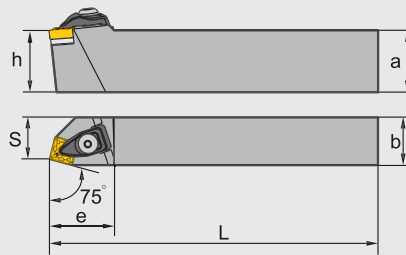
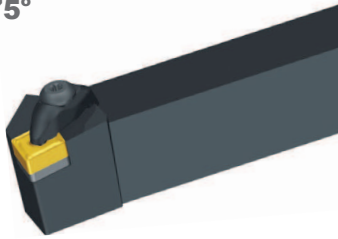


SN\*\* Toolholder · Halter

D-Clamping · D-Halter

**DSBNR/ L**

Kr:75°



| Type<br>Typ    |                | Stock<br>Lager |   | Dimension (mm)<br>Abmessung |    |     |    |    |    | Screw<br>Schraube | Shim<br>Unterlage | Wrench<br>Schlüssel | Clamp<br>Pratze | Shim pin<br>Rohrstift | Spring<br>Feder |
|----------------|----------------|----------------|---|-----------------------------|----|-----|----|----|----|-------------------|-------------------|---------------------|-----------------|-----------------------|-----------------|
|                |                | R              | L | a                           | b  | L   | h  | s  | e  |                   |                   |                     |                 |                       |                 |
| <b>DSBNR/L</b> | <b>1616H09</b> | ●              | ○ | 16                          | 16 | 100 | 16 | 13 | 26 | CM5x22C           | S09BM             | WH30L               | C1RA            | SM5 × 8.65XA1         | SPR6            |
|                | <b>2020K12</b> | ●              | ● | 20                          | 20 | 125 | 20 | 17 | 34 |                   |                   |                     |                 |                       |                 |
|                | <b>2525M12</b> | ●              | ● | 25                          | 25 | 150 | 25 | 22 | 34 | CM6x25C           | S12BM             | WH40L               | C2RA            | SM6 × 10XA1           | SPR4            |
|                | <b>3225P12</b> | ●              | ● | 32                          | 25 | 170 | 32 | 22 | 34 |                   |                   |                     |                 |                       |                 |
|                | <b>3232P15</b> | ●              | ● | 32                          | 32 | 170 | 32 | 27 | 41 | CM6x25C           | S15BM             | WH40L               | C3RA            | SM6 × 10XA2           | SPR4            |

Applicable insert  
Wendeschneidplatten

| Application<br>Anwendung           |                                                                                                      | Finishing<br>Schlichten                                                                              | Semi-Finishing<br>Mittlere Bearbeitung                                                                                                     | Roughing<br>Schruppen                                                                                  | Heavy Duty<br>Schwerzerspanung                                                                         | Cast iron machining<br>Grauguss-Bearbeit.                                                  | PCBN · PCD<br>PCBN · PKD |
|------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------|
| insert shape<br>Schneidplattenform | <b>DF</b><br> A73 | <b>PM</b><br> A74 | <b>DR</b><br>Double<br>side<br>doppel<br>seitig<br> A76 | <b>HDR</b><br> A78 |  A80              |  A131 |                          |
|                                    | <b>EF</b><br> A73 | <b>DM</b><br> A75 | <b>DR</b><br>Single<br>side<br>einseitig<br> A77        | <b>HPR</b><br> A78 | <b>TC</b><br> A75 |                                                                                            |                          |
|                                    | <b>SF</b><br> A74 | <b>EM</b><br> A75 | <b>ER</b><br>Double<br>side<br>doppel<br>seitig<br> A76 |                                                                                                        |                                                                                                        |                                                                                            |                          |
|                                    |                                                                                                      | <b>NM</b><br> A76 | <b>ER</b><br>Single<br>side<br>einseitig<br> A78        |                                                                                                        |                                                                                                        |                                                                                            |                          |
|                                    |                                                                                                      |                                                                                                      | <b>LR</b><br>Single<br>side<br>einseitig<br> A77        |                                                                                                        |                                                                                                        |                                                                                            |                          |
| Type · Typ                         | <b>DSBNR/L**H09</b>                                                                                  | SN**0903**                                                                                           | SN**0903**                                                                                                                                 |                                                                                                        |                                                                                                        | SN**0903**                                                                                 |                          |
|                                    | <b>DSBNR/L**K/M/P12</b>                                                                              | SN**1204**                                                                                           | SN**1204**                                                                                                                                 | SN**1204**                                                                                             | SN**1204**                                                                                             | SN**1204**                                                                                 | SN**1204**               |
|                                    | <b>DSBNR/L**P15</b>                                                                                  | SN**1506**                                                                                           | SN**1506**                                                                                                                                 | SN**1506**                                                                                             | SN**1506**                                                                                             | SN**1506**                                                                                 | SN**1506**               |

