



# CA025P

CVD Coated Carbide for Steel



Next Generation CVD Coating for Longer Tool Life

Improved Wear Resistance

Excellent Fracture Resistance

Excellent Adhesion Resistance and Chipping Resistance





# CA025P

## CVD Coated Carbide Grade for Steel

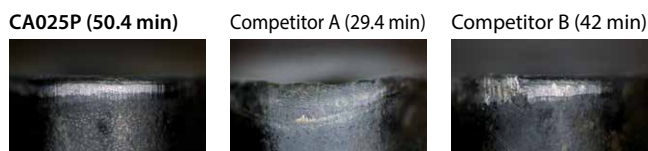
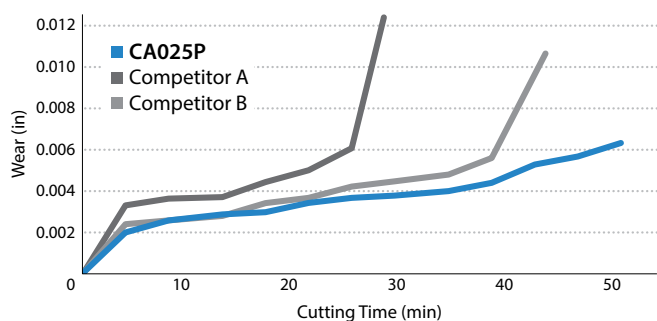
Next Generation CVD Coating for Longer Tool Life

### 1 Improved Wear Resistance with New CVD Grade for Steel

Thickened Alumina with Good Thermal Resistance (Twice as thick as conventional coating)

Improved Plastic Deformation Resistance by Increased Temperature Strength

Wear Resistance Comparison (Internal Evaluation)

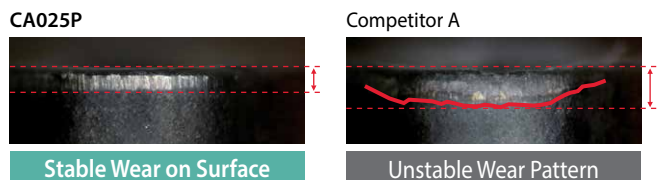


CA025P (50.4 min)  
Good Surface Condition

Cutting Conditions : Vc = 980 sfm, D.O.C. = 0.059", f = 0.012 ipr, Wet Workpiece : 4137

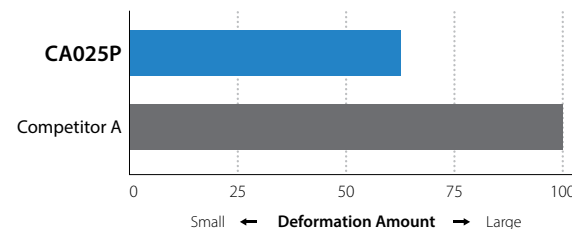
### CA025P Maintains Smooth and Flat Surface with Stable Tool Life

Wear Comparison (Internal Evaluation) Cutting Time 25.2 min



Cutting Conditions : Vc = 980 sfm, D.O.C. = 0.059", f = 0.012 ipr, Wet Workpiece : 4137

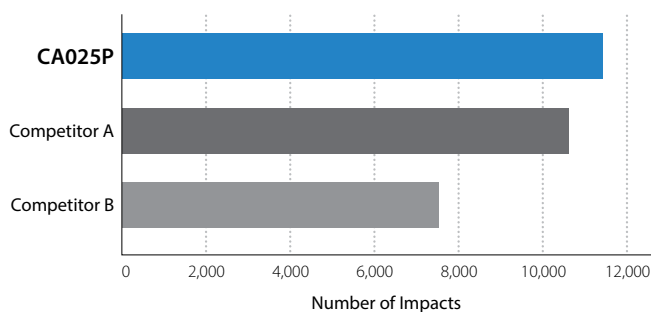
Plastic Deformation Comparison under High Temperature (Internal Evaluation) Comparison with Competitor A



### 2 Excellent Fracture Resistance

New Substrate with High Stability Provides Excellent Chipping Resistance

Fracture Resistance Comparison (Internal Evaluation) Average of 5 times

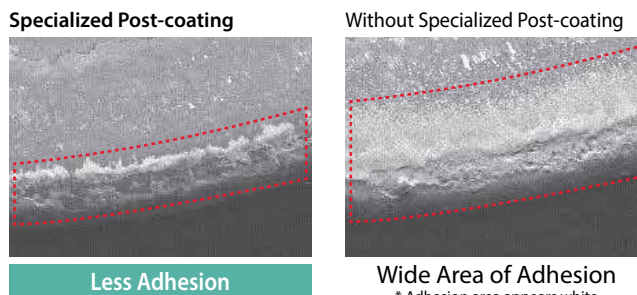


Cutting Conditions : Vc = 820 sfm, D.O.C. = 0.059", f = 0.014 ipr, Wet Workpiece : 4140 (with 4 Slots)

