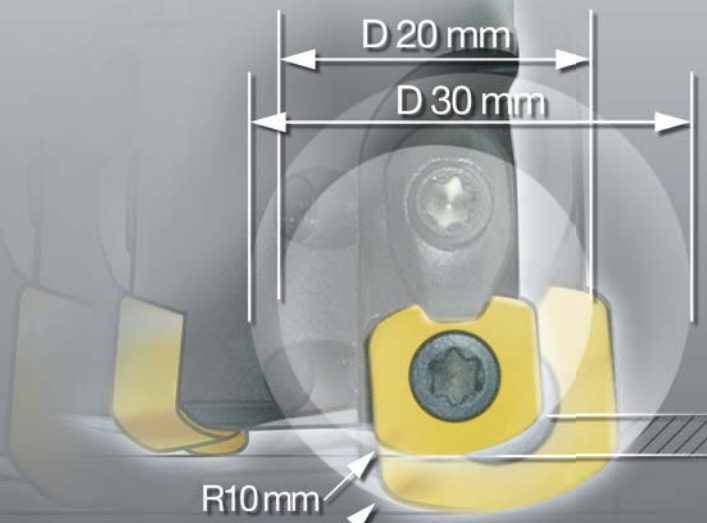
MOLDINO
The Edge To Innovation

# ASR Turbo Metric Series

## Maximum Volume & High Feed Cutting (HFC)

**D 20 mm ~ D 100 mm**

- Modular, Shank & Bore Types
- Insert Radius: 10+15 mm
- CAM Radius: 3 mm





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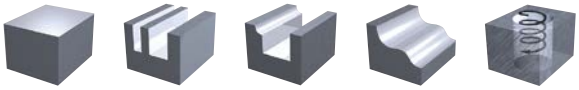
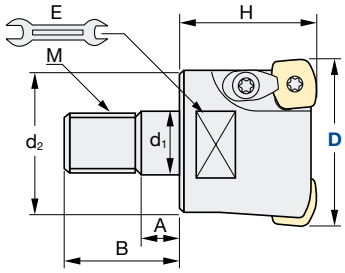
| No. 317.3 | ASR | 2020-03 |
|---|---|---|

# ASRM | Turbo Modular

| Q max | ∇ | HRC | No. of Teeth | No. of Teeth | No. of Teeth |
|---|---|---|---|---|---|
| High Efficient | Roughing | 50 | 2 | 3 | 4 |






| Diameter Holder only [mm] |
|---|
| 0/-0.2 mm |

| ID Code | Item Code | Z | D | H | $d_1$ | $d_2$ | A | B | C | E | M | Inserts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FH494 | **ASRM0020-2** | 2 | 20 | 30 | 10.5 | 18 | 6 | 19 | 10 | 15 | M10 | EPNW-0803TN-10 |
| FH495 | **ASRM0025-2** | | 25 | 35 | 12.5 | 21 | 7 | 22 | | 17 | M12 | EDNW-10T3TN-10 |
| FH496 | **ASRM0032-3** | 3 | 32 | 40 | 17 | 29 | | 23 | 12 | 22 | M16 | |
| FH497 | **ASRM0040-4** | 4 | 40 | | | | | | | | | |

Inserts p. 7

| Parts | Clamp Screw | | | Clamp Piece Set | | Wrench | |
|---|---|---|---|---|---|---|---|
| |  | | |  | |  | |
| **Body** | **ID-Code** | **Item-Code** | **Fastening Torque [Nm]** | **ID-Code** | **Item-Code** | **ID-Code** | **Item-Code** |
| **ASRM-0020-2** | ET32 | **242-141** | **2.9 Nm** | – | **–** | ET12 | **104-T15** |
| **ASRM-0025-2** | ET38 | **412-141** | **2.9 Nm** | ET163 | **CM3,5-141** | | |
| **ASRM-0032-3** | | | | | | | |
| **ASRM-0040-4** | | | | | | | |

| Cutting Conditions \| Schnittwerte \| Condizioni di taglio \| Condiciones de Corte \| Conditions de coupe \| Valores de corte: | | | | | |
|---|---|---|---|---|---|
| D 20 mm (Z2) – D 25 mm (Z2): | p. 8 | D 32 (Z3) EDNW10T3: | p. 9 | D 40 (Z4) EDNW10T3: | p. 10 |



