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| ZDET  | L    | I.C  | S    | d    |
|-------|------|------|------|------|
| 08 T2 | 8.4  | 6,75 | 2.78 | 2.8  |
| 11 03 | 10.6 | 8.5  | 3.18 | 2.8  |
| 13 T3 | 13.2 | 10.5 | 3.97 | 4.4  |
| 22 04 | 16.1 | 12.7 | 4.76 | 5.56 |

- Ideal machining conditions
- ⊗ Normal machining conditions
- ⊗ Unfavourable machining conditions

## Milling inserts

| ZD** milling insert |                  |      | HC <sup>1</sup> (CVD) |        |        |        |        |        | HC <sup>1</sup> (PVD) |        |        |        |        |        | HT     | HC <sup>2</sup> | HW     |        |        |        |        |  |         |       |       |
|---------------------|------------------|------|-----------------------|--------|--------|--------|--------|--------|-----------------------|--------|--------|--------|--------|--------|--------|-----------------|--------|--------|--------|--------|--------|--|---------|-------|-------|
|                     | <b>P</b>         |      | ⊗                     | ⊗      | ⊗      | ⊗      | ⊗      | ⊗      | ⊗                     | ⊗      | ⊗      | ⊗      | ⊗      | ⊗      | ⊗      | ⊗               |        |        |        |        |        |  |         |       |       |
|                     | <b>M</b>         |      | ⊗                     | ⊗      | ⊗      | ⊗      | ⊗      | ⊗      | ⊗                     | ⊗      | ⊗      | ⊗      | ⊗      | ⊗      | ⊗      | ⊗               |        |        |        |        |        |  |         |       |       |
|                     | <b>K</b>         |      |                       |        |        |        |        |        | ⊗                     | ⊗      |        |        |        |        |        |                 | ⊗      |        |        |        |        |  |         |       |       |
|                     | <b>N</b>         |      |                       |        |        |        |        |        | ⊗                     |        |        |        |        |        |        |                 | ⊗      |        |        |        |        |  |         |       |       |
|                     | <b>S</b>         |      |                       | ⊗      | ⊗      |        |        |        | ⊗                     | ⊗      | ⊗      | ⊗      | ⊗      | ⊗      |        |                 |        |        |        |        |        |  |         |       |       |
|                     | <b>H</b>         |      |                       |        |        |        |        |        |                       |        |        |        |        |        |        |                 |        |        |        |        |        |  |         |       |       |
|                     | ISO              | R    | YBC302                | YBC301 | YBC401 | YBM253 | YBM251 | YBM351 | YBD152                | YBD252 | YBG101 | YBG102 | YBG202 | YBG212 | YBS203 | YBG205          | YB9320 | YBG302 | YBS303 | YBG252 | YNG151 |  | YNG151C | YD101 | YD201 |
|                     | ZDET13T3Cyr16-PM | 16   |                       |        |        | ○      |        |        |                       |        |        | ○      |        |        |        |                 |        |        |        |        |        |  |         |       |       |
|                     | ZDET08T2Cyr10    | 10   |                       |        |        | ○      |        |        |                       |        |        |        |        |        |        |                 |        |        |        |        |        |  |         |       |       |
|                     | ZDET1103Cyr12.5  | 12.5 |                       |        |        | ○      |        |        |                       |        |        |        |        |        |        |                 |        |        |        |        |        |  |         |       |       |
|                     | ZPNT2204CY(R20)  | 20   |                       |        |        | ○      |        |        |                       |        |        |        |        |        |        |                 |        |        |        |        |        |  |         |       |       |
|                     | ZPNT2204CY(R25)  | 25   |                       |        |        | ●      |        |        |                       |        |        |        |        |        |        |                 |        |        |        |        |        |  |         |       |       |
|                     | ZPNT2204CY(R31)  | 31.5 |                       |        |        | ○      |        |        |                       |        |        |        |        |        |        |                 |        |        |        |        |        |  |         |       |       |

● Ex stock    ○ On demand

HC<sup>1</sup> Coated carbide  
 HT Uncoated cermet  
 HC<sup>2</sup> Coated cermet  
 HW Uncoated carbide