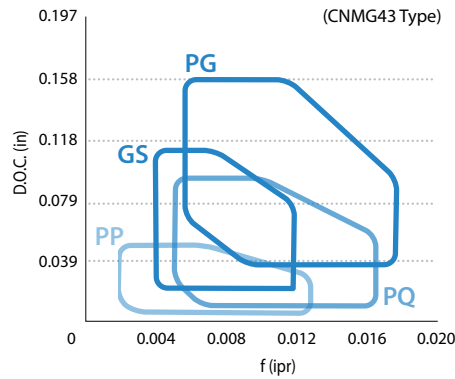
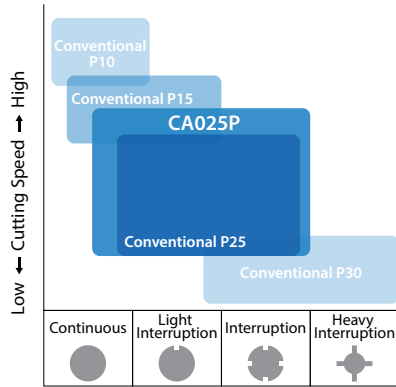
### 3 Excellent Adhesion Resistance and Chipping Resistance

Specialized Post-coating Process Prevents Adhesion

Adhesion on the Edge after Cutting (Internal Evaluation)



Cutting Conditions : Vc = 890 sfm, D.O.C. = 0.039", f = 0.004 ipr, Wet Workpiece : 4140 (with 4 Slots)



- PG Chipbreaker (Medium-Roughing)**
  - 1st Recommendation** Interruption (Medium-Roughing)
  - Stable Machining and Good Chip Control in a Wide Range of Applications
- GS Chipbreaker (Medium-Roughing)**
  - 1st Recommendation** Continuous (Medium-Roughing)
  - Hybrid Land Enables Stable Machining During Light Interruption
- PQ Chipbreaker (Finishing-Medium)**
  - Reduces Chip Clogging and Resistance at High Feed Rates
- PP Chipbreaker (Finishing)**
  - Improves Chip Clogging and Chip Crunching at High Feed Rates with Small D.O.C.

## Case Studies

### Cold Forging Die H13

Vc = 755 sfm  
D.O.C. = 0.079"~  
f = 0.009 ipr  
Wet  
CNMG432PG  
CA025P



Tool Life

**CA025P**  
PG Chipbreaker

**25 pcs/edge**

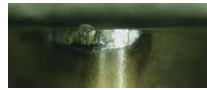


Competitor B  
(Molded Chipbreaker)

**15 pcs/edge**



CA025P



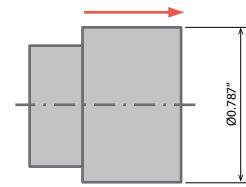
Competitor B

CA025P PG chipbreaker extended tool life by 1.6 times when compared to Competitor B. Good cutting edge provided continuous machining.

(User Evaluation)

### Pipe 4140

Vc = 525 sfm  
D.O.C. = 0.047"  
f = 0.008 ipr  
Wet  
DNMG432PG  
CA025P



Tool Life

**CA025P**  
PG Chipbreaker

**40 pcs/edge**



Competitor C  
(Molded Chipbreaker)

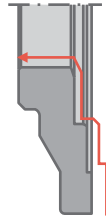
**20 pcs/edge**

CA025P PG chipbreaker maintained doubled the tool life of Competitor C. Less edge build-up and superior surface finish.

(User Evaluation)

### Flange 1045

Vc = 820 sfm  
D.O.C. = 0.039"  
f = 0.004 ~ 0.014 ipr  
Wet  
WNMG432PQ  
CA025P



Tool Life

**CA025P**  
PQ Chipbreaker

**150 pcs/edge**



Competitor D  
(Molded Chipbreaker)

**100 pcs/edge**



CA025P



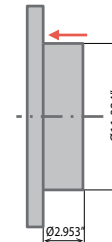
Competitor D

CA025P PQ chipbreaker extended tool life by 1.5 times that of Competitor D. Excellent cutting edge maintained continuous machining.

(User Evaluation)

### Flange 4140 (Normalized)

Vc = 655 sfm  
D.O.C. = 0.012"  
f = 0.006 ipr  
Wet  
DNMG431PP  
CA025P



Tool Life

**CA025P**  
PP Chipbreaker

**30 pcs/edge**



Competitor E  
(Molded Chipbreaker)

**30 pcs/edge**



CA025P



Competitor E

CA025P PP chipbreaker showed less wear on cutting edge after machining 30 pcs and maintained stable machining.



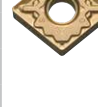




(User Evaluation)

## Recommended Cutting Conditions

|        | Low Carbon Steel<br>Low Carbon Alloy Steel |  | Medium Carbon Steel<br>Medium Carbon Alloy Steel | High Carbon Alloy Steel | Vc (sfm) |
|--------|--|--|--|-------------------------|----------|
|        | 150 HB or Below                            |  | 250 HB or Below                                  | 300 HB or Below         |          |
| CA025P | 490 ~ 790 ~ 1050                           |  |  | 490 ~ 720 ~ 920         |          |

