

### TURNING

#### Insert Shapes/Sizes

CNMG 431, 432, 433

DNMG 431, 432, 433, 441,  
442, 443

VNMG 331, 332

VNMX 2.531, 2.532

#### Chipbreakers

MGP - Medium applications

MLP - Semi-finishing to  
medium applications

FX - Ball stud and pulley  
applications

#### Coating

PVD - AlTiN

#### ISO Code

H05-H10

## ISO TURN™

### New Carbide Grade TT2010 for Hardened Steel Machining

- » Extremely high wear resistance
- » Designed for machining 40-62 HRC hardened steel
- » Economical alternative to ceramic and CBN



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information »

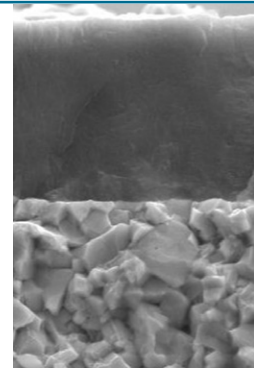


## Ingersoll introduces the TT2010 carbide grade for hardened steel machining.

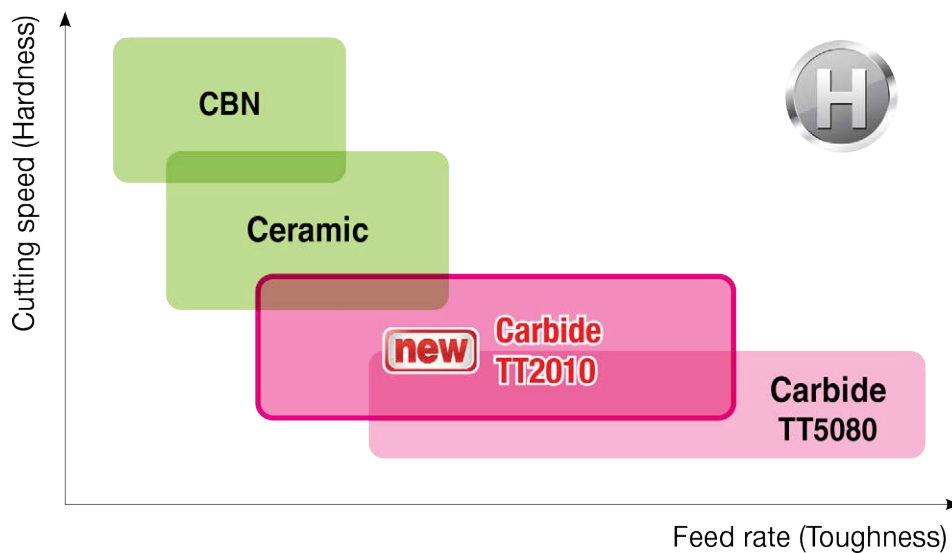
The TT2010 carbide grade offers exceptional hardness and sufficient toughness, delivering longer tool life when machining heat-treated hardened steel compared to conventional carbide grades. As a cost-effective alternative to ceramic and CBN grades, it provides an economical solution for customers seeking performance without the premium price. TT2010 also performs better at lower cutting speeds, enabling deeper cuts than CBN and improved chip breaking compared to ceramic options.

### TT2010 Grade Features

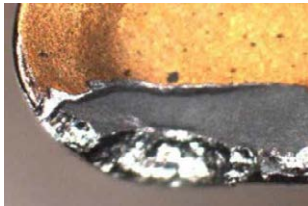
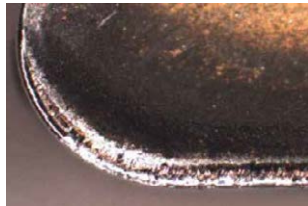
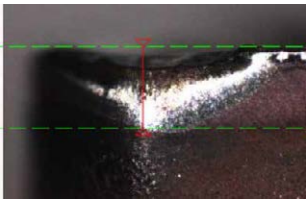
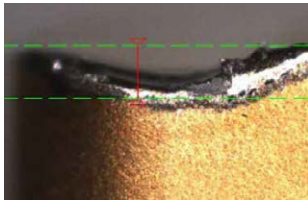
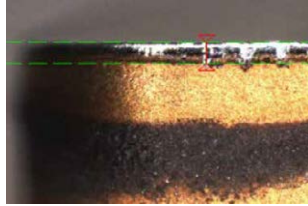
- Ultra fine-grained substrate for extremely high wear resistance
- An AlTiN-based PVD coating layer enables high deformation resistance
- ISO H05-H10 turning grade is optimally designed for HRC 40-62 hardened steel
- Excellent machining performance in finish and light interrupted cutting



