

Tungaloy

Member IMC Group

Keeping the Customer First

Tungaloy Report No. 388-E

ISO TOOL™

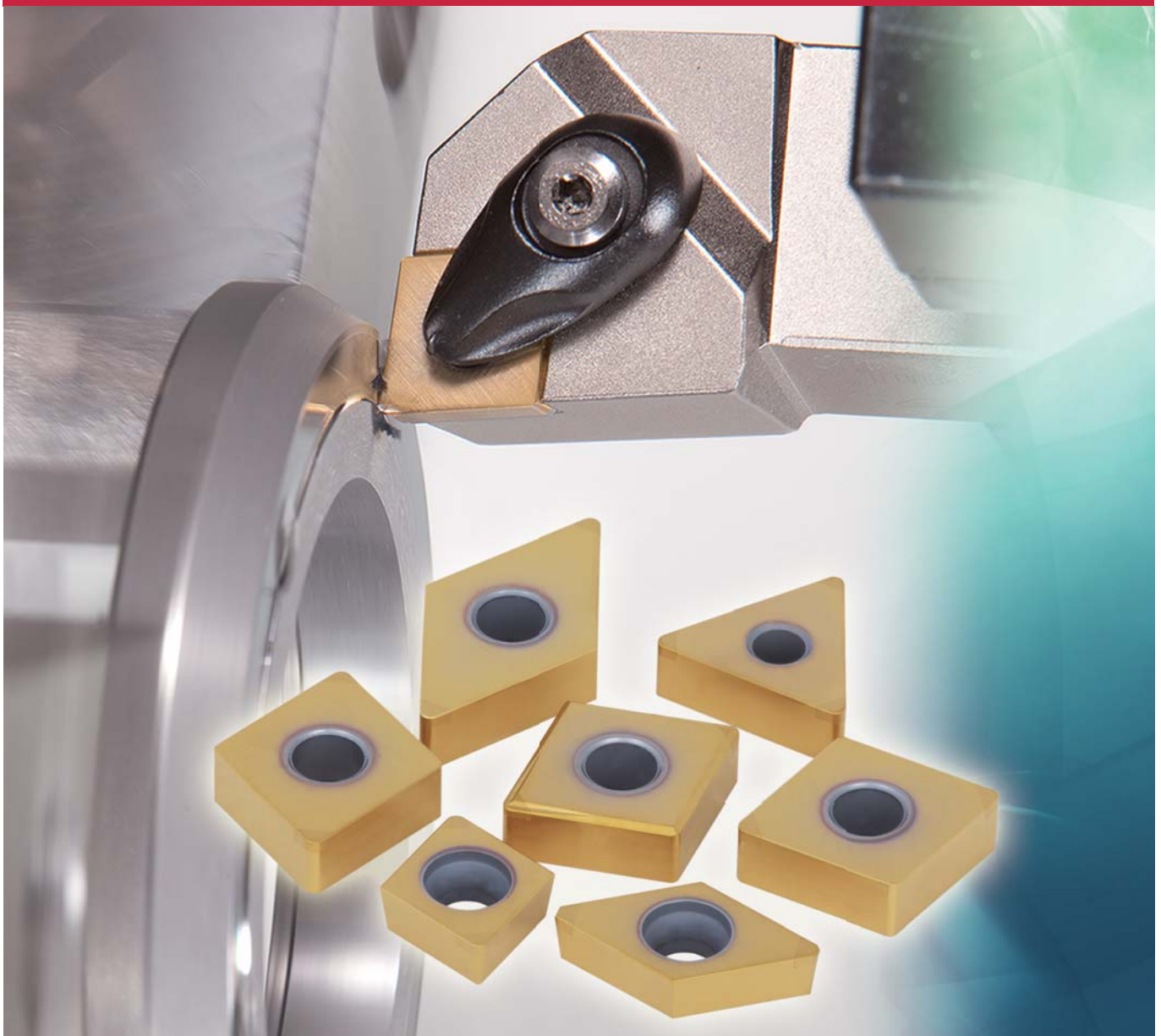
T-CBN

New coated CBN grade for hardened steel turning

BXM SERIES

NEW

The new standard for hardened steel machining



New coated CBN grades

BXM series

Applicable for all types of hard

NEW For high speed machining

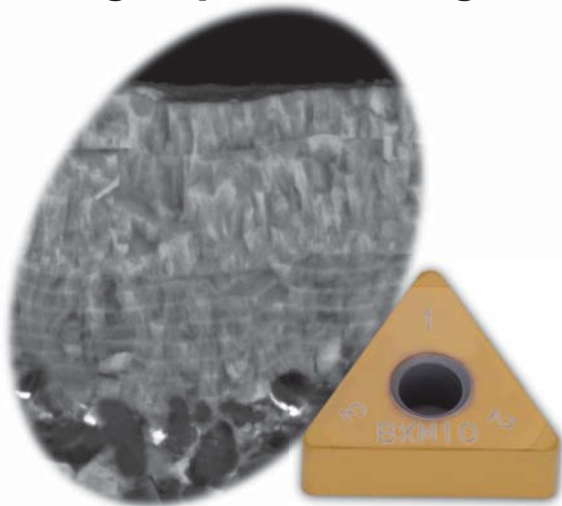
BXM10

Excellent crater wear resistance !

Newly developed CBN substrate for high speed cutting !