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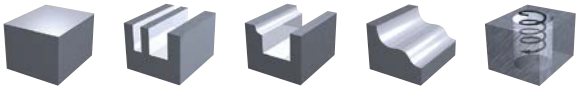
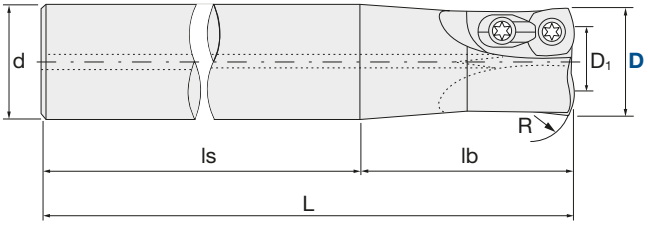
# ASR-S | Turbo - Maximum Volume End Mill - Shank Type - Regular

| Q max | Jet | ∇ | HRC | No. of Teeth | No. of Teeth | No. of Teeth |
|---|---|---|---|---|---|---|
| High Efficient | Air Hole | Roughing | 50 | 2 | 3 | 4 |






| Diameter Holder only [mm] |
|---|
| 0/-0.2 mm |

| ID Code | Item Code | Z | D | $D_1$ | L | d | R | lb | ls | Inserts |
|---|---|---|---|---|---|---|---|---|---|---|
| FH414 | **ASRS-0020** | 2 | **20** | 8.8 | 130 | 20 | 10 | 50 | 80 | EPNW0803TN-10 |
| FH415 | **ASRS-0025** | | **25** | 13.8 | 140 | 25 | | 60 | | EDNW10T3TN-10 |
| FH416 | **ASRS-4032** | | **32** | 16.6 | 150 | 32 | 15 | 70 | | EDNW13T4TN-( ) |

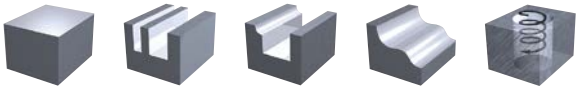
Inserts p. 7

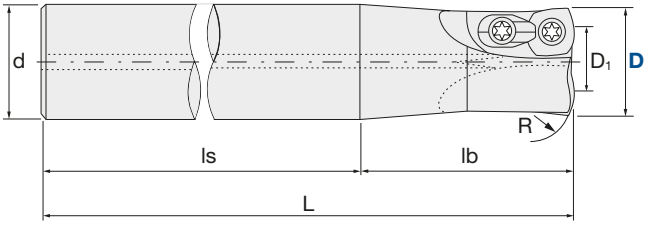
| Parts | Clamp Screw | | | Clamp Piece Set | | Wrench | |
|---|---|---|---|---|---|---|---|
| |  | | |  | |  | |
| **Body** | **ID-Code** | **Item-Code** | **Fastening Torque [Nm]** | **ID-Code** | **Item-Code** | **ID-Code** | **Item-Code** |
| **ASRS-0020** | ET32 | **242-141** | **2.9 Nm** | – | **–** | ET12 | **104-T15** |
| **ASRS-0025** | ET38 | **412-141** | **2.9 Nm** | ET163 | **CM3,5-141** | | |
| **ASRS-4032** | ET162 | **555-141** | **4.9 Nm** | ET164 | **CM5-147** | ET14 | **105-T20** |

| Cutting Conditions \| Schnittwerte \| Condizioni di taglio \| Condiciones de Corte \| Conditions de coupe \| Valores de corte: | | | |
|---|---|---|---|
| D 20 mm (Z2) – D 25 mm (Z2): | p. 8 | D 32 mm (Z2) EDNW13T4 | p. 9 |

# ASR-L | Turbo - Maximum Volume End Mill - Shank Type - Long

| Q max | Jet | ∇ | HRC | No. of Teeth |
|---|---|---|---|---|
| High Efficient | Air Hole | Roughing | 50 | 2 |






| Diameter Holder only [mm] |
|---|
| 0/-0.2 mm |

| ID Code | Item Code | Z | D | $D_1$ | L | d | R | lb | ls | Inserts |
|---|---|---|---|---|---|---|---|---|---|---|
| FH419 | **ASRL-0020** | 2 | **20** | 8.8 | 180 | 20 | 10 | 100 | 80 | EPNW0803TN-10 |
| FH420 | **ASRL-0025** | | **25** | 13.8 | 200 | 25 | | 120 | | EDNW10T3TN-10 |
| FH421 | **ASRL-4032** | | **32** | 16.6 | | 32 | 15 | | | EDNW13T4TN-( ) |