A

General Turning  
Allgemeine Drehbearbeitung

## ■ Recommended cutting data · Empfohlene Schnittdaten

| ISO | Workpiece Materials<br>Werkstückstoff |                                  | Hardness · Härte HB | CVD Coating<br>Beschichtung                     |         |         |         |         | PVD Coating<br>Beschicht. |         |  | Cermet<br>Cermet | Coated cermet<br>Coated cermet |  |  | Ceramic<br>Keramik |         |
|-----|---------------------------------------|----------------------------------|---------------------|-------------------------------------------------|---------|---------|---------|---------|---------------------------|---------|--|------------------|--------------------------------|--|--|--------------------|---------|
|     |                                       |                                  |                     | YBC151                                          | YBC251  | YBC152  | YBC252  | YBC351  | YBG102                    | YBG202  |  | YNG151           | YNG151C                        |  |  | CA1000             | CN2000  |
|     |                                       |                                  |                     | Feed rate<br>Vorschub (mm/rev)                  |         |         |         |         |                           |         |  |                  |                                |  |  |                    |         |
|     |                                       |                                  |                     | 0.1-0.6                                         | 0.1-0.8 | 0.1-0.6 | 0.1-0.8 | 0.2-1.0 | 0.2-0.4                   | 0.1-0.6 |  | 0.05-0.2         | 0.05-0.2                       |  |  | 0.1-1.5            | 0.1-1.5 |
|     |                                       |                                  |                     | Cutting speed<br>Schnittgeschwindigkeit (m/min) |         |         |         |         |                           |         |  |                  |                                |  |  |                    |         |
| P   | Carbon steel<br>Kohlenstoffstahl      | C=0.15%                          | 125                 | 430-200                                         | 430-190 | 500-270 | 480-240 | 380-165 | 460-220                   | 380-180 |  | 550-350          | 580-350                        |  |  | 800-300            |         |
|     |                                       | C=0.35%                          | 150                 | 380-180                                         | 410-180 | 460-250 | 460-230 | 300-150 | 440-210                   | 300-170 |  | 500-300          | 520-300                        |  |  | 600-200            |         |
|     |                                       | C=0.60%                          | 200                 | 330-150                                         | 350-150 | 400-220 | 400-200 | 260-130 | 380-180                   | 260-150 |  | 460-260          | 480-260                        |  |  | 400-150            |         |
|     | Alloy steel<br>legierter Stahl        | low alloy, annealed<br>geglüht   | 180                 | 350-170                                         | 350-150 | 400-180 | 400-200 | 200-100 | 380-180                   | 200-120 |  | 410-240          | 430-240                        |  |  | 150-180            | 400-150 |
|     |                                       | low alloy, tempered<br>vergütet  | 275                 | 230-100                                         | 210-100 | 280-150 | 260-140 | 140-70  | 240-120                   | 140-90  |  | 300-180          | 320-180                        |  |  | 350-120            | 300-100 |
|     |                                       | low alloy, tempered<br>vergütet  | 300                 | 210-100                                         | 190-70  | 260-150 | 240-120 | 125-60  | 220-100                   | 125-80  |  | 250-170          | 270-170                        |  |  | 300-100            | 250-80  |
|     |                                       | low alloy, tempered<br>vergütet  | 350                 | 180-80                                          | 170-70  | 230-120 | 220-120 | 110-55  | 200-100                   | 110-75  |  | 230-150          | 250-150                        |  |  | 300-80             |         |