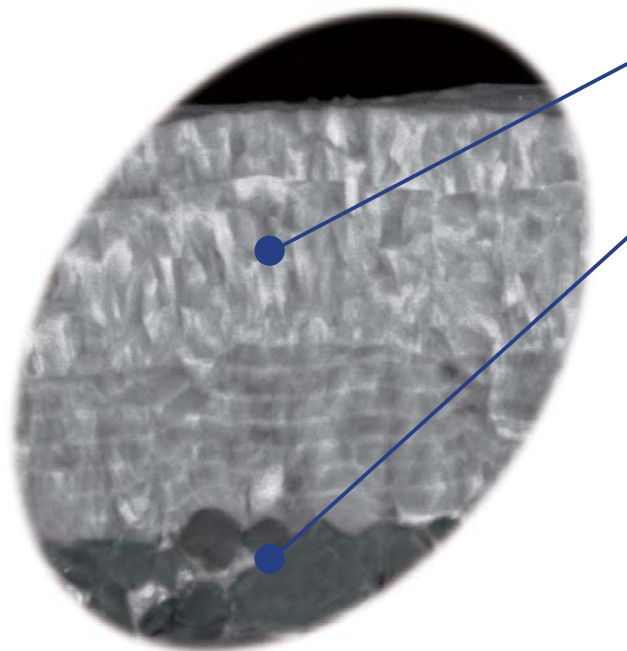


Continuous cutting




NEW All-round

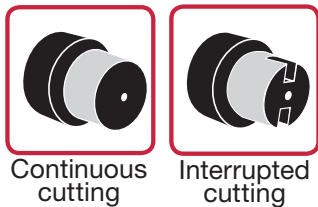
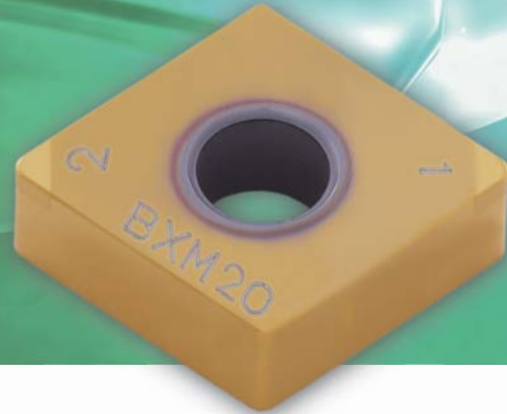
BXM20



● Standard cutting condition

| Application | Grades | Machining Mode | Cutting speed Vc (m/min) | Depth of cut ap (mm) | Feed f (mm/rev) |
|---|--------|-------------------|--------------------------|----------------------|-------------------|
|  | BXM10 | Continuous | 200 (150 - 350) | 0.1 (0.05 - 0.30) | 0.1 (0.03 - 0.18) |
| | | Light interrupted | 170 (150 - 250) | 0.1 (0.05 - 0.30) | 0.1 (0.03 - 0.15) |
| | BXM20 | Continuous | 150 (70 - 220) | 0.2 (0.05 - 0.30) | 0.1 (0.05 - 0.25) |
| | | Interrupted | 150 (70 - 220) | 0.1 (0.05 - 0.30) | 0.1 (0.05 - 0.15) |

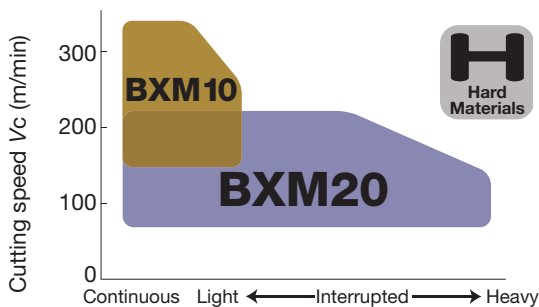
ened steel turning



New coating layer
 Remarkable adhesion strength

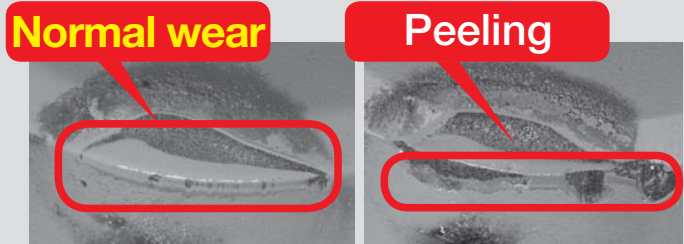
Unique CBN substrate
 High chipping resistance !!
 Extremely tough Substrate !!

● Application range



● Comparison of damage

BMX20 has normal wear pattern without peeling

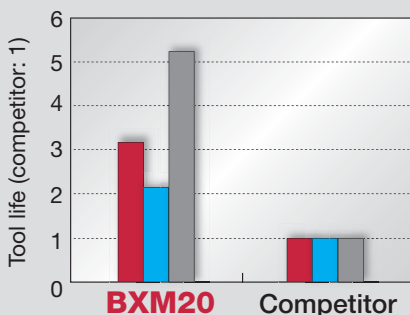


BXM20

Competitor

Insert : 2QP-CNGA120408
 Work material : SCM415H (60HRC)
 Cutting speed : $V_c = 130$ m/min
 Feed : $f = 0.15$ mm/rev
 Depth of cut : $a_p = 0.15$ mm
 Coolant : Water soluble

● Cutting performance



5 times longer tool life !

■ Interrupted cutting $V_c = 130$ m/min $f = 0.15$ mm/rev $a_p = 0.15$ mm
 ■ Removing carburized layer $V_c = 110$ m/min $f = 0.12$ mm/rev $a_p = 0.6$ mm
 ■ Continuous cutting $V_c = 130$ m/min $f = 0.15$ mm/rev $a_p = 0.15$ mm

Insert : 2QP-CNGA120408
 Work material : SCM415H
 Coolant : Water soluble

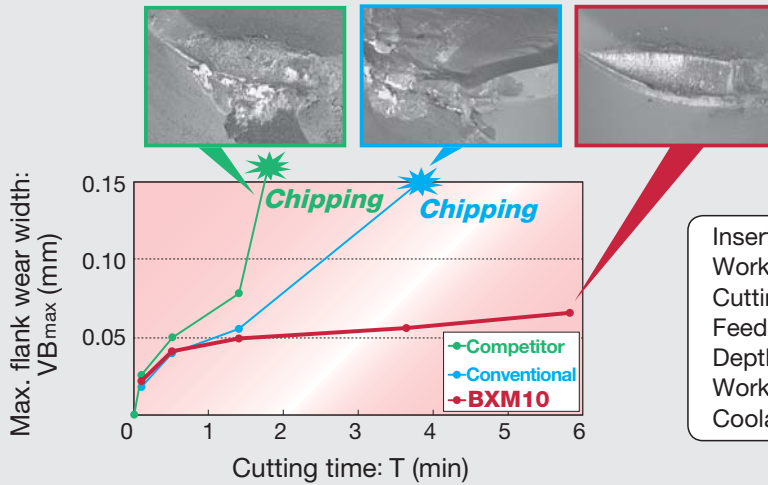
Cutting performance

BXM10

High speed machining comparisons ($V_c = 300$ m/min)



