100 1300 | ≤ 212 ≤ 248 ≤ 277 | 230 | 200 |
| | | 250 | No35B | | | 240 | 215 |
| | | 350 | No50B | | | 280 | 250 |
| | Ductile cast iron | 500 | 80-55-06 | 1200 1440 1650 | 170 ~ 241 192 ~ 269 229 ~ 302 | 150 | 135 |
| | | 600 | - | | | 200 | 175 |
| | | 700 | 100-70-03 | | | 220 | 195 |

Grade selection guide



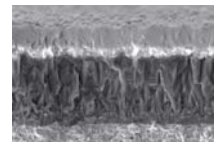
NC5320 *New*

- For interrupted cutting and good chipping resistance
- Universal grade



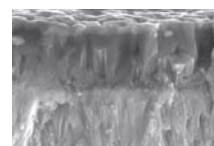
NC5330

- For interrupted cutting and good toughness
- Universal grade



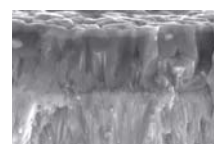
NC3215

- For continuous cutting, good wear resistance
- Exclusive grade for Steel cutting



NC3225

- For interrupted cutting and good wear resistance
- Exclusive grade for Steel cutting



| Grade | Chipping resistance | Diversity of workpiece | Interrupted cutting | Diversity of designation | High cutting speed |
|-------------------|---------------------|------------------------|---------------------|--------------------------|--------------------|
| NC5320 <i>New</i> | ★★★★★ | ★★★★★ | ★★★ | ★★ | ★★★ |
| NC5330 | ★★★★★ | ★★★★★ | ★★★★★ | ★★★★★ | ★★ |
| NC3215 | ★★ | ★★★ | ★★ | ★★★ | ★★★★★ |
| NC3225 | ★★★ | ★★★ | ★★★ | ★★★★★ | ★★★★☆ |

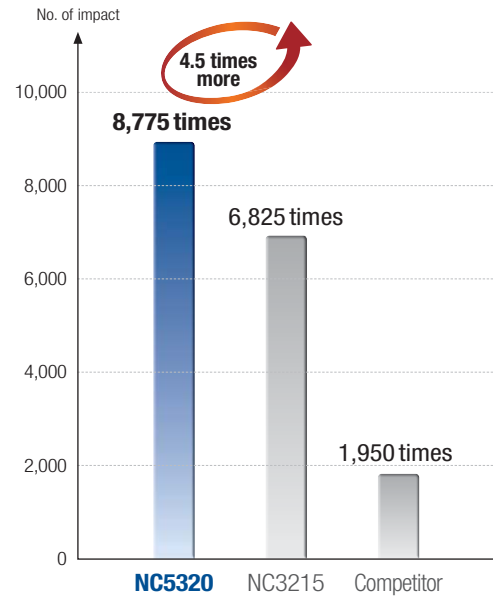
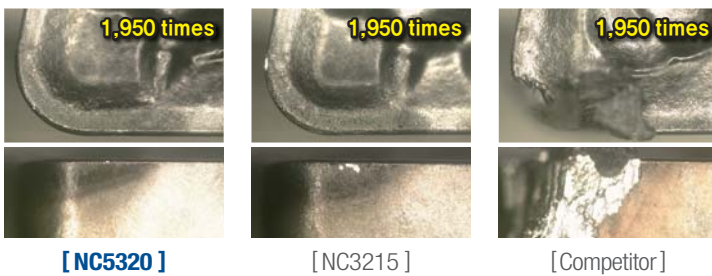
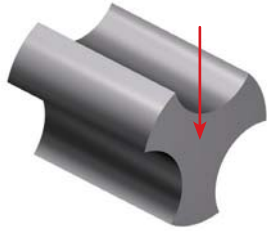
Performance evaluation

Fracture resistance

Workpiece Low alloy steel (20Cr4)