|     | High alloy steel<br>Hochlegierter     | high alloy, annealed<br>geglüht  | 200                 | 320-150                                         | 260-120 | 360-190 | 310-170 | 175-80  | 290-150                   | 175-100 |  | 350-200          | 370-200                        |  |  | 400-150            | 350-120 |
|     |                                       | high alloy, tempered<br>vergütet | 325                 | 140-90                                          | 100-50  | 190-130 | 150-100 | 85-40   | 130-80                    | 85-60   |  | 170-110          | 190-110                        |  |  | 300-100            | 280-80  |
|     | Cast steel<br>Stahlguss               | Non-Alloy unlegiert              | 180                 | 240-120                                         | 200-100 | 280-160 | 250-140 | 135-75  | 230-125                   | 135-95  |  | 260-170          | 280-170                        |  |  | 600-220            |         |
|     |                                       | Low alloy niedrig legiert        | 200                 | 230-70                                          | 170-60  | 280-110 | 220-110 | 120-80  | 200-90                    | 120-100 |  | 260-170          | 280-170                        |  |  | 400-150            |         |
|     |                                       | High alloy hoch legiert          | 225                 | 160-70                                          | 140-50  | 210-110 | 190-100 | 95-55   | 170-80                    | 95-55   |  | 260-100          | 280-100                        |  |  | 350-120            |         |
| ISO | Workpiece Materials<br>Werkstückstoff |                                  | Hardness · Härte HB | CVD Coating<br>Beschichtung                     |         |         |         |         | PVD Coating<br>Beschicht. |         |  | Cermet<br>Cermet | Coated cermet<br>Coated cermet |  |  |                    |         |
|     |                                       |                                  |                     | YBM151                                          | YBM153  | YBM251  | YBM253  |         | YBG202                    | YBG205  |  | YNG151           | YNG151C                        |  |  |                    |         |
|     |                                       |                                  |                     | Feed rate<br>Vorschub (mm/rev)                  |         |         |         |         |                           |         |  |                  |                                |  |  |                    |         |
|     |                                       |                                  |                     | 0.2-0.6                                         | 0.2-0.6 | 0.2-0.6 | 0.2-0.6 |         | 0.1-0.3                   | 0.1-0.3 |  | 0.05-0.2         | 0.05-0.2                       |  |  |                    |         |
|     |                                       |                                  |                     | Cutting speed<br>Schnittgeschwindigkeit (m/min) |         |         |         |         |                           |         |  |                  |                                |  |  |                    |         |
| M   | Stainless steel<br>Rostfreier Stahl   | Ferrous<br>Ferrous               | 200                 | 250-180                                         | 280-180 | 230-140 | 250-140 |         | 240-170                   | 250-170 |  | 330-220          | 350-210                        |  |  |                    |         |
|     |                                       | Austenite<br>Austenite           | 260                 | 220-150                                         | 250-150 | 180-110 | 200-110 |         | 180-110                   | 200-100 |  | 250-150          | 270-140                        |  |  |                    |         |
|     |                                       | Martensite<br>Martensite         | 330                 | 110-60                                          | 130-60  | 90-50   | 110-50  |         | 120-80                    | 130-80  |  | 270-170          | 290-160                        |  |  |                    |         |