Continuous cutting



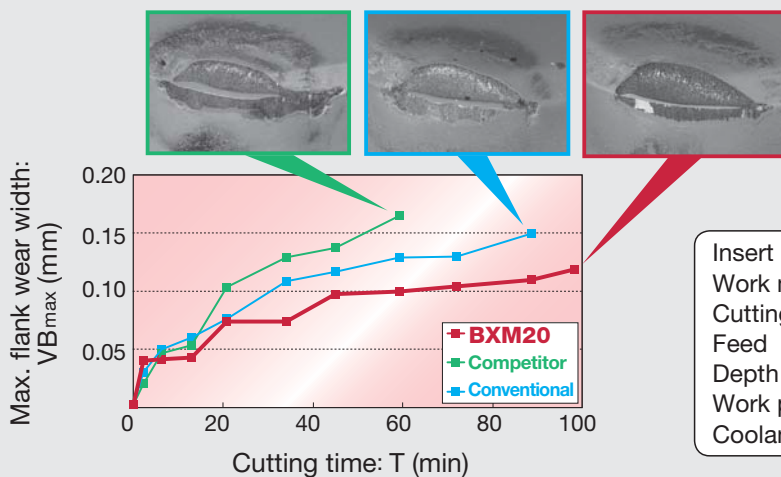
Insert : 2QP-CNGA120408
 Work material : SCM415H (59 ~ 61HRC)
 Cutting speed : $V_c = 300$ m/min
 Feed : $f = 0.1$ mm/rev
 Depth of cut : $a_p = 0.25$ mm
 Work process : Continuous cutting
 Coolant : Dry

BXM20

Comparison of wear resistance



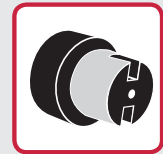
Continuous cutting



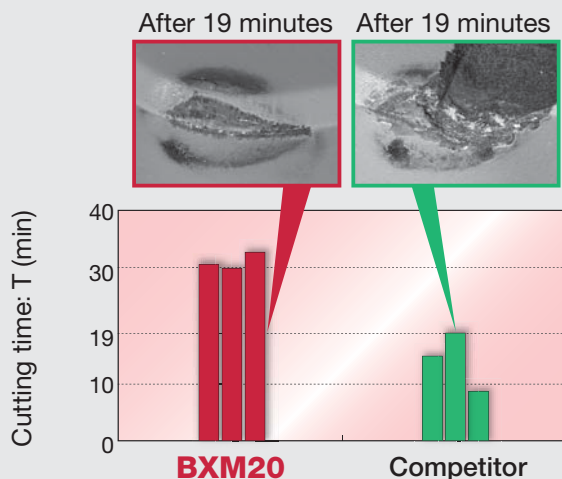
Insert : 2QP-CNGA120408
 Work material : SCM415H (59 ~ 61HRC)
 Cutting speed : $V_c = 130$ m/min
 Feed : $f = 0.15$ mm/rev
 Depth of cut : $a_p = 0.15$ mm
 Work process : Continuous cutting
 Coolant : Water soluble

BXM20

Comparison of toughness



Light interrupted cutting

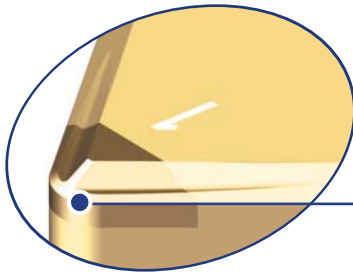


Insert : 2QP-CNGA120408
 Work material : SCM415H (59 ~ 61HRC)
 Cutting speed : $V_c = 130$ m/min
 Feed : $f = 0.15$ mm/rev
 Depth of cut : $a_p = 0.15$ mm
 Work process : Light interrupted cutting
 Coolant : Water soluble

“Hard Breakers” for removing the carburized layer

Two types of chipbreaker provide excellent chip control in a wide application range !

HF type For finishing

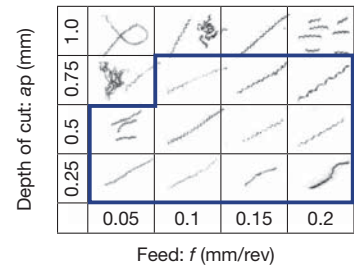


Single sided CBN insert provides higher stability in heavy machining.

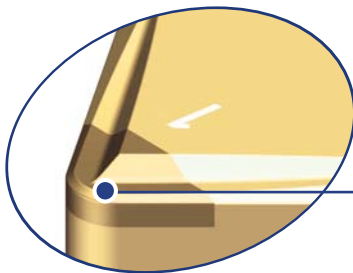
Excellent chip control in small DoC due to the high functional nose. Delivers exceptional surface finishes.

Example of chips

HF Chipbreaker



HM type For medium cutting

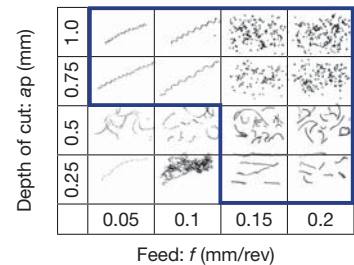


Single sided CBN insert provides higher stability in heavy machining.

Providing ideal chip control in large DoC by the well designed chipbreaker. Suitable for medium cutting or roughing.

Example of chips

HF Chipbreaker



Standard cutting condition (for removing the carburized layer)

| Application | Grades | Chipbreaker | Cutting speed Vc (m/min) | Depth of cut ap (mm) | Feed f (mm/rev) |
|-------------|--------|-------------|--------------------------|----------------------|-------------------|
| | BXM20 | HF | 150 (70 - 220) | 0.4 (0.2 - 0.75) | 0.1 (0.05 - 0.20) |
| | | HM | 150 (70 - 200) | 0.7 (0.5 - 1.0) | 0.1 (0.05 - 0.20) |

Wiper edge inserts

A finishing edge (wiper edge) is formed at the point of intersection between the corner radius and the straight cutting edge.