Cutting condition vc (m/min) = 300, fn (mm/rev) = 0.2, ap (mm) = 1.5, wet

Tool **Insert** CNMG120408-MP (NC5320) **Holder** DCLNL2525-M12



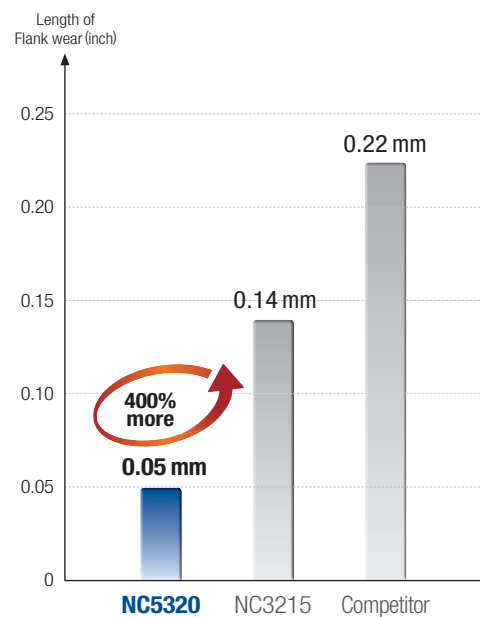
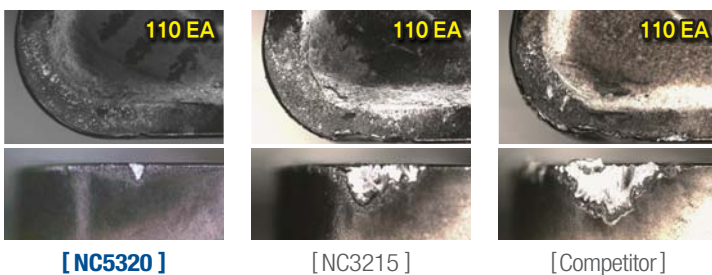
- Longer tool life than NC3215 and competitor
- Increased fracture resistance

Chipping resistance

Workpiece Bearing hub wheel (C55Cr)

Cutting condition vc (m/min) = 120, fn (mm/rev) = 0.23~0.37, ap (mm) = 1.6, wet

Tool **Insert** WNMG080412-MK (NC5320) **Holder** DWLNL2525-M08

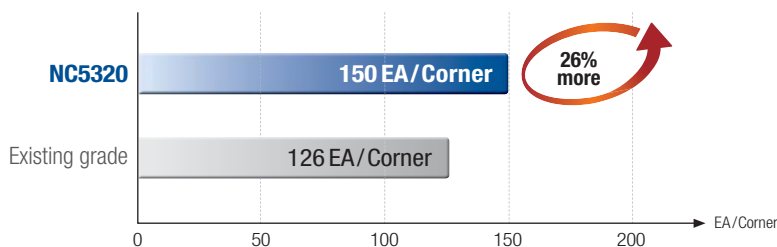


- Better state of cutting edge than NC3215 and competitor
- Improved chipping resistance

Application examples

High carbon steel (C55Cr)

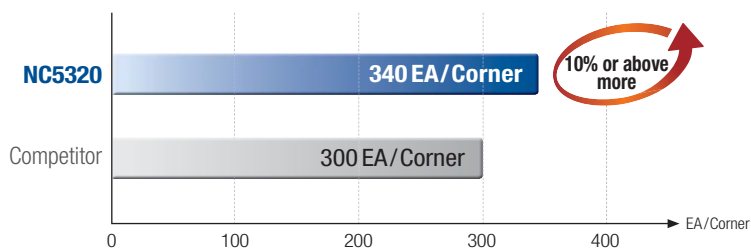
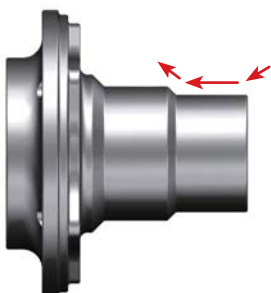
| | |
|--------------------------|--|
| Workpiece use | Bearing hub (hub) |
| Cutting condition | vc (m/min) = 280, fn (mm/rev) = 0.3~0.42, ap (mm) = 1.5, dry (interruption cutting) + wet (continuous cutting) |
| Tool | Insert WNMG080416-MP (NC5320) |



» 26% more cutting than existing grade

High carbon steel (C55Cr)