**S P K N 12 04 ED T21K R – DM**

**1**

**2**

**3**

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| Insert shape |           |
|--------------|-----------|
| A            | C         |
| H            | L         |
| M            | O         |
| P            | R         |
| S            | T         |
| W            | X Special |
| Z Special    |           |

| Clearance angle |   |
|-----------------|---|
| B               | C |
| D               | E |
| F               | N |
| P               |   |

| Tolerance class |            |            |        |
|-----------------|------------|------------|--------|
| Code            | I.C [mm]   | m [mm]     | S [mm] |
| A               | ±0,025     | ±0,005     | ±0,025 |
| C               | ±0,025     | ±0,013     | ±0,025 |
| E               | ±0,025     | ±0,025     | ±0,025 |
| F               | ±0,013     | ±0,005     | ±0,025 |
| G               | ±0,025     | ±0,025     | ±0,130 |
| H               | ±0,013     | ±0,013     | ±0,025 |
| J               | ±0,05-0,13 | ±0,005     | ±0,025 |
| K               | ±0,05-0,13 | ±0,013     | ±0,025 |
| L               | ±0,05-0,13 | ±0,025     | ±0,025 |
| M               | ±0,05-0,13 | ±0,08-0,18 | ±0,130 |
| N               | ±0,05-0,13 | ±0,08-0,18 | ±0,025 |
| U               | ±0,08-0,25 | ±0,13-0,38 | ±0,130 |

**1**

**2**

**3**

| Fastening features (metric) |   |
|-----------------------------|---|
| Insert shape                |   |
| A                           | B |
| C                           | F |
| G                           | H |
| J                           | M |
| N                           | Q |
| R                           | T |
| U                           | W |
| X Special                   |   |

| Cutting edge length l [mm] |      |
|----------------------------|------|
| Insert shape               |      |
|                            |      |
| A                          | C, M |
|                            |      |
| H, O, P                    | L    |
|                            |      |
| R                          | S    |
|                            |      |
| T                          | W    |

**4**

**5**

| Insert thickness S [mm] |      |      |       |
|-------------------------|------|------|-------|
|                         |      |      |       |
| Code                    | S    | Code | S     |
| 00                      | 0,79 | 05   | 5,56  |
| T0                      | 0,99 | T5   | 5,95  |
| 01                      | 1,59 | 06   | 6,35  |
| T1                      | 1,98 | T6   | 6,75  |
| 02                      | 2,38 | 07   | 7,94  |
| T2                      | 2,58 | 09   | 9,52  |
| 03                      | 3,18 | T9   | 9,72  |
| T3                      | 3,97 | 11   | 11,11 |
| 04                      | 4,76 | 12   | 12,70 |
| T4                      | 4,96 |      |       |

**6**

| Angle |         |      |         |
|-------|---------|------|---------|
|       |         |      |         |
| Code  | Kr      | Code | an      |
| A     | 45°     | A    | 3°      |
| D     | 60°     | B    | 5°      |
| E     | 75°     | C    | 7°      |
| F     | 85°     | D    | 15°     |
| P     | 90°     | E    | 20°     |
| Z     | Special | F    | 25°     |
|       |         | G    | 30°     |
|       |         | N    | 0°      |
|       |         | P    | 11°     |
|       |         | Z    | Special |

**7**

| Chamfer |      |      |       |      |            |      |          |
|---------|------|------|-------|------|------------|------|----------|
| Code    | Type | Code | Angle | Code | Width [mm] | Code | Position |
| F       |      | 0    | 5°    | 0    | 0,10       | K    |          |
| E       |      | 1    | 10°   | 1    | 0,15       | P    |          |
| T       |      | 2    | 15°   | 2    | 0,20       | W    |          |
| S       |      | 3    | 20°   | 3    | 0,25       | -    |          |
|         |      | 4    | 25°   | 4    | 0,30       |      |          |
|         |      | 5    | 30°   | 5    | 0,35       |      |          |
|         |      |      |       | 6    | 0,40       |      |          |
|         |      |      |       | 7    | 0,45       |      |          |

**8**

| Cutting direction |                |
|-------------------|----------------|
| Code              | Description    |
| R                 | Right          |
| L                 | Left           |
| N                 | Right and left |

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Chip breaker overview  
(on page B20)