Effect of wiper edge

Doubles the productivity → Reduced machining time

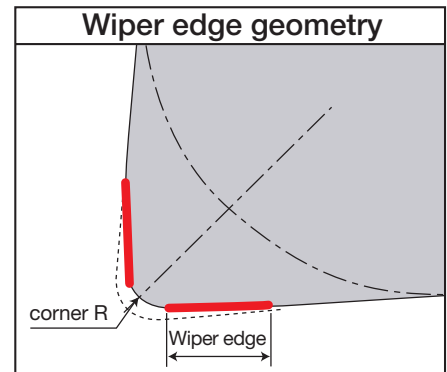
The wiper edge can double the feed rate and suppresses deterioration of the surface finish.

* $f \leq 0.3$ mm/rev

Superior surface finishes

→ By integrating roughing and finishing into one process, the productivity can be increased.

Compared with conventional inserts, surface roughness can be improved with the wiper edge.



■ Comparison of surface finish with hardened steel at 60 - 62 HRC

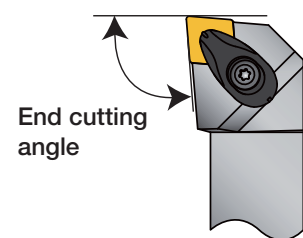
| | |
|-----------------|--|
| Without wiper | Ra: 0.83 μ m, Rz: 4.11 μ m |
| With wiper edge | Ra: 0.10 μ m, Rz: 1.03 μ m |

| | |
|---------------|---------------------|
| Insert | : 2QP-CNGA120408WL |
| Work material | : SCM415 (62HRC) |
| Cutting speed | : $V_c = 150$ m/min |
| Feed | : $f = 0.1$ mm/rev |
| Depth of cut | : $a_p = 0.15$ mm |
| Coolant | : Dry |

Note for using of wiper edge

The wiper edge needs to contact the work piece at a right angle.

- For the wiper edge, the toolholder should have an end cutting angle as shown in the illustration.
- In using the wiper edge a high rigidity toolholder like the Turning-A or D-type is recommended. In the table below, recommended toolholders are shown.



● End cutting angle, recommended toolholders

| | 2QP-CNGA1204**WL | 3QP-WNGA080408WL | 2QP-DNGA1504**WJ | 3QP-TNGA1604**WG |
|---------------------|---------------------|---------------------|---------------------|------------------|
| End cutting angle | 95° | | 93° | 91° |
| External toolholder | ACLNR/L****12-A | AWLNR/L****08-A | ADJNR/L****15-A | ATGNR/L****16-A |
| | DCLNR/L****12 | DWLNR/L****08 | DDJNR/L****15 | ATFNR/L****16-A |
| Internal toolholder | A***-ACLNR/L12-D*** | A***-AWLNR/L08-D*** | A***-ADUNR/L15-D*** | DTGNR/L****16 |
| | | | | DTFNR/L****16 |

Designation System



| 1 Number of edge | |
|------------------|----------------------------|
| 2 | One side multi-corner type |
| 3 | type |

| 2 Type | |
|--------|---------------------|
| QP | T-CBN TAC insert |

3 ISO symbols
(Based on ISO standard)

| 4 Additional symbol | |
|---------------------|------------------------------------|
| Without | Standard honing |
| -L | Light honing for low cutting force |
| -H | Heavy honing for toughness |
| WG | Wiper edge, 91° end cutting angle |
| WJ | Wiper edge, 93° end cutting angle |
| WL | Wiper edge, 95° end cutting angle |

| 4 Chipbreaker symbol | |
|----------------------|--------------------------------|
| -HF | For finishing |
| -HM | For medium cutting to roughing |

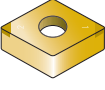
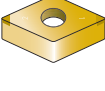
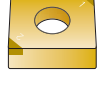



Honing specification

| | |
|-----------------|---------------------------|
| Standard honing | : 0.13 mm × 25° +R-honing |
| “-L” honing | : 0.13 mm × 15° +R-honing |
| “-H” honing | : 0.13 mm × 35° +R-honing |

Smaller honing angle makes the edge sharper with lower cutting forces.









Larger honing angle makes edge tougher.

Inserts (Negative type)