Inserts p. 7

| Parts | Clamp Screw | | | Clamp Piece Set | | Wrench | |
|---|---|---|---|---|---|---|---|
| |  | | |  | |  | |
| **Body** | **ID-Code** | **Item-Code** | **Fastening Torque [Nm]** | **ID-Code** | **Item-Code** | **ID-Code** | **Item-Code** |
| **ASRL-0020** | ET32 | **242-141** | **2.9 Nm** | – | **–** | ET12 | **104-T15** |
| **ASRL-0025** | ET38 | **412-141** | **2.9 Nm** | ET163 | **CM3,5-141** | | |
| **ASRL-4032** | ET162 | **555-141** | **4.9 Nm** | ET164 | **CM5-147** | ET14 | **105-T20** |



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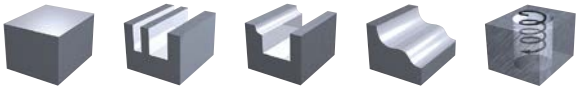
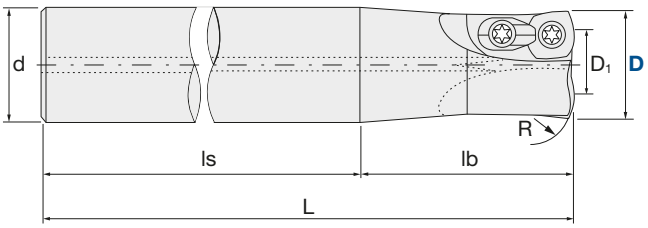
# ASR-E | Turbo - Maximum Volume End Mill - Shank Type - Extra Long

| Q max | Jet | ∇ | HRC | No. of Teeth |
|---|---|---|---|---|
| High Efficient | Air Hole | Roughing | 50 | 2 |






| Diameter Holder only [mm] |
|---|
| 0/-0.2 mm |

| ID Code | Item Code | Z | D | $D_1$ | L | d | R | lb | ls | Inserts |
|---|---|---|---|---|---|---|---|---|---|---|
| FH422 | **ASRE-0020** | 2 | **20** | 8.8 | 250 | 20 | 10 | 130 | 120 | EPNW0803TN-10 |
| FH423 | **ASRE-0025** | | **25** | 13.8 | 300 | 25 | | 180 | | EDNW10T3TN-10 |
| FH424 | **ASRE-4032** | | **32** | 16.6 | | 32 | 15 | | | EDNW13T4TN-( ) |

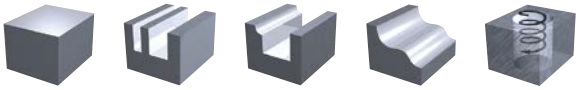
Inserts p. 7

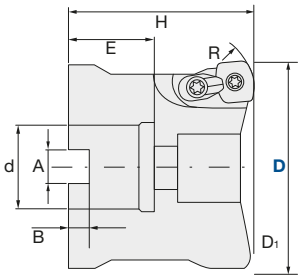
| Parts | Clamp Screw | | | Clamp Piece Set | | Wrench | |
|---|---|---|---|---|---|---|---|
| |  | | |  | |  | |
| **Body** | **ID-Code** | **Item-Code** | **Fastening Torque [Nm]** | **ID-Code** | **Item-Code** | **ID-Code** | **Item-Code** |
| **ASRE-0020** | ET32 | **242-141** | **2.9 Nm** | – | **–** | ET12 | **104-T15** |
| **ASRE-0025** | ET38 | **412-141** | **2.9 Nm** | ET163 | **CM3,5-141** | | |
| **ASRE-4032** | ET162 | **555-141** | **4.9 Nm** | ET164 | **CM5-147** | ET14 | **105-T20** |

| Cutting Conditions \| Schnittwerte \| Condizioni di taglio \| Condiciones de Corte \| Conditions de coupe \| Valores de corte: | | | |
|---|---|---|---|
| D 20 mm (Z2) – D 25 mm (Z2): | p. 8 | D 32 mm (Z2) EDNW13T4 | p. 9 |