# Turning · Drehen

Application information · Anwendungsinformation

## ■ Recommended table of cutting parameters for general turning Empfohlene Schnittparameter für allgemeine Drehbearbeitung

| ISO | Workpiece Materials<br>Werkstückstoff  |                                                         | Hardness · Härte HB | CVD Coating Beschichtung                     |         |                             |         |  | Cermet Cermet | Coated cermet Coated cermet | Ceramic Keramik |         |         |  |  |
|-----|----------------------------------------|---------------------------------------------------------|---------------------|----------------------------------------------|---------|-----------------------------|---------|--|---------------|-----------------------------|-----------------|---------|---------|--|--|
|     |                                        |                                                         |                     | YBD052                                       | YBD102  | YBD152                      | YBD152C |  | YNG151        | YNG151C                     | CA1000          | CN1000  | CN2000  |  |  |
|     |                                        |                                                         |                     | Feed rate Vorschub (mm/rev)                  |         |                             |         |  |               |                             |                 |         |         |  |  |
|     |                                        |                                                         |                     | 0.1-0.4                                      | 0.1-0.4 | 0.1-0.5                     | 0.1-0.5 |  | 0.1-0.4       | 0.1-0.4                     | 0.1-1.5         | 0.1-1.5 | 0.1-1.5 |  |  |
|     |                                        |                                                         |                     | Cutting speed Schnittgeschwindigkeit (m/min) |         |                             |         |  |               |                             |                 |         |         |  |  |
| K   | Malleable cast iron<br>Temperguss      | Ferrous Ferrous                                         | 130                 | 350-230                                      | 330-220 | 320-105                     | 320-105 |  | 280-160       | 300-180                     | 1200-200        | 800-600 | 800-600 |  |  |
|     |                                        | Pearlite Pearlite                                       | 230                 | 250-105                                      | 230-100 | 230-100                     | 230-100 |  | 220-120       | 240-150                     | 1000-200        | 700-500 | 700-500 |  |  |
|     | Low cast iron Grauguss                 |                                                         | 180                 | 520-200                                      | 480-200 | 480-190                     | 480-190 |  | 400-250       | 420-270                     | 1200-200        | 800-600 | 700-500 |  |  |
|     | High cast iron Grauguss                |                                                         | 260                 | 230-120                                      | 220-115 | 210-100                     | 210-100 |  | 360-240       | 380-260                     | 1000-200        | 750-500 | 800-600 |  |  |
|     | Nodular cast iron<br>Nodular cast iron | Ferrous Ferrous                                         | 160                 | 310-150                                      | 300-150 | 290-140                     | 290-140 |  | 330-190       | 350-210                     | 800-200         | 600-450 | 600-450 |  |  |
|     |                                        | Pearlite Pearlite                                       | 250                 | 230-110                                      | 220-105 | 210-100                     | 210-100 |  | 310-200       | 330-220                     | 700-200         | 500-350 | 500-350 |  |  |
| ISO | Workpiece Materials<br>Werkstückstoff  |                                                         | Hardness Härte HB   | PVD Coating Beschichtung                     |         | Cemented carbide Hartmetall |         |  |               |                             |                 |         |         |  |  |
|     |                                        |                                                         |                     | YBG102                                       | YBG105  | YD101                       |         |  |               |                             |                 |         |         |  |  |
|     |                                        |                                                         |                     | Feed rate Vorschub (mm/rev)                  |         |                             |         |  |               |                             |                 |         |         |  |  |
|     |                                        |                                                         |                     | 0.05-0.15                                    |         | 0.05-0.35                   |         |  |               |                             |                 |         |         |  |  |
|     |                                        |                                                         |                     | Cutting speed Schnittgeschwindigkeit (m/min) |         |                             |         |  |               |                             |                 |         |         |  |  |
| N   | Al alloy<br>Al Legierung               | No heat treatment keine Wärmebeh.                       | 60                  |                                              |         | 1750-800                    |         |  |               |                             |                 |         |         |  |  |
|     |                                        | Heat treatment Wärmebeh.                                | 100                 |                                              |         | 510-250                     |         |  |               |                             |                 |         |         |  |  |
|     | Cast aluminum alloy<br>Alu. leg.       | No heat treatment keine Wärmebeh.                       | 75                  |                                              |         | 460-175                     |         |  |               |                             |                 |         |         |  |  |
|     |                                        | Heat treatment Wärmebeh.                                | 90                  |                                              |         | 300-110                     |         |  |               |                             |                 |         |         |  |  |
|     | Copper alloy<br>Kupfer leg.            | Cu-alloy short chip Cu-Leg. kurzspanend                 | 110                 |                                              |         | 610-205                     |         |  |               |                             |                 |         |         |  |  |
|     |                                        | Messing, Bronze Rotguss                                 | 90                  |                                              |         | 310-195                     |         |  |               |                             |                 |         |         |  |  |
| S   | Ni-base alloy<br>Ni-base alloy         | unalloy electrolytic Copper unlegiert Elektrolyt Kupfer | 100                 |                                              |         | 225-115                     |         |  |               |                             |                 |         |         |  |  |
|     |                                        | Ni-base alloy Ni-base alloy                             | 40                  | 90-30                                        | 100-30  | 70-20                       |         |  |               |                             |                 |         |         |  |  |
| H   | Other materials<br>Andere Materialien  | Hard steel Harte Stahl                                  | 45 HRC              |                                              |         |                             |         |  |               |                             |                 |         |         |  |  |
|     |                                        | Super hard steel Super harte Stahl                      | 50~60 HRC           |                                              |         |                             |         |  |               |                             |                 |         |         |  |  |
|     |                                        | Chilled cast iron gekühlt Gusseisen                     | 500                 |                                              |         |                             |         |  |               |                             |                 |         |         |  |  |