| Features | Shape | Cat. No. | Grades | | No. of corners | Dimensions (mm) | | | | | |
|------------------|---|---|------------------|-------|----------------|-----------------|----------------|-----------------|----------------|-----------------|------|
| | | | BXM10 | BXM20 | | I.C.dia ød | Thickness s | Hole dia ød1 | Corner R rε | CBN length a | |
| Standard |  | 2QP-CNGA120404 | ● | ● | 2 | 12.7 | 4.76 | 5.16 | 0.4 | 2.3 | |
| | | 2QP-CNGA120408 | ● | ● | | | | | 0.8 | 2.2 | |
| | | 2QP-CNGA120412 | | ● | | | | | 1.2 | 2.4 | |
| Light honing | | 2QP-CNGA120404-L | | ● | 2 | 12.7 | 4.76 | 5.16 | 0.4 | 2.3 | |
| | | 2QP-CNGA120408-L | | ● | | | | | 0.8 | 2.2 | |
| | | 2QP-CNGA120412-L | | ● | | | | | 1.2 | 2.4 | |
| Heavy honing | | 2QP-CNGA120404-H | | | ★ | 2 | 12.7 | 4.76 | 5.16 | 0.4 | 2.3 |
| | | 2QP-CNGA120408-H | | | ★ | | | | | 0.8 | 2.2 |
| | | 2QP-CNGA120412-H | | | ★ | | | | | 1.2 | 2.4 |
| Wiper edge | 2QP-CNGA120404WL | ● | ● | 2 | 12.7 | 4.76 | 5.16 | 0.4 | 2.3 | | |
| | 2QP-CNGA120408WL | ● | ● | | | | | 0.8 | 2.2 | | |
| | 2QP-CNGA120412WL | | ● | | | | | 1.2 | 2.4 | | |
| Standard |  | 2QP-DNGA150404 | ● | ● | 2 | 12.7 | 4.76 | 5.16 | 0.4 | 2.5 | |
| | | 2QP-DNGA150408 | ● | ● | | | | | 0.8 | 2.1 | |
| | | 2QP-DNGA150412 | ● | ● | | | | | 1.2 | 2.0 | |
| | | Light honing | 2QP-DNGA150604 | ● | ● | 2 | 12.7 | 6.35 | 5.16 | 0.4 | 2.5 |
| | | | 2QP-DNGA150608 | ● | ● | | | | | 0.8 | 2.1 |
| | | | 2QP-DNGA150612 | ● | ● | | | | | 1.2 | 2.0 |
| Heavy honing | | | 2QP-DNGA150404-L | | ● | 2 | 12.7 | 4.76 | 5.16 | 0.4 | 2.5 |
| | | | 2QP-DNGA150408-L | | ● | | | | | 0.8 | 2.1 |
| | | | 2QP-DNGA150412-L | | ● | | | | | 1.2 | 2.0 |
| Wiper edge | | 2QP-DNGA150404-H | | | ★ | 2 | 12.7 | 4.76 | 5.16 | 0.4 | 2.5 |
| | | 2QP-DNGA150408-H | | | ★ | | | | | 0.8 | 2.1 |
| | | 2QP-DNGA150412-H | | | ★ | | | | | 1.2 | 2.0 |
| Wiper edge | 2QP-DNGA150404WJ | ● | ● | 2 | 12.7 | 4.76 | 5.16 | 0.4 | 2.4 | | |
| | 2QP-DNGA150408WJ | ● | ● | | | | | 0.8 | 2.1 | | |
| Standard |  | 2QP-SNGA120404 | | ● | 2 | 12.7 | 6.35 | 5.16 | 0.4 | 2.4 | |
| | | 2QP-SNGA120408 | | ● | | | | | 0.8 | 2.4 | |
| | | 2QP-SNGA120412 | | ● | | | | | 1.2 | 2.4 | |
| Light honing | | 2QP-SNGA120408-L | | ● | 2 | 12.7 | 6.35 | 5.16 | 0.8 | 2.4 | |
| | | 2QP-SNGA120412-L | | ● | | | | | 1.2 | 2.4 | |
| | | 2QP-SNGA120408-H | | ★ | | | | | 2 | 12.7 | 6.35 |
| 2QP-SNGA120412-H | | | ★ | 1.2 | 2.4 | | | | | | |
| Standard | |  | 3QP-TNGA160404 | ● | ● | 3 | 9.525 | 4.76 | 3.81 | 0.4 | 2.2 |
| | | | 3QP-TNGA160408 | ● | ● | | | | | 0.8 | 1.9 |
| | 3QP-TNGA160412 | | ● | ● | 1.2 | | | | | 2.4 | |
| Light honing | 3QP-TNGA160404-L | | | ● | 3 | 9.525 | 4.76 | 3.81 | 0.4 | 2.2 | |
| | 3QP-TNGA160408-L | | | ● | | | | | 0.8 | 1.9 | |
| | 3QP-TNGA160412-L | | | ● | | | | | 1.2 | 2.4 | |
| Heavy honing | 3QP-TNGA160404-H | | | | ★ | 3 | 9.525 | 4.76 | 3.81 | 0.4 | 2.2 |
| | 3QP-TNGA160408-H | | | | ★ | | | | | 0.8 | 1.9 |
| | 3QP-TNGA160412-H | | | | ★ | | | | | 1.2 | 2.4 |
| Wiper edge | 3QP-TNGA160404WG | | ● | 3 | 9.525 | 4.76 | 3.81 | 0.4 | 2.4 | | |
| | 3QP-TNGA160408WG | | ● | | | | | 0.8 | 2.2 | | |
| Standard |  | 2QP-VNGA160404 | ● | ● | 2 | 9.525 | 4.76 | 3.81 | 0.4 | 3.1 | |
| | | 2QP-VNGA160408 | ● | ● | | | | | 0.8 | 2.2 | |
| | | 2QP-VNGA160412 | | ● | | | | | 0.8 | 3.0 | |
| Light honing | | 2QP-VNGA160404-L | | ● | 2 | 9.525 | 4.76 | 3.81 | 0.4 | 3.1 | |
| | | 2QP-VNGA160408-L | | ● | | | | | 0.8 | 2.2 | |
| Heavy honing | | 2QP-VNGA160404-H | | | ★ | 2 | 9.525 | 4.76 | 3.81 | 0.4 | 3.1 |
| | | 2QP-VNGA160408-H | | | ★ | | | | | 0.8 | 2.2 |
| Standard | |  | 3QP-WNGA080408 | ● | ● | 3 | 12.7 | 4.76 | 5.16 | 0.8 | 2.2 |
| Wiper edge | | | 3QP-WNGA080408WL | ● | ● | | | | | 0.8 | 2.2 |

● : Stocked items
★ : Coming soon

Inserts (Negative type with chipbreaker)

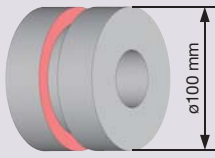
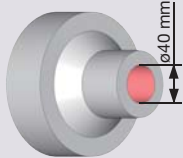
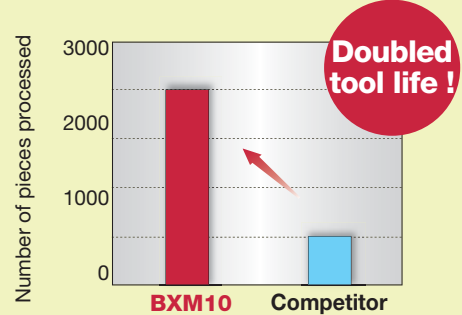
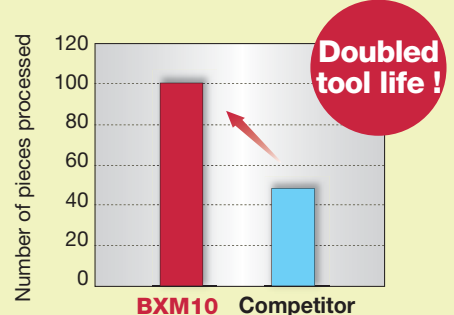
| Features | Shape | Cat. No. | Grades | | No. of corners | Dimensions (mm) | | | | |
|------------------|---|-------------------|--------|-------|----------------|------------------|-------------|---------------------|-----------------------|--------------|
| | | | BXM10 | BXM20 | | I.C.dia ϕd | Thickness s | Hole dia ϕd_1 | Corner R r ϵ | CBN length a |
| With chipbreaker |  | 2QP-CNGM120408-HF | | ● | 2 | 12.7 | 4.76 | 5.16 | 0.8 | 2.2 |
| | | 2QP-CNGM120412-HF | | ● | 2 | 12.7 | 4.76 | 5.16 | 1.2 | 2.4 |
| |  | 2QP-DNGM150408-HF | | ● | 2 | 12.7 | 4.76 | 5.16 | 0.8 | 2.1 |
| | | 2QP-DNGM150412-HF | | ● | 2 | 12.7 | 4.76 | 5.16 | 1.2 | 2.0 |
| |  | 3QP-TNGM160408-HF | | ● | 3 | 9.525 | 4.76 | 3.81 | 0.8 | 1.9 |
| | | 3QP-TNGM160412-HF | | ● | 3 | 9.525 | 4.76 | 3.81 | 1.2 | 2.4 |
| |  | 2QP-VNGM160408-HF | | ● | 2 | 9.525 | 4.76 | 3.81 | 0.8 | 2.2 |
| With chipbreaker |  | 2QP-CNGM120408-HM | | ● | 2 | 12.7 | 4.76 | 5.16 | 0.8 | 2.2 |
| | | 2QP-CNGM120412-HM | | ● | 2 | 12.7 | 4.76 | 5.16 | 1.2 | 2.4 |
| |  | 2QP-DNGM150408-HM | | ● | 2 | 12.7 | 4.76 | 5.16 | 0.8 | 2.1 |
| | | 2QP-DNGM150412-HM | | ● | 2 | 12.7 | 4.76 | 5.16 | 1.2 | 2.0 |
| |  | 3QP-TNGM160408-HM | | ● | 3 | 9.525 | 4.76 | 3.81 | 0.8 | 1.9 |
| | | 3QP-TNGM160412-HM | | ● | 3 | 9.525 | 4.76 | 3.81 | 1.2 | 2.4 |
| |  | 2QP-VNGM160408-HM | | ● | 2 | 9.525 | 4.76 | 3.81 | 0.8 | 2.2 |