# ASR-0000-0 | Turbo - Maximum Volume End Mill - Bore Type

| Q max | ∇ | HRC | No. of Teeth | No. of Teeth | No. of Teeth |
|---|---|---|---|---|---|
| High Efficient | Roughing | 50 | 4 | 5 | 6 |






| Diameter Holder only [mm] |
|---|
| 0/-0.2 mm |

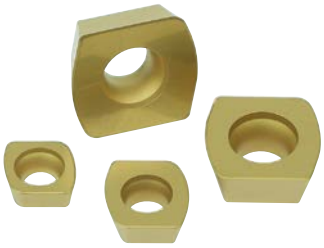
| ID Code | Item Code | Z | D | $D_1$ | H | E | R | A | B | d | Item Code |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FH433 | **ASR-4050M-4** | 4 | 50 | 34.6 | 50 | 20 | 15 | 10.4 | 6.3 | 22 | EDNW13T4TN-( ) |
| FH437 | **ASR-0050M-5** | 5 | | 38.8 | | | 10 | | | | EDNW10T3TN-10 |
| FH434 | **ASR-5063M-4** | 4 | 63 | 47.6 | | | 15 | | | | EDNW15T4TN-( ) |
| FH438 | **ASR-0063M-6** | 6 | | 51.8 | | | 10 | | | | EDNW10T3TN-10 |
| FH435 | **ASR-5080M-5** | 5 | 80 | 64.6 | 70 | 22 | 15 | 12.4 | 7 | 27 | EDNW15T4TN-( ) |
| FH436 | **ASR-5100M-6** | 6 | 100 | 84.6 | | 25 | | 14.4 | 8 | 32 | EDNW15T4TN-( ) |

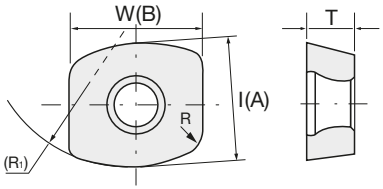
Inserts p. 7

| Parts | Clamp Screw | | | Clamp Piece Set | | Wrench | |
|---|---|---|---|---|---|---|---|
| |  | | |  | |  | |
| **Body** | **ID-Code** | **Item-Code** | **Fastening Torque [Nm]** | **ID-Code** | **Item-Code** | **ID-Code** | **Item-Code** |
| **ASR-4050M-4** | ET162 | **555-141** | **4.9 Nm** | ET164 | **CM5-147** | ET14 | **105-T20** |
| **ASR-0050M-5** | ET038 | **412-141** | **2.9 Nm** | ET163 | **CM3,5-141** | ET12 | **104-T15** |
| **ASR-5063M-4** | ET162 | **555-141** | **4.9 Nm** | ET164 | **CM5-147** | ET14 | **105-T20** |
| **ASR-0063M-6** | ET038 | **412-141** | **2.9 Nm** | ET163 | **CM3,5-141** | ET12 | **104-T15** |
| **ASR-5080M-5** | ET162 | **555-141** | **4.9 Nm** | ET164 | **CM5-147** | ET14 | **105-T20** |
| **ASR-5100M-6** | ET162 | **555-141** | **4.9 Nm** | ET164 | **CM5-147** | ET14 | **105-T20** |

| Cutting Conditions \| Schnittwerte \| Condizioni di taglio \| Condiciones de Corte \| Conditions de coupe \| Valores de corte: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bore Type | Multiflute Bore Type | | Bore Type | Multiflute Bore Type | | Bore Type | |
| D 50 (Z4) EDNW13T4 | D 50 (Z5) EDNW10T3 | p. 11 | D 63 (Z4) EDNW15T4 | D 63 (Z6) EDNW10T3 | p. 12 | D 80 (Z5) – D 100 (Z6) | p. 13 |

# INSERTS | Turbo - Maximum Volume End Mill






| ID Code | Item Code | Tolerance Class | Grade | R | $R_1$ | I(A) | T | W(B) |
|---|---|---|---|---|---|---|---|---|
| WF569 | **EPNW-0803TN-10** | **N** | **CY250** | 3 | 10 | 8.1 | 3.18 | 7.94 |
| WF572 | **EDNW-10T3TN-10** | | **CY250** | | | 10 | 3.97 | 10 |
| WF627 | **EDNW-13T4TN-10** | | **TB6045** | | | 13.5 | 5.56 | 12.7 |
| WF576 | **EDNW-13T4TN-15** | | **CY250** | | 15 | | | |
| WF629 | **EDNW-15T4TN-10** | | **TB6045** | | 10 | 15 | | 14 |
| WF578 | **EDNW-15T4TN-15** | | **CY250** | | 15 | | | |