### ■ Correctional cutting parameters table of internal turning Schnittparameter Übersicht zur Innendrehbearbeitung

#### Internal turning tools by P type clamping · Drehwerkzeuge (Innen) P Typ Klemmung

|          | Workpiece material<br>Werkstück Material                                 | Hardness HB<br>Härte | Machining<br>category<br>Anwendung | L/D≤3                             |                                       | L/D=3-4<br>(Diameter of shank ≥ Φ16mm)<br>(Schaftdurchmesser ≥ Φ16mm) |                                       |
|----------|--------------------------------------------------------------------------|----------------------|------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------------|---------------------------------------|
|          |                                                                          |                      |                                    | Feed rate<br>Vorschub<br>(mm/rev) | Cutting depth<br>Schnitttiefe<br>(mm) | Feed rate<br>Vorschub<br>(mm/rev)                                     | Cutting depth<br>Schnitttiefe<br>(mm) |
| <b>P</b> | Carbon steel, Alloy steel<br>Kohlenstoff Stahl, Stahlleg.<br>45#, 42CrMo | HB180—280            | Semi-finishing<br>Mittlere Bear.   | 0.1- <b>0.25</b> -0.4             | <5.0                                  | 0.1- <b>0.2</b> -0.3                                                  | <4.0                                  |
| <b>M</b> | Stainless steel<br>Rostfreier Stahl<br>1Cr18Ni9Ti 0Cr18Ni9               | ≤HB220               | Semi-finishing<br>Mittlere Bear.   | 0.1- <b>0.2</b> -0.3              | <4.0                                  | 0.1- <b>0.15</b> -0.25                                                | <3.0                                  |
| <b>K</b> | Cast iron HT250<br>Gusseisen                                             | HB170—230            | Semi-finishing<br>Mittlere Bear.   | 0.1- <b>0.25</b> -0.4             | <5.0                                  | 0.1- <b>0.2</b> -0.3                                                  | <4.0                                  |