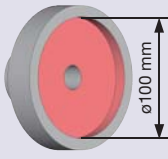
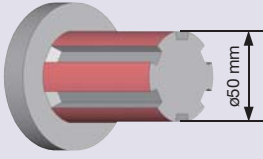
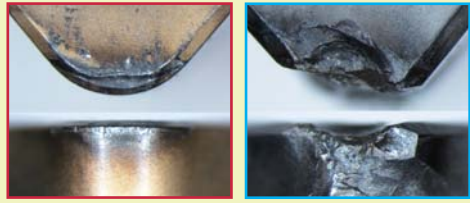
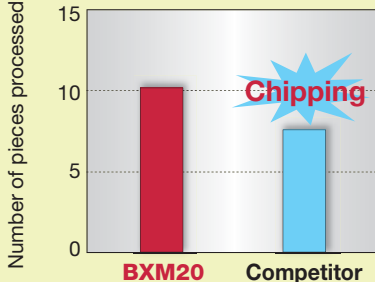
Inserts (Positive type)

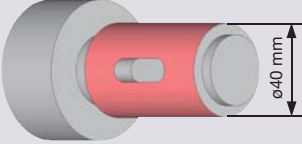
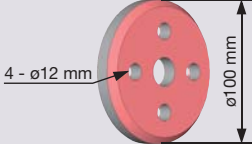
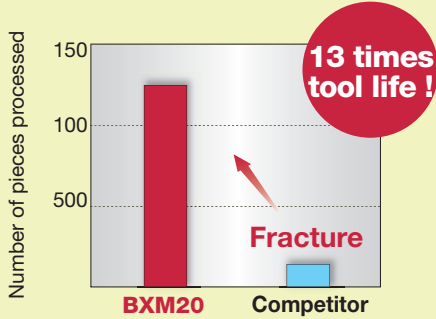
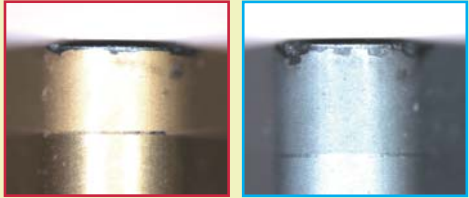
| Features | Shape | Cat. No. | Grades | | No. of corners | Dimensions (mm) | | | | | |
|----------------|---|----------------|--------|-------|----------------|-----------------------|------------------|-------------|---------------------|-----------------------|--------------|
| | | | BXM10 | BXM20 | | Relief angle ϕd | I.C.dia ϕd | Thickness s | Hole dia ϕd_1 | Corner R r ϵ | CBN length a |
| Standard |  | 2QP-CCGW060202 | ● | ● | 2 | 7° | 6.35 | 2.38 | 2.8 | 0.2 | 2.3 |
| | | 2QP-CCGW060204 | ● | ● | 2 | 7° | 6.35 | 2.38 | 2.8 | 0.4 | 2.3 |
| | | 2QP-CCGW09T304 | ● | ● | 2 | 7° | 9.525 | 3.97 | 4.4 | 0.4 | 2.3 |
| | | 2QP-CCGW09T308 | ● | ● | 2 | 7° | 9.525 | 3.97 | 4.4 | 0.8 | 2.2 |
| |  | 2QP-DCGW070202 | ● | ● | 2 | 7° | 6.35 | 2.38 | 2.8 | 0.2 | 2.7 |
| | | 2QP-DCGW070204 | ● | ● | 2 | 7° | 6.35 | 2.38 | 2.8 | 0.4 | 2.5 |
| | | 2QP-DCGW11T302 | ● | ● | 2 | 7° | 9.525 | 3.97 | 4.4 | 0.2 | 2.7 |
| | | 2QP-DCGW11T304 | ● | ● | 2 | 7° | 9.525 | 3.97 | 4.4 | 0.4 | 2.5 |
| | | 2QP-DCGW11T308 | ● | ● | 2 | 7° | 9.525 | 3.97 | 4.4 | 0.8 | 2.1 |
| |  | 3QP-TPGW080204 | ● | ● | 3 | 11° | 4.76 | 2.38 | 2.3 | 0.4 | 2.2 |
| | | 3QP-TPGW090202 | | ● | 3 | 11° | 4.76 | 2.38 | 2.3 | 0.2 | 2.3 |
| | | 3QP-TPGW090204 | ● | ● | 3 | 11° | 4.76 | 2.38 | 2.3 | 0.4 | 2.2 |
| | | 3QP-TPGW110202 | | ● | 3 | 11° | 6.35 | 2.38 | 2.8 | 0.2 | 2.3 |
| | | 3QP-TPGW110204 | ● | ● | 3 | 11° | 6.35 | 2.38 | 2.8 | 0.4 | 2.2 |
| | | 3QP-TPGW110302 | | ● | 3 | 11° | 6.35 | 3.18 | 3.4 | 0.2 | 2.3 |
| | | 3QP-TPGW110304 | ● | ● | 3 | 11° | 6.35 | 3.18 | 3.4 | 0.4 | 2.2 |
| | | 3QP-TPGW110308 | ● | ● | 3 | 11° | 6.35 | 3.18 | 3.4 | 0.8 | 2.0 |
| | | 3QP-TPGW130302 | | ● | 3 | 11° | 7.94 | 3.18 | 3.4 | 0.2 | 2.3 |
| | | 3QP-TPGW130304 | ● | ● | 3 | 11° | 7.94 | 3.18 | 3.4 | 0.4 | 2.2 |
| | | 3QP-TPGW16T304 | ● | ● | 3 | 11° | 9.525 | 3.97 | 4.4 | 0.4 | 2.2 |
| | | 3QP-TPGW16T308 | ● | ● | 3 | 11° | 9.525 | 3.97 | 4.4 | 0.8 | 1.9 |
| | | 3QP-TPGW160404 | ● | ● | 3 | 11° | 9.525 | 4.76 | 4.4 | 0.4 | 2.2 |
| | 3QP-TPGW160408 | | ● | 3 | 11° | 9.525 | 4.76 | 4.4 | 0.8 | 2.0 | |
| |  | 2QP-VBGW110304 | ● | ● | 2 | 5° | 6.35 | 3.18 | 2.8 | 0.4 | 3.1 |
| | | 2QP-VBGW110308 | ● | ● | 2 | 5° | 6.35 | 3.18 | 2.8 | 0.8 | 2.2 |
| | | 2QP-VBGW160404 | ● | ● | 2 | 5° | 9.525 | 4.76 | 4.4 | 0.4 | 3.1 |
| | | 2QP-VBGW160408 | ● | ● | 2 | 5° | 9.525 | 4.76 | 4.4 | 0.8 | 2.2 |
| 2QP-VCGW160404 | | ● | ● | 2 | 7° | 9.525 | 4.76 | 4.4 | 0.4 | 3.1 | |