# Negative Inserts














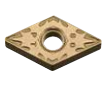

| Shape   | Part Number | Dimensions (in) |           |       |                            | CVD Coated Carbide |  |
|---|-------------|-----------------|-----------|-------|----------------------------|--------------------|--|
|   |             | I.C.            | Thickness | Hole  | Corner-R (r <sub>e</sub> ) | CA025P             |  |
| Wiper Edge<br>                     | CNMG 431WF  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|   | 432WF       |                 |           |       | 1/32                       | ●                  |  |
| Wiper Edge<br>                     | CNMG 431WP  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|   | 432WP       |                 |           |       | 1/32                       | ●                  |  |
| Wiper Edge<br>                     | CNMG 431WE  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|   | 432WE       |                 |           |       | 1/32                       | ●                  |  |
|   | 433WE       |                 |           |       | 3/64                       | ●                  |  |
| Wiper Edge<br>                     | CNMG 431WQ  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|   | 432WQ       |                 |           |       | 1/32                       | ●                  |  |
|   | 433WQ       |                 |           |       | 3/64                       | ●                  |  |
| Finishing<br>                      | CNMG 4305PP | 1/2             | 3/16      | 0.203 | 0.008                      | ●                  |  |
|   | 431PP       |                 |           |       | 1/64                       | ●                  |  |
|   | 432PP       |                 |           |       | 1/32                       | ●                  |  |
| Finishing<br>                      | CNMG 4305GP | 1/2             | 3/16      | 0.203 | 0.008                      | ●                  |  |
|   | 431GP       |                 |           |       | 1/64                       | ●                  |  |
|   | 432GP       |                 |           |       | 1/32                       | ●                  |  |
| Finishing-Medium<br>              | CNMG 431PQ  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|   | 432PQ       |                 |           |       | 1/32                       | ●                  |  |
|   | 433PQ       |                 |           |       | 3/64                       | ●                  |  |
| Finishing-Medium<br>             | CNMG 331HQ  | 3/8             | 3/16      | 0.150 | 1/64                       | ●                  |  |
|   | 332HQ       |                 |           |       | 1/32                       | ●                  |  |
|   | CNMG 431HQ  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|   | 432HQ       |                 |           |       | 1/32                       | ●                  |  |
| Finishing-Medium / Up Facing<br> | CNMG 431CQ  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|   | 432CQ       |                 |           |       | 1/32                       | ●                  |  |
|   | 433CQ       |                 |           |       | 3/64                       | ●                  |  |
|   | CNMG 542CQ  | 5/8             | 1/4       | 0.250 | 1/32                       | ●                  |  |
|   | 543CQ       |                 |           |       | 3/64                       | ●                  |  |
|   | 544CQ       |                 |           |       | 1/16                       | ●                  |  |
| Finishing-Medium / Up Facing<br> | CNMG 432CJ  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
|   | 433CJ       |                 |           |       | 3/64                       | ●                  |  |
|   | CNMG 543CJ  | 5/8             | 1/4       | 0.250 | 3/64                       | ●                  |  |
|   | 544CJ       |                 |           |       | 1/16                       | ●                  |  |
| Medium-Roughing (Continuous)<br> | CNMG 331GS  | 3/8             | 3/16      | 0.150 | 1/64                       | ●                  |  |
|   | 332GS       |                 |           |       | 1/32                       | ●                  |  |
|   | CNMG 431GS  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|   | 432GS       |                 |           |       | 1/32                       | ●                  |  |
|   | 433GS       |                 |           |       | 3/64                       | ●                  |  |

| Shape   | Part Number | Dimensions (in) |           |       |                            | CVD Coated Carbide |       |
|---|-------------|-----------------|-----------|-------|----------------------------|--------------------|-------|
|   |             | I.C.            | Thickness | Hole  | Corner-R (r <sub>e</sub> ) | CA025P             |       |
| Medium-Roughing (Interrupted)<br>        | CNMG 431PG  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |       |
|   | 432PG       |                 |           |       | 1/32                       | ●                  |       |
|   | 433PG       |                 |           |       | 3/64                       | ●                  |       |
|   | 434PG       |                 |           |       | 1/16                       | ●                  |       |
| Medium-Roughing<br>                      | CNMG 431PS  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |       |
|   | 432PS       |                 |           |       | 1/32                       | ●                  |       |
|   | 433PS       |                 |           |       | 3/64                       | ●                  |       |
|   | 434PS       |                 |           |       | 1/16                       | ●                  |       |
|   | CNMG 543PS  | 5/8             | 1/4       | 0.250 | 3/64                       | ●                  |       |
| 544PS   | 1/16        |                 |           |       | ●                          |                    |       |
| Medium-Roughing / High Feed<br>          | CNMG 432PT  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |       |
|   | 433PT       |                 |           |       | 3/64                       | ●                  |       |
|   | CNMG 542PT  | 5/8             | 1/4       | 0.250 | 1/32                       | ●                  |       |
|   | 543PT       |                 |           |       | 3/64                       | ●                  |       |
| 544PT   | 1/16        | ●               |           |       |                            |                    |       |
| Medium-Roughing / High Feed<br>          | CNMG 432GT  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |       |
|   | 433GT       |                 |           |       | 3/64                       | ●                  |       |
| Roughing<br>                             | CNMG 431    | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |       |
|   | 432         |                 |           |       | 1/32                       | ●                  |       |
|   | 433         |                 |           |       | 3/64                       | ●                  |       |
|   | CNMG 542    | 5/8             | 1/4       | 0.250 | 1/32                       | ●                  |       |
|   | 543         |                 |           |       | 3/64                       | ●                  |       |
|   | CNMG 643    |                 |           |       | 3/4                        | 1/4                | 0.313 |
| 644   | 1/16        | ●               |           |       |                            |                    |       |
| Roughing<br>                             | CNMG 432PH  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |       |
|   | 433PH       |                 |           |       | 3/64                       | ●                  |       |
|   | 434PH       |                 |           |       | 1/16                       | ●                  |       |
|   | CNMG 542PH  | 5/8             | 1/4       | 0.250 | 1/32                       | ●                  |       |
|   | 543PH       |                 |           |       | 3/64                       | ●                  |       |
|   | 544PH       |                 |           |       | 1/16                       | ●                  |       |
|   | CNMG 642PH  | 3/4             | 1/4       | 0.313 | 1/32                       | ●                  |       |
|   | 643PH       |                 |           |       | 3/64                       | ●                  |       |
| 644PH   | 1/16        |                 |           |       | ●                          |                    |       |
| 646PH   | 3/32        | ●               |           |       |                            |                    |       |
| Roughing / High Feed / Single Sided<br> | CNMM 432PX  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |       |
|   | 433PX       |                 |           |       | 3/64                       | ●                  |       |
|   | 434PX       |                 |           |       | 1/16                       | ●                  |       |
|   | CNMM 542PX  | 5/8             | 1/4       | 0.250 | 1/32                       | ●                  |       |
|   | 543PX       |                 |           |       | 3/64                       | ●                  |       |
|   | 544PX       |                 |           |       | 1/16                       | ●                  |       |
|   | CNMM 642PX  | 3/4             | 1/4       | 0.313 | 1/32                       | ●                  |       |
|   | 643PX       |                 |           |       | 3/64                       | ●                  |       |
|   | 644PX       |                 |           |       | 1/16                       | ●                  |       |
|   | 646PX       |                 |           |       | 3/32                       | ●                  |       |