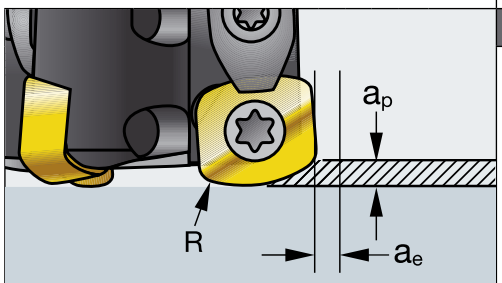
**Programming Radius**

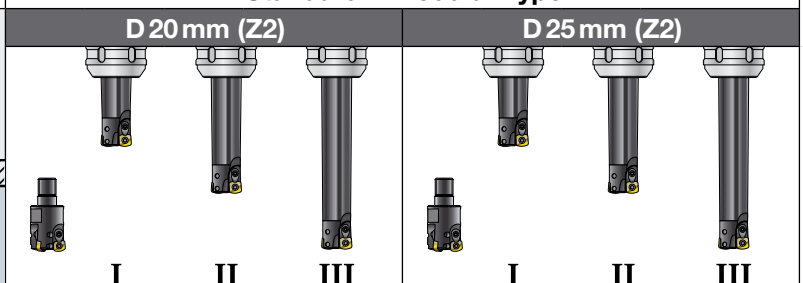
| NEW SHAPE AND NEW COATED INSERTS FOR INTERRUPT CUTTING | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **ID Code** | **Item Code** | **Tolerance Class** | **Grade** | **R** | **$R_1$** | **I(A)** | **T** | **W(B)** |
| WF628 | **EDNW-13T4TN-15Z** | **N** | **TB6045** | 3 | 15 | 13.5 | 5.56 | 12.7 |
| WF630 | **EDNW-15T4TN-15Z** | | **TB6045** | | | 15 | | 14 |

**Programming Radius**

| | |
|---|---|
| **TB6045** | PVD Hybrid Coating |
| **CY250** | C-Coated (Cermet) |