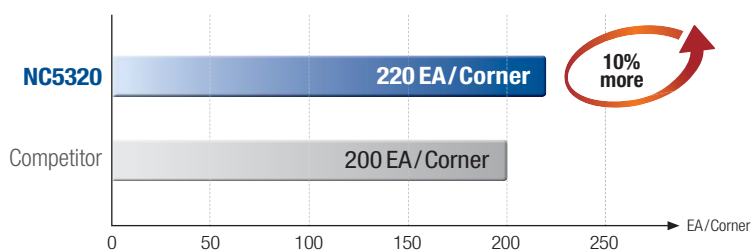
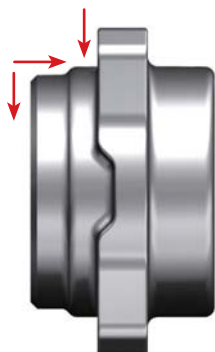
| | |
|--------------------------|--|
| Workpiece use | Bearing hub (hub) |
| Cutting condition | vc (m/min) = 250, fn (mm/rev) = 0.28, ap (mm) = 0.3, wet |
| Tool | Insert WNMG080408-CP (NC5320) |



» 10% or above more cutting than competitor


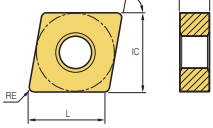

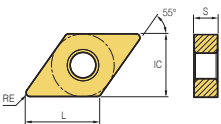
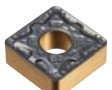
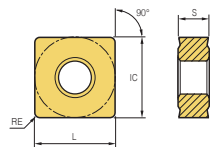
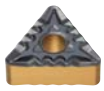
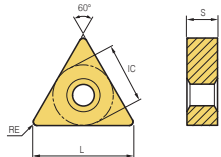

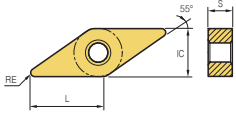

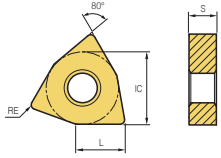
High carbon steel (C55Cr)

| | |
|--------------------------|--|
| Workpiece use | Bearing hub (wheel) |
| Cutting condition | vc (m/min) = 180, fn (mm/rev) = 0.38, ap (mm) = 2.0~3.0, dry (interruption cutting) + wet (continuous cutting) |
| Tool | Insert CNMG120416-MP (NC5320) |