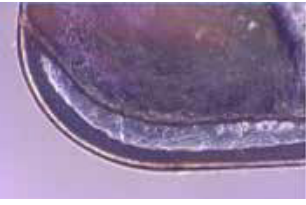
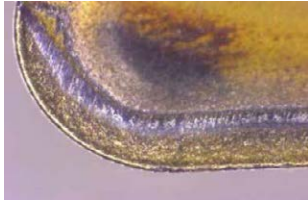
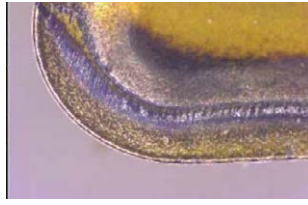
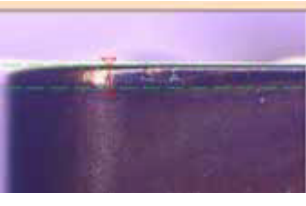
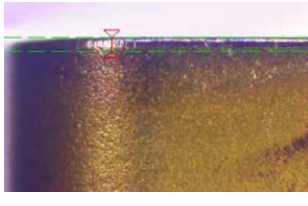
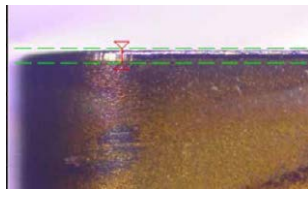
### For Hardenend Steel (HRC 40-62)



## Case Study 1

|               |           | Competitor                                                                         | Ingersoll                                                                           | Ingersoll                                                                            |
|---------------|-----------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Material      |           | Mold Steel (HRC 61-63)                                                             |                                                                                     |                                                                                      |
| Application   |           | External Turning                                                                   |                                                                                     |                                                                                      |
| Insert        |           | CNMG432                                                                            |                                                                                     |                                                                                      |
| Grades        |           | Carbide (for ISO H)                                                                | TT5080                                                                              | TT2010                                                                               |
| Cutting speed | V (sfm)   | 165                                                                                |                                                                                     |                                                                                      |
| Feed rate     | f (ipr)   | .004                                                                               |                                                                                     |                                                                                      |
| Depth of cut  | ap (inch) | .079                                                                               |                                                                                     |                                                                                      |
| Coolant       |           | Wet                                                                                |                                                                                     |                                                                                      |
| Wear          | Top       |   |   |   |
|               | Side      |  |  |  |

## Case Study 2

|               |           | Competitor                                                                          | Ingersoll                                                                            | Ingersoll                                                                             |
|---------------|-----------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Material      |           | Alloy Steel (HRC 45-50)                                                             |                                                                                      |                                                                                       |
| Application   |           | External Turning                                                                    |                                                                                      |                                                                                       |
| Insert        |           | CNMG432                                                                             |                                                                                      |                                                                                       |
| Grades        |           | Carbide (for ISO H)                                                                 | TT5080                                                                               | TT2010                                                                                |
| Cutting speed | V (sfm)   | 260                                                                                 |                                                                                      |                                                                                       |
| Feed rate     | f (ipr)   | .008                                                                                |                                                                                      |                                                                                       |
| Depth of cut  | ap (inch) | .079                                                                                |                                                                                      |                                                                                       |
| Coolant       |           | Wet                                                                                 |                                                                                      |                                                                                       |
| Wear          | Top       |  |  |  |
|               | Side      |  |  |  |