Inserts sold in 10 piece boxes

● : U.S. Stock

# Negative Inserts

| Shape   | Part Number   | Dimensions (in) |           |       |               | CVD Coated Carbide |   |
|---|---|-----------------|-----------|-------|---------------|--------------------|---|
|   |   | I.C.            | Thickness | Hole  | Corner-R (re) | CA025P             |   |
| Low Carbon Steel<br><br>Finishing                                    | CNMG 431XP  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |   |
|   | 432XP   |                 |           |       | 1/32          | ●                  |   |
| Low Carbon Steel<br><br>Medium                                       | CNMG 431XQ  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |   |
|   | 432XQ   |                 |           |       | 1/32          | ●                  |   |
| Low Carbon Steel<br><br>Roughing                                     | CNMG 432XS  | 1/2             | 3/16      | 0.203 | 1/32          | ●                  |   |
| Wiper Edge<br><br>Wiper Edge   | DNMX 431WF  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |   |
|   | 432WF   |                 |           |       | 1/32          | ●                  |   |
|   | 433WF   |                 |           |       | 3/64          | ●                  |   |
|   | DNMX 441WF  | 1/2             | 1/4       | 0.203 | 1/64          | ●                  |   |
|   | 442WF   |                 |           |       | 1/32          | ●                  |   |
|   | 443WF   |                 |           |       | 3/64          | ●                  |   |
| Finishing<br><br>Finishing   | DNMG 4305PP   | 1/2             | 3/16      | 0.203 | 0.008         | ●                  |   |
|   | 431PP   |                 |           |       | 1/64          | ●                  |   |
|   | 432PP   |                 |           |       | 1/32          | ●                  |   |
|   | 433PP   |                 |           |       | 3/64          | ●                  |   |
|   | DNMG 4405PP   | 1/2             | 1/4       | 0.203 | 0.008         | ●                  |   |
|   | 441PP   |                 |           |       | 1/64          | ●                  |   |
|   | 442PP   |                 |           |       | 1/32          | ●                  |   |
|   | 443PP   |                 |           |       | 3/64          | ●                  |   |
| Finishing<br><br>Finishing   | DNMG 331GP  | 3/8             | 3/16      | 0.150 | 1/64          | ●                  |   |
|   | 332GP   |                 |           |       | 1/32          | ●                  |   |
|   | DNMG 4305GP   | 1/2             | 3/16      | 0.203 | 0.008         | ●                  |   |
|   | 431GP   |                 |           |       | 1/64          | ●                  |   |
| Finishing-Medium<br><br>Finishing-Medium                           | DNMG 431PQ  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |   |
|   | 432PQ   |                 |           |       | 1/32          | ●                  |   |
|   | 433PQ   |                 |           |       | 3/64          | ●                  |   |
|   | DNMG 441PQ  | 1/2             | 1/4       | 0.203 | 1/64          | ●                  |   |
| 442PQ   | 1/32  |                 |           |       | ●             |                    |   |
| Finishing-Medium<br><br>Finishing-Medium                           | DNMG 3305HQ   | 3/8             | 3/16      | 0.150 | 0.008         | ●                  |   |
|   | 331HQ   |                 |           |       | 1/64          | ●                  |   |
|   | DNMG 431HQ  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |   |
|   | 432HQ   |                 |           |       | 1/32          | ●                  |   |
|   | 433HQ   |                 |           |       | 3/64          | ●                  |   |
|   | DNMG 441HQ  | 1/2             | 1/4       | 0.203 | 1/64          | ●                  |   |
|   | 442HQ   |                 |           |       | 1/32          | ●                  |   |
|   | 443HQ   |                 |           |       | 3/64          | ●                  |   |
| Finishing-Medium / Up-Facing<br><br>Finishing-Medium / Up-Facing     | DNMG 431CQ  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |   |
|   | 432CQ   |                 |           |       | 1/32          | ●                  |   |
|   | 433CQ   |                 |           |       | 3/64          | ●                  |   |
|   | DNMG 441CQ  | 1/2             | 1/4       | 0.203 | 1/64          | ●                  |   |
|   | 442CQ   |                 |           |       | 1/32          | ●                  |   |
|   | 443CQ   |                 |           |       | 3/64          | ●                  |   |
|   | Finishing-Medium / Up-Facing<br><br>Finishing-Medium / Up-Facing | DNMG 432CJ      | 1/2       | 3/16  | 0.203         | 1/32               | ● |
|   |   | 433CJ           |           |       |               | 3/64               | ● |
|   |   | DNMG 442CJ      | 1/2       | 1/4   | 0.203         | 1/32               | ● |
| 443CJ   | 3/64  | ●               |           |       |               |                    |   |
| Medium-Roughing (Continuous)<br><br>Medium-Roughing (Continuous)     | DNMG 331GS  | 3/8             | 3/16      | 0.150 | 1/64          | ●                  |   |