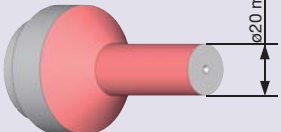
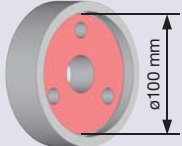
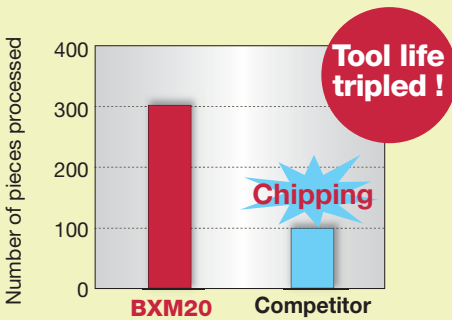
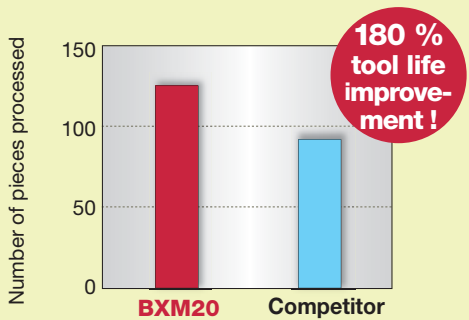
● : Stocked items
★ : Coming soon

Practical Examples

| Work piece type | | Automotive parts | Automotive parts |
|--------------------|------------------------------|---|--|
| Insert | | 2QP-VNGA160408 | 2QP-DNGA150404 |
| Grade | | BXM10 | BXM10 |
| Work material | | SCr420, 20Cr4(H) (60 ~ 65HRC) | SCM420H (58 ~ 60HRC) |
| | |  |  |
| Cutting conditions | Cutting speed: V_c (m/min) | 150 | 200 |
| | Feed : f (mm/rev) | 0.05 ~ 0.07 | 0.1 |
| | Depth of cut: a_p (mm) | 0.15 | 0.25 |
| | Machining | Continuous cutting | Continuous cutting |
| | Coolant | Dry | Dry |
| Results | |  <p>Excellent surface roughness.</p> |  <p>Doubled tool life due to higher wear resistance.</p> |

| Work piece type | | Automotive parts | Automotive parts |
|--------------------|------------------------------|---|---|
| Insert | | 2QP-CNGA120408 | 2QP-CNGA120408 |
| Grade | | BXM20 | BXM20 |
| Work material | | SCr420, 20Cr4(H) | SKH54, HS6-5-4 (63 ~ 64HRC) |
| | |  |  |
| Cutting conditions | Cutting speed: V_c (m/min) | 90 ~ 120 | 100 |
| | Feed : f (mm/rev) | 0.12 | 0.1 |
| | Depth of cut: a_p (mm) | 0.2 ~ 0.5 | 0.05 |
| | Machining | Continuous cutting | Heavy interrupted cutting |
| | Coolant | Water soluble | Water soluble |
| Results | | <p>■ After machining 200 pcs.</p>  <p>BXM20 has normal wear and stable tool life.</p> |  <p>140% tool life improvement !</p> |

| Work piece type | | Automotive parts | Machine parts (Wear parts) |
|--------------------|------------------------------|---|--|
| Insert | | 2QP-DNGA150408 | 2QP-DNGA150404 |
| Grade | | BXM20 | BXM20 |
| Work material | | SCr420, 20CrS4 (60 ~ 65HRC) | SKH51, HS6-5-2 (64HRC) |
| | |  |  |
| Cutting conditions | Cutting speed: V_c (m/min) | 80 | 45 |
| | Feed : f (mm/rev) | 0.08 | 0.07 |
| | Depth of cut: a_p (mm) | 0.1 | 0.05 |
| | Machining | Continuous to interrupted cutting | Continuous to interrupted cutting |
| | Coolant | Dry | Dry |
| Results | |  <p>13 times tool life !</p> <p>BXM20 has 13 times longer tool life than competitors.</p> | <p>■ After machining 5 pcs.</p>  <p>BXM20 is stable, even in heavy interrupted. Still available.</p> |