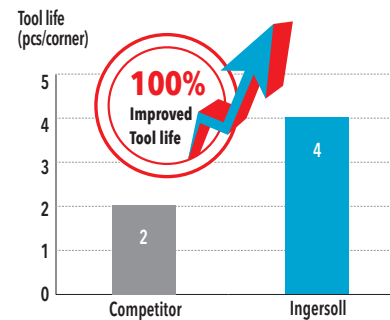
## Case Study 3

|                        |           | Competitor           | Ingersoll | Ingersoll |
|------------------------|-----------|----------------------|-----------|-----------|
| Material               |           | Alloy Steel (HRC 60) |           |           |
| Application            |           | Face Turning         |           |           |
| Insert                 |           | CNGA432              | CNGA433   | CNMG432   |
| Grades                 |           | CBN                  | Ceramic   | TT2010    |
| Cutting speed          | V (sfm)   | 525                  | 395       | 165       |
| Feed rate              | f (ipr)   | .004                 |           |           |
| Depth of cut           | ap (inch) | .003                 |           |           |
| Coolant                |           | Dry                  |           |           |
| No. of Corners         |           | 2                    | 4         | 4         |
| Tool Life (pcs/corner) |           | 350                  | 60        | 175       |
| Tool Life (pcs/insert) |           | 700                  | 240       | 700       |



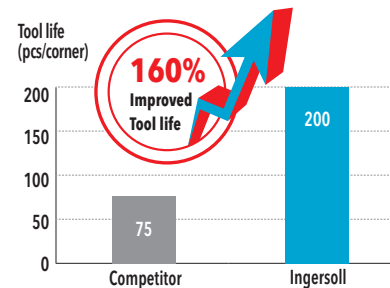
## Case Study 4

|                        |           | Competitor                      | Ingersoll |
|------------------------|-----------|---------------------------------|-----------|
| Material               |           | Carburizing Steel (HRC 55-60)   |           |
| Application            |           | External Turning & Face Turning |           |
| Insert                 |           | CNMG432                         |           |
| Grades                 |           | Carbide (for ISO H)             | TT2010    |
| Cutting speed          | V (sfm)   | 225                             |           |
| Feed rate              | f (ipr)   | .005                            |           |
| Depth of cut           | ap (inch) | .020                            |           |
| Coolant                |           | Wet                             |           |
| Tool Life (pcs/corner) |           | 2                               | 4         |



## Case Study 5

|                        |           | Competitor                  | Ingersoll |
|------------------------|-----------|-----------------------------|-----------|
| Material               |           | Heat Treated Steel (HRC 35) |           |
| Application            |           | Face Turning Interrupted    |           |
| Insert                 |           | CNMG432                     |           |
| Grades                 |           | Carbide (for ISO P25)       | TT2010    |
| Cutting speed          | V (sfm)   | 720                         |           |
| Feed rate              | f (ipr)   | .009                        |           |
| Depth of cut           | ap (inch) | .020                        |           |
| Tool Life (pcs/corner) |           | 60-90                       | 200       |



## CNMG MGP

### NEGATIVE 80° RHOMBIC INSERTS FOR MEDIUM APPLICATIONS

| Size | Dimensions (inch)         |                |                        |
|------|---------------------------|----------------|------------------------|
|      | IC<br>Inscribed<br>Circle | S<br>Thickness | RE<br>Corner<br>Radius |
| 431  | .500                      | .187           | .016                   |
| 432  | .500                      | .187           | .031                   |
| 433  | .500                      | .187           | .047                   |

| Part Number |               | Depth of Cut |      | Feed Rate |      | Grade  |
|-------------|---------------|--------------|------|-----------|------|--------|
| ANSI        | ISO           | ap (inch)    |      | fn (ipr)  |      | TT2010 |
|             |               | Min.         | Max. | Min.      | Max. |        |
| INCH        |               |              |      |           |      |        |
| CNMG431MGP  | CNMG120404MGP | .016         | .118 | .004      | .016 | •      |
| CNMG432MGP  | CNMG120408MGP | .020         | .118 | .006      | .022 | •      |
| CNMG433MGP  | CNMG120412MGP | .024         | .118 | .007      | .022 | •      |