|   | 332GS   |                 |           |       | 1/32          | ●                  |   |
|   | DNMG 431GS  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |   |
|   | 432GS   |                 |           |       | 1/32          | ●                  |   |
|   | 433GS   |                 |           |       | 3/64          | ●                  |   |
|   | DNMG 441GS  | 1/2             | 1/4       | 0.203 | 1/64          | ●                  |   |
| 442GS   | 1/32  |                 |           |       | ●             |                    |   |
| Medium-Roughing (Interrupted)<br><br>Medium-Roughing (Interrupted) | DNMG 431PG  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |   |
|   | 432PG   |                 |           |       | 1/32          | ●                  |   |
|   | 433PG   |                 |           |       | 3/64          | ●                  |   |
|   | 434PG   | 1/2             | 1/4       | 0.203 | 1/16          | ●                  |   |
|   | DNMG 441PG  |                 |           |       | 1/64          | ●                  |   |
|   | 442PG   |                 |           |       | 1/32          | ●                  |   |
| 443PG   | 1/2   | 1/4             | 0.203     | 3/64  | ●             |                    |   |
| 444PG   |   |                 |           | 1/16  | ●             |                    |   |
| Medium-Roughing<br><br>Medium-Roughing                             | DNMG 431PS  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |   |
|   | 432PS   |                 |           |       | 1/32          | ●                  |   |
|   | 433PS   |                 |           |       | 3/64          | ●                  |   |
|   | DNMG 441PS  | 1/2             | 1/4       | 0.203 | 1/64          | ●                  |   |
| 442PS   | 1/32  |                 |           |       | ●             |                    |   |
| 443PS   | 3/64  |                 |           |       | ●             |                    |   |
| 444PS   | 1/16  | ●               |           |       |               |                    |   |
| Medium-Roughing / High Feed<br><br>Medium-Roughing / High Feed     | DNMG 432PT  | 1/2             | 3/16      | 0.203 | 1/32          | ●                  |   |
|   | 433PT   |                 |           |       | 3/64          | ●                  |   |
|   | DNMG 442PT  | 1/2             | 1/4       | 0.203 | 1/32          | ●                  |   |
| 443PT   | 3/64  |                 |           |       | ●             |                    |   |
| Medium-Roughing / High Feed<br><br>Medium-Roughing / High Feed     | DNMG 432GT  | 1/2             | 3/16      | 0.203 | 1/32          | ●                  |   |
|   | 433GT   |                 |           |       | 3/64          | ●                  |   |
|   | DNMG 442GT  | 1/2             | 1/4       | 0.203 | 1/32          | ●                  |   |
| 443GT   | 3/64  |                 |           |       | ●             |                    |   |

Inserts sold in 10 piece boxes

● : U.S. Stock

# Negative Inserts

| Shape                               | Part Number | Dimensions (in) |           |       |                            | CVD Coated Carbide |  |
|-------------------------------------|-------------|-----------------|-----------|-------|----------------------------|--------------------|--|
|                                     |             | I.C.            | Thickness | Hole  | Corner-R (r <sub>e</sub> ) | CA025P             |  |
| Roughing                            | DNMG 431    | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
|                                     | DNMG 442    | 1/2             | 1/4       | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
| Roughing                            | DNMG 432PH  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |
|                                     | DNMG 442PH  | 1/2             | 1/4       | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |
| Roughing / High Feed / Single Sided | DNMM 432PX  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |
|                                     | DNMM 442PX  | 1/2             | 1/4       | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |
| Low Carbon Steel                    | DNMG 431XP  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
| Low Carbon Steel                    | DNMG 431XQ  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
| Low Carbon Steel                    | DNMG 432XS  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
| Medium-Roughing                     | RNMG 32     | 3/8             | 1/8       | 0.150 | -                          | ●                  |  |
|                                     | RNMG 43     | 1/2             | 3/16      | 0.203 | -                          | ●                  |  |
|                                     | RNMG 54     | 5/8             | 1/4       | 0.250 | -                          | ●                  |  |
| Finishing-Medium                    | SNMG 431PQ  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
| Finishing-Medium                    | SNMG 431HQ  | 1/2             | 3/16      | 0.203 | 1/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
| Medium-Roughing (Interrupted)       | SNMG 432PG  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |