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## Chip breaker overview

|                                   | Finishing | Medium machining | Roughing |     |     |  |
|-----------------------------------|-----------|------------------|----------|-----|-----|--|
| <b>A</b><br>Turning               | DF        | DM               | DR       |     |     |  |
|                                   | APF       | APM              | -        |     |     |  |
|                                   | PF        | PM               | PR       |     |     |  |
|                                   | GF        | GM               | GR       |     |     |  |
|                                   | GL        | GM               | GH       |     |     |  |
|                                   | -         | HGR              | -        |     |     |  |
|                                   | -         | -                | ZR       |     |     |  |
|                                   | -         | XR               | -        |     |     |  |
|                                   | -         | MM               | -        |     |     |  |
| <b>B</b><br>Milling               | MO-2      | MO-1             | MO-3     |     |     |  |
|                                   | <b>P</b>  | EF               | EM       | -   |     |  |
|                                   |           | APF              | APM      | -   |     |  |
|                                   |           | DF               | DM       | -   |     |  |
|                                   |           | PF               | PM       | PR  |     |  |
|                                   |           | GF               | GM       | GR  |     |  |
|                                   |           | GL               | GM       | GH  |     |  |
|                                   |           | -                | HGR      | -   |     |  |
|                                   |           | E                | E        | -   |     |  |
| -                                 |           | -                | ZR       |     |     |  |
| <b>C</b><br>Drilling              | -         | XR               | -        |     |     |  |
|                                   | -         | MM               | -        |     |     |  |
|                                   | <b>M</b>  | CF               | CM       | CR  |     |  |
|                                   |           | DF               | DM       | DR  |     |  |
|                                   |           | EDFR             | DER      | DER |     |  |
|                                   |           | PF               | PM       | PR  |     |  |
|                                   |           | GF               | GM       | GR  |     |  |
|                                   |           | GL               | GM       | GH  |     |  |
|                                   |           | -                | -        | ZR  |     |  |
| -                                 |           | XR               | -        |     |     |  |
| MO-2                              |           | MO-1             | MO-3     |     |     |  |
| <b>D</b><br>Technical Information | <b>K</b>  | EF               | EM       | -   |     |  |
|                                   |           | NM               | NM       | -   |     |  |
|                                   |           | <b>S</b>         | LH       | LH  | LH  |  |
|                                   |           |                  | ALH      | ALH | ALH |  |
|                                   |           |                  | <b>N</b> |     |     |  |
|                                   |           |                  |          |     |     |  |
|                                   |           |                  |          |     |     |  |
|                                   |           |                  |          |     |     |  |
|                                   |           |                  |          |     |     |  |
|                                   |           |                  |          |     |     |  |
|                                   |           |                  |          |     |     |  |
|                                   |           |                  |          |     |     |  |
|                                   |           |                  |          |     |     |  |

**Coated cemented carbide CVD**

| Grade         | ISO                    | Micro structure   | Grade description  |
|---------------|------------------------|---|--|
| <b>YBC302</b> | P20 - P35              |    | CVD coated P20-P35 carbide grade for medium operation to roughing of steel at higher cutting speed. Optimal performance of wear resistance and toughness for a wide application field.                                       |
| <b>YBC301</b> | P20 - P35              |    | CVD coated P20-P35 carbide grade for medium operation to roughing of steel at lower cutting speed.   |
| <b>YBC401</b> | P30 - P50<br>M30 - M40 |    | CVD coated P30-P50/M30-M40 carbide grade for roughing operation of steel at lower cutting speed and unstable condition.  |
| <b>YBM251</b> | P20 - P30<br>M15 - M35 |   | CVD coated P20-P30/M15-M35 carbide grade for medium to roughing operation in stainless steel and steel with wide application field. Good wear resistance and capability against plastic deformation at normal cutting speed. |
| <b>YBM253</b> | M15 - M35              |  | CVD coated M15-M35 carbide grade for medium to roughing operation in stainless steel with wide application field. High wear resistance and capability against plastic deformation at higher cutting speed.                   |
| <b>YBM351</b> | P25 - P40<br>M20 - M40 |  | CVD coated P25-P40/M25-M40 carbide grade for roughing operation in stainless steel and steel. Good wear resistance and edge stability at normal cutting speed.   |
| <b>YBD152</b> | K10 - K25              |  | CVD coated K10-K25 carbide substrate. Optimized for medium to roughing operation of cast iron. Good wear resistance and toughness at higher cutting speed.   |
| <b>YBD252</b> | K20 - K35              |  | CVD coated K20-K35 carbide substrate. Optimized for medium to roughing operation of cast iron and Steel. Good wear resistance and toughness at higher cutting speed.   |

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## Coated cemented carbide PVD

| Grade                      | ISO                    | Micro structure   | Grade description  |
|----------------------------|------------------------|---|--|
| A<br>Turning               | YBG101                 | N05–N20   |  <p>PVD coated N05–N20 carbide substrate for finishing to semi-finishing in aluminium materials. Coating only on the top face, in combination with the aluminium chip breakers, prevents built-up edges and gives a smooth cut.</p>   |
|                            |                        |   |  |
| B<br>Milling               | YBG202                 | P10 - P30<br>M10-M25  |  <p>PVD coated P10–P30/M10–M25 carbide substrate for finishing to medium application of stainless steel and steel (milling). Good wear resistance in a wide application field.</p>  |
|                            |                        |   |  |
| D<br>Technical Information | YBS203                 | S15 – S25   |  <p>Turning and milling grades for processing heat-resistant materials. A special carbon substrate and the latest PVD coating technology enable a very good wear behaviour, high fracture toughness and high thermal stability.</p> |
|                            |                        |   |  |
| YBG302                     | P15 - P30<br>M25 - M40 |  <p>PVD multilayer coated P10–P30/M10–M25 carbide substrate for finishing to medium machining of stainless steel, super alloys and steel (grooving/milling). Optimised coating stability for higher wear resistance and thermal stability in a wide range of applications.</p> |  |
|                            |                        |   | YBG302   |