• = Standard Items

## DNMG MGP

### NEGATIVE 55° RHOMBIC INSERTS FOR MEDIUM APPLICATIONS

| Size | Dimensions (inch)         |                |                        |
|------|---------------------------|----------------|------------------------|
|      | IC<br>Inscribed<br>Circle | S<br>Thickness | RE<br>Corner<br>Radius |
| 431  | .500                      | .187           | .016                   |
| 432  | .500                      | .187           | .031                   |
| 433  | .500                      | .187           | .047                   |
| 441  | .500                      | .250           | .016                   |
| 442  | .500                      | .250           | .031                   |
| 443  | .500                      | .250           | .047                   |

| Part Number |               | Depth of Cut |      | Feed Rate |      | Grade  |
|-------------|---------------|--------------|------|-----------|------|--------|
| ANSI        | ISO           | ap (inch)    |      | fn (ipr)  |      | TT2010 |
|             |               | Min.         | Max. | Min.      | Max. |        |
| INCH        |               |              |      |           |      |        |
| DNMG431MGP  | DNMG150404MGP | .016         | .079 | .004      | .016 | •      |
| DNMG432MGP  | DNMG150408MGP | .020         | .079 | .006      | .020 | •      |
| DNMG433MGP  | DNMG150412MGP | .024         | .079 | .007      | .022 | •      |
| DNMG441MGP  | DNMG150604MGP | .016         | .079 | .004      | .016 | •      |
| DNMG442MGP  | DNMG150608MGP | .020         | .079 | .006      | .020 | •      |
| DNMG443MGP  | DNMG150612MGP | .024         | .079 | .007      | .022 | •      |

• = Standard Items

## VNMG MLP

### NEGATIVE 35° RHOMBIC INSERTS FOR SEMI-FINISHING TO MEDIUM APPLICATIONS

| Size | Dimensions (inch)         |                |                        |
|------|---------------------------|----------------|------------------------|
|      | IC<br>Inscribed<br>Circle | S<br>Thickness | RE<br>Corner<br>Radius |
| 331  | .375                      | .187           | .016                   |
| 332  | .375                      | .187           | .031                   |

| Part Number |               | Depth of Cut |      | Feed Rate |      | Grade  |
|-------------|---------------|--------------|------|-----------|------|--------|
| ANSI        | ISO           | ap (inch)    |      | fn (ipr)  |      | TT2010 |
|             |               | Min.         | Max. | Min.      | Max. |        |
| INCH        |               |              |      |           |      |        |
| VNMG331MLP  | VNMG160404MLP | .004         | .059 | .002      | .008 | •      |
| VNMG332MLP  | VNMG160408MLP | .008         | .059 | .003      | .012 | •      |

• = Standard Items

## VNMX FX

### NEGATIVE 35° RHOMBIC INSERTS FOR BALL STUD AND PULLEY APPLICATIONS

| Size  | Dimensions (inch)         |                |                        |
|-------|---------------------------|----------------|------------------------|
|       | IC<br>Inscribed<br>Circle | S<br>Thickness | RE<br>Corner<br>Radius |
| 2.531 | .313                      | .187           | .016                   |
| 2.532 | .313                      | .187           | .031                   |

| Part Number |              | Depth of Cut |      | Feed Rate |      | Grade  |
|-------------|--------------|--------------|------|-----------|------|--------|
| ANSI        | ISO          | ap (inch)    |      | fn (ipr)  |      | TT2010 |
|             |              | Min.         | Max. | Min.      | Max. |        |
| INCH        |              |              |      |           |      |        |
| VNMX2.531FX | VNMX130404FX | .004         | .039 | .002      | .008 | •      |
| VNMX2.532FX | VNMX130408FX | .008         | .039 | .003      | .008 | •      |

• = Standard Items

## Recommended Cutting Conditions

| Materials |               |                | Condition | Tensile Strength (Kpsi) | Hardness  | Vc Cutting Speed SFM | Trade Names                      |
|-----------|---------------|----------------|-----------|-------------------------|-----------|----------------------|----------------------------------|
| ISO       | Mtl Group No. | Type           |           |                         |           |                      |                                  |
| <b>H</b>  | 38            | Hardened Steel | Hardened  |                         | 42-55 HRc | 260-650              | Hardox 400, Hardox 500, W1, W210 |
|           | 39            |                | Hardened  |                         | 55-65 HRc | 160-325              | HSS, 90 MnV8                     |

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and IPR may need to be revised to optimize the tools performance.



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