| Shape                               | Part Number | Dimensions (in) |           |       |                            | CVD Coated Carbide |  |
|-------------------------------------|-------------|-----------------|-----------|-------|----------------------------|--------------------|--|
|                                     |             | I.C.            | Thickness | Hole  | Corner-R (r <sub>e</sub> ) | CA025P             |  |
| Medium-Roughing                     | SNMG 432PS  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |
| Medium-Roughing / High Feed         | SNMG 432PT  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
| Roughing                            | SNMG 321    | 3/8             | 1/8       | 0.150 | 1/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
| Roughing                            | SNMG 432PH  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
| Roughing / High Feed / Single Sided | SNMM 432PX  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
| Low Carbon Steel                    | SNMG 432XP  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/16                       | ●                  |  |
|                                     |             |                 |           |       | 3/32                       | ●                  |  |
| Low Carbon Steel                    | SNMG 432XQ  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
| Low Carbon Steel                    | SNMG 432XS  | 1/2             | 3/16      | 0.203 | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
| Wiper Edge                          | TNMX 331WF  | 3/8             | 3/16      | 0.150 | 1/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |
| Finishing                           | TNMG 3305PP | 3/8             | 3/16      | 0.150 | 0.008                      | ●                  |  |
|                                     |             |                 |           |       | 1/64                       | ●                  |  |
|                                     |             |                 |           |       | 1/32                       | ●                  |  |
|                                     |             |                 |           |       | 3/64                       | ●                  |  |

Inserts sold in 10 piece boxes

● : U.S. Stock

# Negative Inserts

| Shape                         | Part Number | Dimensions (in) |           |       |               | CVD Coated Carbide |  |
|-------------------------------|-------------|-----------------|-----------|-------|---------------|--------------------|--|
|                               |             | I.C.            | Thickness | Hole  | Corner-R (re) | CA025P             |  |
| Finishing                     | TNMG 3305GP | 3/8             | 3/16      | 0.150 | 0.008         | ●                  |  |
|                               | 331GP       |                 |           |       | 1/64          | ●                  |  |
|                               | 332GP       |                 |           |       | 1/32          | ●                  |  |
| Finishing-Medium              | TNMG 331PQ  | 3/8             | 3/16      | 0.150 | 1/64          | ●                  |  |
|                               | 332PQ       |                 |           |       | 1/32          | ●                  |  |
|                               | 333PQ       |                 |           |       | 3/64          | ●                  |  |
| Finishing-Medium              | TNMG 231HQ  | 1/4             | 3/16      | 0.089 | 1/64          | ●                  |  |
|                               | 232HQ       |                 |           |       | 1/32          | ●                  |  |
|                               | TNMG 331HQ  | 3/8             | 3/16      | 0.150 | 1/64          | ●                  |  |
|                               | 332HQ       |                 |           |       | 1/32          | ●                  |  |
|                               | 333HQ       |                 |           |       | 3/64          | ●                  |  |
| Finishing-Medium / Up Facing  | TNMG 331CQ  | 3/8             | 3/16      | 0.150 | 1/64          | ●                  |  |
|                               | 332CQ       |                 |           |       | 1/32          | ●                  |  |
|                               | 333CQ       |                 |           |       | 3/64          | ●                  |  |
|                               | TNMG 432CQ  | 1/2             | 3/16      | 0.203 | 1/32          | ●                  |  |
|                               | 433CQ       |                 |           |       | 3/64          | ●                  |  |
| Medium-Roughing (Continuous)  | TNMG 231GS  | 1/4             | 3/16      | 0.089 | 1/64          | ●                  |  |
|                               | 232GS       |                 |           |       | 1/32          | ●                  |  |
|                               | TNMG 331GS  | 3/8             | 3/16      | 0.150 | 1/64          | ●                  |  |
|                               | 332GS       |                 |           |       | 1/32          | ●                  |  |
| Medium-Roughing (Interrupted) | TNMG 331PG  | 3/8             | 3/16      | 0.150 | 1/64          | ●                  |  |
|                               | 332PG       |                 |           |       | 1/32          | ●                  |  |
|                               | 333PG       |                 |           |       | 3/64          | ●                  |  |
| Medium-Roughing               | TNMG 331PS  | 3/8             | 3/16      | 0.150 | 1/64          | ●                  |  |
|                               | 332PS       |                 |           |       | 1/32          | ●                  |  |
|                               | 333PS       |                 |           |       | 3/64          | ●                  |  |
|                               | TNMG 431PS  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                               | 432PS       |                 |           |       | 1/32          | ●                  |  |
|                               | 433PS       |                 |           |       | 3/64          | ●                  |  |
| 434PS                         | 1/16        | ●               |           |       |               |                    |  |
| Medium-Roughing / High Feed   | TNMG 332PT  | 3/8             | 3/16      | 0.150 | 1/32          | ●                  |  |
|                               | 333PT       |                 |           |       | 3/64          | ●                  |  |
| Medium-Roughing / High Feed   | TNMG 332GT  | 3/8             | 3/16      | 0.150 | 1/32          | ●                  |  |
|                               | 333GT       |                 |           |       | 3/64          | ●                  |  |
| Roughing                      | TNMG 331    | 3/8             | 3/16      | 0.150 | 1/64          | ●                  |  |
|                               | 332         |                 |           |       | 1/32          | ●                  |  |
|                               | 333         |                 |           |       | 3/64          | ●                  |  |
|                               | TNMG 432    | 1/2             | 3/16      | 0.203 | 1/32          | ●                  |  |
|                               | 433         |                 |           |       | 3/64          | ●                  |  |