#### Internal turning tools by S type clamping · Drehwerkzeuge (Innen) S Typ Klemmung

|          | Workpiece material<br>Werkstück Material                                | Hardness HB<br>Härte | Machining<br>category<br>Anwendung   | L/D≤3                             |                                       | L/D=4                             |                                       | L/D=5                             |                                       | L/D=6                             |                                       |
|----------|-------------------------------------------------------------------------|----------------------|--------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------|---------------------------------------|
|          |                                                                         |                      |                                      | Feed rate<br>Vorschub<br>(mm/rev) | Cutting depth<br>Schnitttiefe<br>(mm) | Feed rate<br>Vorschub<br>(mm/rev) | Cutting depth<br>Schnitttiefe<br>(mm) | Feed rate<br>Vorschub<br>(mm/rev) | Cutting depth<br>Schnitttiefe<br>(mm) | Feed rate<br>Vorschub<br>(mm/rev) | Cutting depth<br>Schnitttiefe<br>(mm) |
| <b>P</b> | Carbon steel, Alloy steel<br>Kohlenst. Stahl, leg. Stahl<br>45#, 42CrMo | HB180-280            | For finishing<br>Schlichten          | 0.05- <b>0.1</b> -0.15            | <0.2                                  | 0.05- <b>0.1</b> -0.15            | <0.2                                  | -                                 | -                                     | -                                 | -                                     |
|          |                                                                         |                      | For semi-finishing<br>Mittlere Bear. | 0.15- <b>0.25</b> -0.35           | <3.0                                  | 0.1- <b>0.15</b> -0.2             | <1.5                                  | -                                 | -                                     | -                                 | -                                     |
| <b>M</b> | Stainless steel<br>Rostfreier Stahl<br>1Cr18Ni9Ti 0Cr18Ni9              | ≤HB220               | For finishing<br>Schlichten          | 0.05- <b>0.1</b> -0.15            | <0.2                                  | 0.05- <b>0.1</b> -0.15            | <0.2                                  | -                                 | -                                     | -                                 | -                                     |
|          |                                                                         |                      | For semi-finishing<br>Mittlere Bear. | 0.15- <b>0.2</b> -0.25            | <2.0                                  | 0.1- <b>0.15</b> -0.2             | <1.0                                  | -                                 | -                                     | -                                 | -                                     |
| <b>N</b> | Al Alloy<br>Al Leg.                                                     | ---                  | For finishing<br>Schlichten          | 0.05- <b>0.1</b> -0.15            | <0.2                                  | 0.05- <b>0.1</b> -0.15            | <0.2                                  | 0.05- <b>0.1</b> -0.15            | -0.15                                 | 0.05- <b>0.1</b> -0.15            | <0.1                                  |
|          |                                                                         |                      | For semi-finishing<br>Mittlere Bear. | 0.05- <b>0.1</b> -0.15            | <2.0                                  | 0.05- <b>0.1</b> -0.15            | <1.5                                  | 0.05- <b>0.1</b> -0.15            | -1.0                                  | 0.05- <b>0.1</b> -0.15            | <1.0                                  |

#### Antivibration internal turning tools · Antivibrations Drehwerkzeuge (Innen)

|          | Workpiece material<br>Werkstück Material   | Machining conditions<br>Anwendung | Chipbreaker<br>Spanbrecher | Grade<br>Sorte        | Feed rate<br>Vorschub<br>(mm/rev) | Cutting depth<br>Schnitttiefe<br>(mm) |
|----------|--------------------------------------------|-----------------------------------|----------------------------|-----------------------|-----------------------------------|---------------------------------------|
| <b>P</b> | Steel HB180—280<br>Stahl                   | Finishing<br>Schlichten           | SF                         | YNG151<br><br>YNG151C | 0.05- <b>0.2</b> -0.35            | 0.05- <b>0.1-0.3</b> -0.5             |
| <b>M</b> | Stainless steel ≤HB220<br>Rostfreier Stahl |                                   |                            |                       | 0.05- <b>0.2</b> -0.35            | 0.05- <b>0.1-0.3</b> -0.5             |
| <b>K</b> | Cast iron HB170—230<br>Gusseisen           |                                   |                            |                       | 0.05- <b>0.2</b> -0.35            | 0.05- <b>0.1-0.3</b> -0.5             |

The characters in blue color are recommended cutting parameters.  
Die blaue Ziffern sind empfohlene Schnittdaten.