| Work piece type | | Automotive parts | Truck parts |
|--------------------|------------------------------|---|--|
| Insert | | 2QP-CNGA120408 | 2QP-CNGA120408 |
| Grade | | BXM20 | BXM20 |
| Work material | | SCr420H, 20Cr4(H) | SCM420 (59 ~ 63HRC) |
| | |  |  |
| Cutting conditions | Cutting speed: V_c (m/min) | 180 | 140 |
| | Feed : f (mm/rev) | 0.15 ~ 0.2 | 0.12 |
| | Depth of cut: a_p (mm) | 0.2 | 0.1 ~ 0.15 |
| | Machining | Continuous cutting | Continuous to interrupted cutting |
| | Coolant | Water soluble | Dry (Air) |
| Results | |  <p>Tool life tripled !</p> <p>No chippings. Tripled tool life, and more stable.</p> |  <p>180% tool life improvement !</p> <p>Tool life is 180% longer than competitors with stability, even when interrupted machining.</p> |



Tungaloy Corporation (Head office)

11-1 Yoshima-Kogyodanchi
Iwaki-city, Fukushima, 970-1144 Japan
Phone: +81-246-36-8501 Fax: +81-246-36-8542
<http://www.tungaloy.co.jp/>

Tungaloy America, Inc.

1226A Michael Drive, Wood Dale, IL.60191, U.S.A.
Phone: +1-630-227-3700 Fax: +1-630-227-0690
<http://www.tungaloyamerica.com/>

Tungaloy Canada

432 Elgin St. Unit 3, Brantford, Ontario N3S 7P7, Canada
Phone: +1-519-758-5779 Fax: +1-519-758-5791
<http://www.tungaloyamerica.com/>

Tungaloy de Mexico S.A.

C Los Arellano 113, Parque Industrial Siglo XXI
Aguascalientes, AGS, Mexico 20290
Phone: +52-449-929-5410 Fax: +52-449-929-5411
<http://www.tungaloyamerica.com/>

Tungaloy do Brasil Comércio de Ferramentas de Corte Ltda.

Rua dos Sabias N.104
13280-000 Vinhedo, São Paulo, Brazil
Phone: +55-19-38262757 Fax: +55-19-38262757
<http://www.tungaloy.co.jp/br/>

Tungaloy Germany GmbH

Elisabeth-Selbert-Strasse 3
D-40764 Langenfeld, Germany
Phone: +49-2173-90420-0 Fax: +49-2173-90420-19
<http://www.tungaloy-eu.com/>

Tungaloy France S.A.S.

6 Avenue des Andes
F-91952 Courtaboeuf Cedex, France
Phone: +33-1-6486-4300 Fax: +33-1-6907-7817
<http://www.tungaloy-eu.com/>

Tungaloy Italia S.r.l.

Via E. Andolfato 10
I-20126 Milano, Italy
Phone: +39-02-252012-1 Fax: +39-02-252012-65
<http://www.tungaloy-eu.com/>

Tungaloy Czech s.r.o

Tuřanka 115
CZ-627 00 Brno, Czech Republic
Phone: +420-532 123 391 Fax: +420-532 123 392
<http://www.tungaloy.co.jp/cz/>

Tungaloy Ibérica S.L.

C/La Pau, nº46
E-08243 Manresa (BCN), SPAIN
Phone: +34 93 1131360 Fax: +34 93 1131361
<http://www.tungaloy.co.jp/es/>

LLC Tungaloy Rus

Grazhdanskiy Prospectus, 29a
Belgorod, 308019, Russia
Phone: +7 4722 33 97 23 Fax: +7 4722 33 97 23
<http://www.tungaloy.co.jp/ru/>

Tungaloy Polska Sp. z o.o.

ul. Genevska 24
03-963 Warszawa, Poland
Phone: +48-22-617-0890 Fax: +48-22-617-0890
<http://www.tungaloy.co.jp/pl/>

Tungaloy Cutting Tool (Shanghai) Co.,Ltd.

Rm No 401 No.88 Zhabei, Jiangchang No.3 Rd
Shanghai 200436, China
Phone: +86-21-3632-1880 Fax: +86-21-3621-1918
<http://www.tungaloy.co.jp/tcts/>

Tungaloy Cutting Tool (Thailand) Co.,Ltd.

11th Floor, Sorachai Bldg. 23/7, Soi Sukhumvit 63
Klongtonnue, Wattana, Bangkok 10110, Thailand
Phone: +66-2-714-3130 Fax: +66-2-714-3134
<http://www.tungaloy.co.th/>

Tungaloy Singapore (Pte.), Ltd.

50 Kallang Avenue #06-03 Noel Corporate Building
Singapore 339505
Phone: +65-6391-1833 Fax: +65-6299-4557
<http://www.tungaloy.co.jp/tspl/>

Tungaloy India Pvt. Ltd.

201, 2nd Floor, Krishna Apra Business Square,
Netaji Subhash Place, Pitampura, Delhi - 110 034, India
Phone: +91-11-4707-1111 Fax: +91-11-4707-1100
<http://www.tungaloy.co.jp/in/>

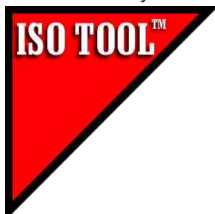
Tungaloy Korea Co., Ltd

#1312, Byucksan Digital Valley 5-cha
60-73 Gasan-dong, Geumcheon-gu
153-788 Seoul, Korea
Phone: +82-2-6393-8930 Fax: +82-2-6393-8952
<http://www.tungaloy.co.jp/kr/>

Tungaloy Malaysia Sdn Bhd

50 K-2, Kelana Mall, Jalan SS6/14, Kelana Jaya, 47301
Petaling Jaya, Selangor Darul Ehsan, Malaysia
Phone: +603-7805-3222 Fax: +603-7804-8563
<http://www.tungaloy.co.jp/my/>

Distributed by:



ISO TOOL AI

Estridsväg 17
SE-291 65 Kristianstad
Tel: 044-245570 / Fax: 044-245540
info@isotool.se / www.sitool.se



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Tungaloy Group
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