| Shape                                | Part Number                               | Dimensions (in)                           |           |       |               | CVD Coated Carbide |   |
|--------------------------------------|---|---|-----------|-------|---------------|--------------------|---|
|                                      |   | I.C.                                      | Thickness | Hole  | Corner-R (re) | CA025P             |   |
| Roughing                             | TNMG 332PH                                | 3/8                                       | 3/16      | 0.150 | 1/32          | ●                  |   |
|                                      | 333PH                                     |   |           |       | 3/64          | ●                  |   |
|                                      | TNMG 432PH                                | 1/2                                       | 3/16      | 0.203 | 1/32          | ●                  |   |
|                                      | 433PH                                     |   |           |       | 3/64          | ●                  |   |
| 434PH                                | 1/16                                      | ●   |           |       |               |                    |   |
| Medium-Roughing / High Feed          | TNMM 332PX                                | 3/8                                       | 3/16      | 0.150 | 1/32          | ●                  |   |
|                                      | 333PX                                     |   |           |       | 3/64          | ●                  |   |
|                                      | TNMM 432PX                                | 1/2                                       | 3/16      | 0.203 | 1/32          | ●                  |   |
|                                      | 433PX                                     |   |           |       | 3/64          | ●                  |   |
| 434PX                                | 1/16                                      | ●   |           |       |               |                    |   |
| Low Carbon Steel                     | TNMG 331XP                                | 3/8                                       | 3/16      | 0.150 | 1/64          | ●                  |   |
|                                      | 332XP                                     |   |           |       | 1/32          | ●                  |   |
| Low Carbon Steel                     | TNMG 331XQ                                | 3/8                                       | 3/16      | 0.150 | 1/64          | ●                  |   |
|                                      | 332XQ                                     |   |           |       | 1/32          | ●                  |   |
| Low Carbon Steel                     | TNMG 332XS                                | 3/8                                       | 3/16      | 0.150 | 1/32          | ●                  |   |
|                                      | Medium-Roughing                           | TNMG 331 <sup>9</sup> / <sub>16</sub> -ST | 3/8       | 3/16  | 0.150         | 1/64               | ● |
| 332 <sup>9</sup> / <sub>16</sub> -ST |   | 1/32                                      |           |       |               | ●                  |   |
| Finishing                            | VNMG 3305PP                               | 3/8                                       | 3/16      | 0.150 | 0.008         | ●                  |   |
|                                      | 331PP                                     |   |           |       | 1/64          | ●                  |   |
|                                      | 332PP                                     |   |           |       | 1/32          | ●                  |   |
|                                      | 333PP                                     |   |           |       | 3/64          | ●                  |   |
| Finishing                            | VNMG 3305GP                               | 3/8                                       | 3/16      | 0.150 | 0.008         | ●                  |   |
|                                      | 331GP                                     |   |           |       | 1/64          | ●                  |   |
|                                      | 332GP                                     |   |           |       | 1/32          | ●                  |   |
| Finishing-Medium                     | VNMG 331 <sup>9</sup> / <sub>16</sub> -VC | 3/8                                       | 3/16      | 0.150 | 1/64          | ●                  |   |
|                                      | 332 <sup>9</sup> / <sub>16</sub> -VC      |   |           |       | 1/32          | ●                  |   |
|                                      | 333 <sup>9</sup> / <sub>16</sub> -VC      |   |           |       | 3/64          | ●                  |   |
| Finishing-Medium                     | VNMG 331VF                                | 3/8                                       | 3/16      | 0.150 | 1/64          | ●                  |   |
|                                      | 332VF                                     |   |           |       | 1/32          | ●                  |   |
|                                      | 333VF                                     |   |           |       | 3/64          | ●                  |   |
| Finishing-Medium                     | VNMG 331PQ                                | 3/8                                       | 3/16      | 0.150 | 1/64          | ●                  |   |
|                                      | 332PQ                                     |   |           |       | 1/32          | ●                  |   |
|                                      | 333PQ                                     |   |           |       | 3/64          | ●                  |   |
| Finishing-Medium                     | VNMG 331HQ                                | 3/8                                       | 3/16      | 0.150 | 1/64          | ●                  |   |
|                                      | 332HQ                                     |   |           |       | 1/32          | ●                  |   |
|                                      | 333HQ                                     |   |           |       | 3/64          | ●                  |   |
| Roughing                             | VNMG 331                                  | 3/8                                       | 3/16      | 0.150 | 1/64          | ●                  |   |
|                                      | 332                                       |   |           |       | 1/32          | ●                  |   |