» 10% more cutting than competitor

Stock items

| Picture | Designation | Coated | Dimension (mm) | | | | Cutting condition | | Geometry |
|---|-----------------------|---------|----------------|-------|-------|------------------|-------------------|------------------|---|
| | | NC5320 | L | IC | S | RE | fn (mm/rev) | ap (mm) | |
|  CNMG-CP* | CNMG 120408-CP | ● | 12.8959 | 12.7 | 4.76 | 0.794 | 0.24 (0.40~0.08) | 2.40 (0.80~4.00) |  |
| | 120408-MP | ● | 12.8959 | 12.7 | 4.76 | 0.794 | 0.30 (0.45~0.15) | 2.50 (0.50~4.50) | |
| | 120408-VB | ● | 12.8959 | 12.7 | 4.76 | 0.794 | 0.30 (0.45~0.15) | 1.25 (0.50~2.00) | |
| | 120408-VC | ● | 12.8959 | 12.7 | 4.76 | 0.794 | 0.25 (0.40~0.10) | 1.50 (0.50~2.50) | |
| | 120412-CP | ● | 12.8959 | 12.7 | 4.76 | 1.191 | 0.28 (0.45~0.10) | 2.40 (0.80~4.00) | |
| | 120412-MP | ● | 12.8959 | 12.7 | 4.76 | 1.191 | 0.33 (0.50~0.15) | 2.90 (0.80~5.00) | |
| | 120412-VB | ● | 12.8959 | 12.7 | 4.76 | 1.191 | 0.35 (0.50~0.20) | 1.25 (0.50~2.00) | |
| | 120412-VC | ● | 12.8959 | 12.7 | 4.76 | 1.191 | 0.29 (0.45~0.12) | 2.00 (0.50~3.50) | |
| 120416-MP | ● | 12.8959 | 12.7 | 4.76 | 1.588 | 0.42 (0.55~0.28) | 3.00 (1.00~5.00) | | |
|  DNMG-CP* | DNMG 150408-CP | ● | 15.5083 | 12.7 | 4.76 | 0.794 | 0.24 (0.35~0.12) | 2.00 (0.50~3.50) |  |
| | 150408-MP | ● | 15.5083 | 12.7 | 4.76 | 0.794 | 0.30 (0.45~0.15) | 2.50 (0.50~4.50) | |
| | 150408-VB | ● | 15.5083 | 12.7 | 4.76 | 0.794 | 0.30 (0.45~0.15) | 1.25 (0.50~2.00) | |
| | 150408-VC | ● | 15.5083 | 12.7 | 4.76 | 0.794 | 0.28 (0.40~0.15) | 1.75 (0.50~3.00) | |
| | 150412-CP | ● | 15.5083 | 12.7 | 4.76 | 1.191 | 0.24 (0.35~0.13) | 2.15 (0.80~3.50) | |
| | 150412-MP | ● | 15.5083 | 12.7 | 4.76 | 1.191 | 0.33 (0.50~0.15) | 2.90 (0.80~5.00) | |
| | 150412-VB | ● | 15.5083 | 12.7 | 4.76 | 1.191 | 0.30 (0.45~0.15) | 1.25 (0.50~2.00) | |
| | 150412-VC | ● | 15.5083 | 12.7 | 4.76 | 1.191 | 0.30 (0.45~0.15) | 1.75 (0.50~3.00) | |
| | 150416-MP | ● | 15.5083 | 12.7 | 4.76 | 1.588 | 0.33 (0.50~0.15) | 2.90 (0.80~5.00) | |
| | 150608-CP | ● | 15.5083 | 12.7 | 6.35 | 1.588 | 0.24 (0.35~0.12) | 2.00 (0.50~3.50) | |
| | 150608-MP | ● | 15.5083 | 12.7 | 6.35 | 1.588 | 0.30 (0.45~0.15) | 2.50 (0.50~4.50) | |
| | 150608-VB | ● | 15.5083 | 12.7 | 6.35 | 1.588 | 0.30 (0.45~0.15) | 1.25 (0.50~2.00) | |
| | 150608-VC | ● | 15.5083 | 12.7 | 6.35 | 1.588 | 0.28 (0.40~0.15) | 1.75 (0.50~3.00) | |
| | 150612-CP | ● | 15.5083 | 12.7 | 6.35 | 1.191 | 0.24 (0.35~0.13) | 2.15 (0.80~3.50) | |
| 150612-MP | ● | 15.5083 | 12.7 | 6.35 | 1.191 | 0.33 (0.50~0.15) | 2.90 (0.80~5.00) | | |
| 150612-VB | ● | 15.5083 | 12.7 | 6.35 | 1.191 | 0.35 (0.50~0.20) | 1.50 (0.50~2.50) | | |
| 150612-VC | ● | 15.5083 | 12.7 | 6.35 | 1.191 | 0.30 (0.45~0.15) | 1.75 (0.50~3.00) | | |
| 150616-MP | ● | 15.5083 | 12.7 | 6.35 | 1.588 | 0.33 (0.50~0.15) | 2.90 (0.80~5.00) | | |
|  SNMG-CP* | SNMG 120408-CP | ● | 12.7 | 12.7 | 4.76 | 0.794 | 0.24 (0.35~0.12) | 2.00 (0.50~3.50) |  |
| | 120408-MP | ● | 12.7 | 12.7 | 4.76 | 0.794 | 0.30 (0.45~0.15) | 2.50 (0.50~4.50) | |
| | 120412-CP | ● | 12.7 | 12.7 | 4.76 | 0.794 | 0.24 (0.35~0.13) | 2.15 (0.80~3.50) | |
| | 120412-MP | ● | 12.7 | 12.7 | 4.76 | 0.794 | 0.33 (0.50~0.15) | 2.90 (0.80~5.00) | |
|  TNMG-CP* | TNMG 160408-CP | ● | 16.498 | 9.525 | 4.76 | 0.794 | 0.20 (0.30~0.10) | 1.75 (0.50~3.00) |  |
| | 160408-MP | ● | 16.498 | 9.525 | 4.76 | 0.794 | 0.30 (0.45~0.15) | 2.25 (0.50~4.00) | |
| | 160412-CP | ● | 16.498 | 9.525 | 4.76 | 1.191 | 0.21 (0.30~0.12) | 1.90 (0.80~3.00) | |
| | 160412-MP | ● | 16.498 | 9.525 | 4.76 | 1.191 | 0.33 (0.50~0.15) | 2.65 (0.80~4.50) | |
|  VNMG-CP* | VNMG 160404-CP | ● | 16.606 | 9.525 | 4.76 | 0.397 | 0.23 (0.35~0.10) | 1.75 (0.50~3.00) |  |
| | 160404-MP | ● | 16.606 | 9.525 | 4.76 | 0.397 | 0.25 (0.40~0.10) | 1.95 (0.40~3.50) | |
| | 160404-VB | ● | 16.606 | 9.525 | 4.76 | 0.397 | 0.23 (0.35~0.10) | 0.90 (0.30~1.50) | |
| | 160404-VC | ● | 16.606 | 9.525 | 4.76 | 0.397 | 0.23 (0.35~0.10) | 1.15 (0.30~2.00) | |
| | 160408-CP | ● | 16.606 | 9.525 | 4.76 | 0.794 | 0.21 (0.30~0.12) | 1.75 (0.50~3.00) | |
| | 160408-MP | ● | 16.606 | 9.525 | 4.76 | 0.794 | 0.30 (0.45~0.15) | 2.25 (0.50~4.00) | |
| | 160408-VB | ● | 16.606 | 9.525 | 4.76 | 0.794 | 0.30 (0.45~0.15) | 1.25 (0.50~2.00) | |
| | 160408-VC | ● | 16.606 | 9.525 | 4.76 | 0.794 | 0.28 (0.40~0.15) | 1.75 (0.50~3.00) | |
|  WNMG-CP* | WNMG 80408-CP | ● | 8.687 | 12.7 | 4.76 | 0.794 | 0.24 (0.35~0.12) | 2.00 (0.50~3.50) |  |
| | 80408-MP | ● | 8.687 | 12.7 | 4.76 | 0.794 | 0.30 (0.45~0.15) | 2.50 (0.50~4.50) | |
| | 80408-VB | ● | 8.687 | 12.7 | 4.76 | 0.794 | 0.30 (0.45~0.15) | 1.25 (0.50~2.00) | |
| | 80408-VC | ● | 8.687 | 12.7 | 4.76 | 0.794 | 0.30 (0.45~0.15) | 2.33 (0.15~4.50) | |
| | 80412-CP | ● | 8.687 | 12.7 | 4.76 | 1.191 | 0.24 (0.35~0.13) | 2.15 (0.80~3.50) | |
| | 80412-MP | ● | 8.687 | 12.7 | 4.76 | 1.191 | 0.33 (0.50~0.15) | 2.90 (0.80~5.00) | |
| | 80412-VB | ● | 8.687 | 12.7 | 4.76 | 1.191 | 0.32 (0.45~0.18) | 1.65 (0.80~2.50) | |
| | 80412-VC | ● | 8.687 | 12.7 | 4.76 | 1.191 | 0.30 (0.45~0.15) | 2.33 (0.15~4.50) | |
| | 80416-CP | ● | 8.687 | 12.7 | 4.76 | 1.191 | 0.25 (0.35~0.14) | 2.15 (0.80~3.50) | |
| | 80416-MP | ● | 8.687 | 12.7 | 4.76 | 1.191 | 0.37 (0.55~0.18) | 2.55 (0.10~5.00) | |