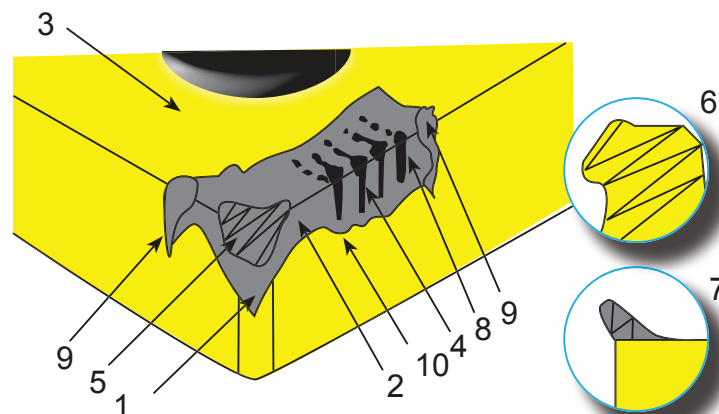
# Turning · Drehen

Application information · Anwendungsinformation

A

General Turning  
Allgemeine Drehbearbeitung

| No. | Tool wear type      | Situation                                                                       | Reason                                                                                                                                                                | Countermeasures                                                                                                                           |
|-----|---------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 1+2 | Flank wear          | Poor surface quality and inconsistent measurement. Increase in cutting force.   | Grade is too soft<br>Cutting speed is too high.<br>Flank angle is too small.<br>Feed rate is too low                                                                  | Select grade with higher wear resistance<br>Reduce cutting speed<br>Increase flank angle.<br>Increase feed rate                           |
| 3   | Crater wear         | Bad surface and chip control                                                    | Grade is too soft.<br>Cutting speed is too high.<br>Feed rate is too high.                                                                                            | Select grade with higher wear resistance<br>Reduce cutting speed<br>Reduce feed rate                                                      |
| 4   | Chipping            | Tool life not stable<br>Sudden breakage of cutting edge                         | Grade is too hard.<br>Feed rate is too high.<br>Cutting edge strength not strong enough<br>The rigidity of holder is insufficient (vibration)                         | Select grade with higher toughness<br>Reduce feed rate<br>Change honing of cutting edge<br>Use holder with bigger shank size              |
| 5   | Fracturing          | Cutting force increasing<br>Surface roughness and measure becomes bad           | Grade is too hard.<br>Feed rate is too high.<br>Cutting edge strength not strong enough<br>The rigidity of holder is insufficient                                     | Select grade with higher toughness<br>Reduce feed rate<br>Change honing of cutting edge<br>Use holder with bigger shank size              |
| 6   | Plastic deformation | Inconsistent measure meet.<br>Damage to the cutting edge                        | Grade is too soft.<br>Cutting speed is too high.<br>Depth of cut and feed rate too high<br>Cutting temperature is high                                                | Grade with high wear resistance.<br>Reduce cutting speed<br>Decrease depth of cut and feed rate.<br>Grade with high thermal conductivity. |
| 7   | Welding             | Poor surface quality and inconsistent measurement. Increase in cutting force.   | Cutting speed is low.<br>Cutting edge not sharp enough<br>Grade not suitable                                                                                          | Increase cutting speed<br>Increase rake angle.<br>Select grade with lower affinity                                                        |
| 8   | Thermal Cracks      | Break due to thermal variation effect often caused when cutting is interrupted. | Expansion or shrinkage due to cutting heat<br>Grade is too hard.                                                                                                      | Use dry cutting<br>Select grade with higher toughness                                                                                     |
| 9   | Notch wear          | Burr increase of Cutting force information                                      | Unstable cutting condition (uncut surface, chilled parts, machining hardened layer)<br>Friction caused by jagged shape chips.<br>Feed rate and cutting speed too high | Grade with high wear resistance.<br>Increase rake angle to improve sharpness<br>Decrease cutting speed                                    |
| 10  | Flaking             | Mostly happens during machining of high hard materials or vibration             | Cutting edge welding and adhesion.<br>Bad chip removing                                                                                                               | Increase rake angle to improve sharpness<br>Use chip breaker with wider chip pocket                                                       |