Inserts sold in 10 piece boxes

● : U.S. Stock

# Negative Inserts

| Shape                          | Part Number | Dimensions (in) |           |       |               | CVD Coated Carbide |  |
|--------------------------------|-------------|-----------------|-----------|-------|---------------|--------------------|--|
|                                |             | I.C.            | Thickness | Hole  | Corner-R (rε) | CA025P             |  |
| Wiper Edge<br>Finishing        | WNMG 431WF  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432WF       |                 |           |       | 1/32          | ●                  |  |
| Wiper Edge<br>Finishing        | WNMG 431WP  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432WP       |                 |           |       | 1/32          | ●                  |  |
| Wiper Edge<br>Finishing-Medium | WNMG 431WE  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432WE       |                 |           |       | 1/32          | ●                  |  |
|                                | 433WE       |                 |           |       | 3/64          | ●                  |  |
| Wiper Edge<br>Finishing-Medium | WNMG 431WQ  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432WQ       |                 |           |       | 1/32          | ●                  |  |
|                                | 433WQ       |                 |           |       | 3/64          | ●                  |  |
| Finishing                      | WNMG 4305PP | 1/2             | 3/16      | 0.203 | 0.008         | ●                  |  |
|                                | 431PP       |                 |           |       | 1/64          | ●                  |  |
|                                | 432PP       |                 |           |       | 1/32          | ●                  |  |
|                                | 433PP       |                 |           |       | 3/64          | ●                  |  |
| Finishing-Medium               | WNMG 431PQ  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432PQ       |                 |           |       | 1/32          | ●                  |  |
|                                | 433PQ       |                 |           |       | 3/64          | ●                  |  |
| Finishing-Medium               | WNMG 3251HQ | 3/8             | 5/32      | 0.150 | 1/64          | ●                  |  |
|                                | 3252HQ      |                 |           |       | 1/32          | ●                  |  |
|                                | WNMG 331HQ  | 3/8             | 3/16      | 0.150 | 1/64          | ●                  |  |
|                                | 332HQ       |                 |           |       | 1/32          | ●                  |  |
|                                | WNMG 431HQ  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432HQ       |                 |           |       | 1/32          | ●                  |  |
| 433HQ                          | 3/64        |                 |           |       | ●             |                    |  |
| Finishing-Medium / Up Facing   | WNMG 431CQ  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432CQ       |                 |           |       | 1/32          | ●                  |  |
|                                | 433CQ       |                 |           |       | 3/64          | ●                  |  |
| Finishing-Medium / Up Facing   | WNMG 432CJ  | 1/2             | 3/16      | 0.203 | 1/32          | ●                  |  |
|                                | 433CJ       |                 |           |       | 3/64          | ●                  |  |

| Shape                          | Part Number | Dimensions (in) |           |       |               | CVD Coated Carbide |  |
|--------------------------------|-------------|-----------------|-----------|-------|---------------|--------------------|--|
|                                |             | I.C.            | Thickness | Hole  | Corner-R (rε) | CA025P             |  |
| Medium-Roughing (Continuous)   | WNMG 331GS  | 3/8             | 3/16      | 0.150 | 1/64          | ●                  |  |
|                                | 332GS       |                 |           |       | 1/32          | ●                  |  |
|                                | WNMG 431GS  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432GS       |                 |           |       | 1/32          | ●                  |  |
| 433GS                          | 3/64        | ●               |           |       |               |                    |  |
| Medium-Roughing (Intermittent) | WNMG 431PG  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432PG       |                 |           |       | 1/32          | ●                  |  |
|                                | 433PG       |                 |           |       | 3/64          | ●                  |  |
|                                | 434PG       |                 |           |       | 1/16          | ●                  |  |
| Medium-Roughing                | WNMG 431PS  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432PS       |                 |           |       | 1/32          | ●                  |  |
|                                | 433PS       |                 |           |       | 3/64          | ●                  |  |
|                                | 434PS       |                 |           |       | 1/16          | ●                  |  |
| Medium-Roughing / High Feed    | WNMG 432PT  | 1/2             | 3/16      | 0.203 | 1/32          | ●                  |  |
|                                | 433PT       |                 |           |       | 3/64          | ●                  |  |
| Medium-Roughing / High Feed    | WNMG 432GT  | 1/2             | 3/16      | 0.203 | 1/32          | ●                  |  |
|                                | 433GT       |                 |           |       | 3/64          | ●                  |  |
| Roughing                       | WNMG 431    | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432         |                 |           |       | 1/32          | ●                  |  |
|                                | 433         |                 |           |       | 3/64          | ●                  |  |
| Roughing                       | WNMG 432PH  | 1/2             | 3/16      | 0.203 | 1/32          | ●                  |  |
|                                | 433PH       |                 |           |       | 3/64          | ●                  |  |
| Low Carbon Steel<br>Finishing  | WNMG 431XP  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432XP       |                 |           |       | 1/32          | ●                  |  |
| Low Carbon Steel<br>Medium     | WNMG 431XQ  | 1/2             | 3/16      | 0.203 | 1/64          | ●                  |  |
|                                | 432XQ       |                 |           |       | 1/32          | ●                  |  |
| Low Carbon Steel<br>Roughing   | WNMG 432XS  | 1/2             | 3/16      | 0.203 | 1/32          | ●                  |  |

Inserts sold in 10 piece boxes

● : U.S. Stock



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