**Coated cemented carbide PVD**

| Grade         | ISO       | Micro structure   | Grade description   |
|---------------|-----------|---|---|
| <b>YBS303</b> | S25 - S35 |  | Milling grade for machining titanium alloys. A tough carbide substrate and the latest PVD coating technology with increased impact resistance and high thermal stability. |

**Cermet**

| Grade          | ISO       | Micro structure  | Grade description  |
|----------------|-----------|--|--|
| <b>YNG151</b>  | P05 - P15 |   | Uncoated P05-P15 cermet grade for fine finishing operation of steel and stainless steel. Good resistance against plastic deformation for good surface finishing.                       |
| <b>YNG151C</b> | P05 - P15 |  | PVD coated P05-P15 cermet grade for fine finishing operation of steel and stainless steel. Good wear resistance and capability against plastic deformation for good surface roughness. |

**Uncoated cemented carbide**

| Grade        | ISO                    | Micro structure   | Grade description   |
|--------------|------------------------|---|---|
| <b>YD101</b> | N05 - N25<br>K05 - K20 |  | Uncoated K05-K20/N05-N20 carbide substrate for fine to medium application in aluminum and other material. |
| <b>YD201</b> | K10 - K30<br>N10 - N30 |  | Uncoated K10-K30/N10-N30 carbide substrate for medium application in aluminum and other material.         |

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## Application fields of grades – indexable milling

|          | ISO | HC <sup>1</sup> (CVD) | HC <sup>1</sup> (PVD) | HT     | HC <sup>2</sup> | HW    | PCBN/PCD |
|----------|-----|-----------------------|-----------------------|--------|-----------------|-------|----------|
| <b>P</b> | P01 |                       | YBG102                |        | YNG151C         |       |          |
|          | P10 |                       | YBG202                | YNG151 |                 |       |          |
|          | P20 | YBC301                | YBG205                |        | YNG151C         |       |          |
|          | P30 | YBC401                | YBG302                |        |                 | YC305 |          |
|          | P40 | YBM351                | YB9320                |        |                 |       |          |
| <b>M</b> | M01 |                       | YBG102                |        | YNG151C         |       |          |
|          | M10 | YBM251                | YBG202                | YNG151 |                 |       |          |
|          | M20 | YBM253                | YBG205                |        | YNG151C         |       |          |
|          | M30 | YBM351                | YBG302                |        |                 | YC305 |          |
|          | M40 | YBC401                | YB9320                |        |                 |       |          |
| <b>K</b> | K01 |                       | YBG102                |        |                 |       |          |
|          | K10 | YBD152                | YBG152                |        |                 |       |          |
|          | K20 | YBD252                | YBG202                |        |                 | YD201 |          |
|          | K30 |                       |                       |        |                 |       |          |
|          | K40 |                       |                       |        |                 |       |          |
| <b>N</b> | N01 |                       |                       |        |                 | YD051 |          |
|          | N10 |                       | YBG101                |        |                 | YD101 |          |
|          | N20 |                       | YBG202                |        |                 |       | YD201    |
|          | N30 |                       |                       |        |                 |       |          |
| <b>S</b> | S01 |                       | YBG102                |        |                 |       |          |
|          | S10 |                       | YBG202                |        |                 |       |          |
|          | S20 |                       | YBG205                |        |                 |       |          |
|          | S30 |                       | YBS203                |        |                 |       |          |
|          |     |                       | YBS303                |        |                 |       |          |
| <b>H</b> | H01 |                       | YBG102                |        |                 |       |          |
|          | H10 |                       |                       |        |                 |       |          |
|          | H20 |                       |                       |        |                 |       |          |
|          | H30 |                       |                       |        |                 |       |          |

|          |                 |
|----------|-----------------|
| <b>P</b> | Steel           |
| <b>M</b> | Stainless steel |
| <b>K</b> | Cast iron       |

|          |                       |
|----------|-----------------------|
| <b>N</b> | Non-ferrous metals    |
| <b>S</b> | Heat-resistant alloys |
| <b>H</b> | Hardened materials    |

|                 |                  |
|-----------------|------------------|
| HC <sup>1</sup> | Coated carbide   |
| HT              | Uncoated cermet  |
| HC <sup>2</sup> | Coated carbide   |
| HW              | Uncoated carbide |