* : Standard insert shape

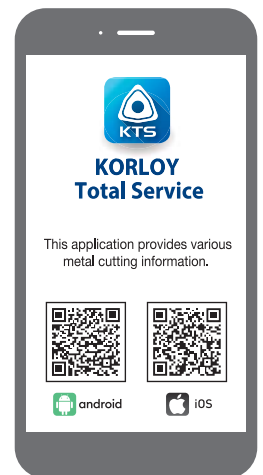
● : Stock item

⚠ For the safe metalcutting

- Use safety supplies such as protective gloves to prevent possible injury while touching the edge of tools.
- Use safety glasses or safety cover to hedge possible dangers. Inappropriate usage or excessive cutting condition may lead tool's breakage or even the fragment's scattering.
- Clamp the workpiece tightly enough to prevent its movement while its machining.
- Properly manage the tool change phase because the inordinately used tool can be easily broken under the excessive cutting load or severe wear, and it may threat the operator's safety.
- Use safety cover because chips evacuated during cutting are hot and sharp and may cause burns and cuts. To remove chips safely, stop machining, put on protective gloves, and use a hook or other tools.
- Prepare for fire prevention measures as the use of the non-water soluble cutting oil may cause fire.
- Use safety cover and other safety supplies because the spare parts or the inserts can be pulled out due to centrifugal force while high speed machining.



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