| Bild | Art des Verschleißes      | Auswirkungen                                                                     | Grund                                                                                                                                               | Gegenmaßnahmen                                                                                                                                              |
|------|---------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1+2  | Freiflächenverschleiß     | Schlechte Oberflächengüte und Maßhaltigkeit<br>Anstieg der Schnittkraft          | Sorte nicht verschleißfest genug<br>Schnittgeschwindigkeit zu hoch<br>Freiwinkel zu klein<br>Vorschub zu gering                                     | Sorte mit höherer Verschleißfestigkeit<br>Schnittgeschwindigkeit reduzieren<br>Freiwinkel vergrößern<br>Vorschub reduzieren                                 |
| 3    | Kolkverschleiß            | Schlechte Oberflächengüte und Spankontrolle                                      | Sorte nicht verschleißfest genug<br>Schnittgeschwindigkeit zu hoch<br>Vorschub zu hoch                                                              | Sorte mit höherer Verschleißfestigkeit<br>Schnittgeschwindigkeit reduzieren<br>Vorschub reduzieren                                                          |
| 4    | Ausbröckelung             | Standzeit nicht stabil<br>Plötzlicher Bruch der Schneidkante                     | Sorte ist zu hart<br>Vorschub zu hoch<br>Schneidkantenstabilität nicht ausreichend<br>Stabilität des Werkzeughalter oder Spannung nicht ausreichend | Sorte mit höherer Zähigkeit<br>Vorschub reduzieren<br>Schneidkantenverrundung ändern<br>Stabileren Halter verwenden                                         |
| 5    | Bruch                     | Anstieg der Schnittkraft<br>Schlechte Oberflächengüte und Maßhaltigkeit          | Sorte ist zu hart<br>Vorschub zu hoch<br>Schneidkantenstabilität nicht ausreichend<br>Stabilität des Werkzeughalter oder Spannung nicht ausreichend | Sorte mit höherer Zähigkeit<br>Vorschub reduzieren<br>Schneidkantenverrundung ändern<br>Stabileren Halter verwenden                                         |
| 6    | Plastische Deformation    | Schlechte Maßhaltigkeit<br>Beschädigung der Schneidkante                         | Sorte nicht verschleißfest genug.<br>Schnittgeschwindigkeit zu hoch<br>Schnitttiefe und/oder Vorschub zu hoch<br>Temperatur an der Schneide zu hoch | Sorte mit höherer Verschleißfestigkeit<br>Schnittgeschwindigkeit reduzieren<br>Schnitttiefe und Vorschub reduzieren<br>Sorte mit höherer Wärmebeständigkeit |
| 7    | Aufbauschneide            | Anstieg der Schnittkraft<br>Schlechte Oberflächengüte                            | Schnittgeschwindigkeit zu niedrig<br>Schneidkante nicht scharf genug<br>Sorte nicht geeignet                                                        | Schnittgeschwindigkeit erhöhen<br>Spanwinkel erhöhen<br>Sorte mit geringer Affinität                                                                        |
| 8    | Thermischer Verschleiß    | Bruch durch thermische Wechselwirkung<br>Off bei unterbrochenem Schnitt (Fräsen) | Durch die Bearbeitungs-<br>Temperaturschwankungen<br>Sorte ist zu hart                                                                              | Trockenbearbeitung<br>Sorte mit höherer Zähigkeit                                                                                                           |
| 9    | Kerbverschleiß            | Gratbildung<br>Anstieg der Schnittkraft                                          | Beschädigung durch Späne<br>(ausgefranzte Spankante)<br>Vorschub und Schnittgeschwindigkeit zu hoch                                                 | Sorte mit höherer Verschleißfestigkeit<br>Spanwinkel vergrößern um eine schärfere Schneide zu bekommen<br>Schnittgeschwindigkeit verringern                 |
| 10   | Abplatzung (Beschichtung) | Offt bei der Bearbeitung härterer Werkstoffe oder wenn Vibrationen auftauchen    | Verklebungen an der Schneidkante sowie Ausbrüche.<br>Schlechte Spanabfuhr                                                                           | Spanwinkel vergrößern um eine schärfere Schneide zu bekommen<br>Spanbrecher mit größerer Spankammer                                                         |