# ASR | Recommended Cutting Conditions




| Work piece material | | Recommend grade & Target hardness (HRC) 30 | 40 | 50 | Emulsion | Mist | Air | Parameter | | Standard + Modular Type D 20 mm (Z2) Overhang <3D General | <3D High Speed | I 3D–5D | II 5D–7D | III >7D | D 25 mm (Z2) Overhang <3D General | <3D High Speed | I 3D–5D | II 5D–7D | III >7D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I II | Carbon steel Alloy steel (<30HRC) | CY250 | | | | | • | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 | 90 | 180 | 130 | 130 | 90 |
| | | | | | | | | n | $min^{-1}$ | 1,440 | 2,870 | 2,080 | 2,080 | 1,440 | 1,150 | 2,300 | 1,660 | 1,660 | 1,150 |
| | | | | | | | • | $f_z$ | mm/t | 0.8 | 1.4 | 0.8 | 0.8 | 0.8 | 1.0 | 1.6 | 1.0 | 1.0 | 1.0 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 2,310 | 8,040 | 3,330 | 3,330 | 2,310 | 2,300 | 7,360 | 3,320 | 3,320 | 2,300 |
| | | | | | | | | $a_p$ | mm | 0.8 | 0.6 | 0.6 | 0.5 | 0.4 | 1.0 | 0.5 | 0.8 | 0.6 | 0.4 |
| | | | | | | | | $a_e$ | mm | <15 | <15 | <15 | <15 | <15 | <20 | <20 | <20 | <20 | <20 |
| III | Alloy steel Tool steel (30-40HRC) | | | | | | | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 | 90 | 180 | 130 | 130 | 90 |
| | | | | | | | | n | $min^{-1}$ | 1,440 | 2,870 | 2,080 | 2,080 | 1,440 | 1,150 | 2,300 | 1,660 | 1,660 | 1,150 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 0.8 | 1.4 | 0.8 | 0.8 | 0.8 | 1.0 | 1.6 | 1.0 | 1.0 | 1.0 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 2,310 | 8,040 | 3,330 | 3,330 | 2,310 | 2,300 | 7,360 | 3,320 | 3,320 | 2,300 |
| | | | | | | | | $a_p$ | mm | 0.6 | 0.4 | 0.5 | 0.4 | 0.3 | 0.8 | 0.4 | 0.6 | 0.5 | 0.35 |
| | | | | | | | | $a_e$ | mm | <15 | <15 | <15 | <15 | <15 | <20 | <20 | <20 | <20 | <20 |
| IV | Pre-Hardened Steel Tool steel (40-50HRC) | | | | | | | $V_c$ | m/min | 90 | 130 | 90 | 90 | 90 | 90 | 130 | 90 | 90 | 90 |
| | | | | | | | | n | $min^{-1}$ | 1,440 | 2,080 | 1,440 | 1,440 | 1,440 | 1,150 | 1,660 | 1,150 | 1,150 | 1,150 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 0.6 | 1.2 | 0.8 | 0.8 | 0.8 | 0.8 | 1.4 | 0.8 | 0.8 | 0.8 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 1,730 | 5,000 | 2,310 | 2,310 | 2,310 | 1,840 | 4,650 | 1,840 | 1,840 | 1,840 |
| | | | | | | | | $a_p$ | mm | 0.5 | 0.35 | 0.4 | 0.3 | 0.2 | 0.6 | 0.35 | 0.5 | 0.4 | 0.25 |
| | | | | | | | | $a_e$ | mm | <15 | <15 | <15 | <15 | <15 | <20 | <20 | <20 | <20 | <20 |
| VIII | Cast iron GG GGG | | | | | | | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 | 90 | 180 | 130 | 130 | 90 |
| | | | | | | | | n | $min^{-1}$ | 1,440 | 2,870 | 2,080 | 2,080 | 1,440 | 1,150 | 2,300 | 1,660 | 1,660 | 1,150 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 1.2 | 1.6 | 1.2 | 1.2 | 1.2 | 1.4 | 1.8 | 1.4 | 1.4 | 1.4 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 3,460 | 9,190 | 5,000 | 5,000 | 3,460 | 3,220 | 8,280 | 4,650 | 4,650 | 3,220 |
| | | | | | | | | $a_p$ | mm | 1.0 | 0.8 | 0.8 | 0.6 | 0.5 | 1.25 | 1.0 | 0.8 | 0.6 | 0.4 |
| | | | | | | | | $a_e$ | mm | <15 | <15 | <15 | <15 | <15 | <20 | <20 | <20 | <20 | <20 |
| Maximum $f_z$ (mm/tooth) | | | | | | | | | | <2.0 | | | | | <2.0 | | | | |
| Maximum $a_p$ (mm) | | | | | | | | | | <1.2 | | | | | <1.2 | | | | |

## Notes

1. Refer to the above list for best cutting conditions (For overhang of 3xD or less the cutting speed is $V_c$=180~200 m/min; 3xD or more $V_c$ =90~130m/min).
2. Make sure to use air blow to remove the thick and heavy chips produced when using this tool. Blockage of chips can result in tool breakage. The recommended method is „Spindle centre through air blast". (Pay much attention to chip removal when using vertical machining centres).
3. To maintain safe cutting conditions ensure effective chip removal before running machine unmanned.
4. The chips can cause cuts, burns and damage of eyes. Make sure you have installed cover panels (door or similar) to the machine and wear safety glasses during machine operation.
5. To avoid tool breakage, it is important to replace the inserts when wear occurs.

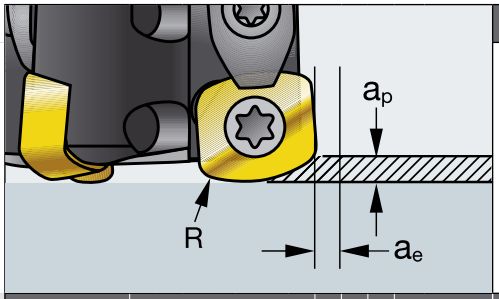
## Bemerkungen

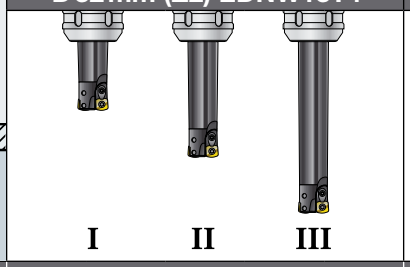
1. Bezogen auf die oben angeführten Schnittwerte für beste Resultate: für Auskraglängen bis 3xD, empfohlene $V_c$ 180~200 m/min - über 3xD $V_c$ 90~130 m/min.
2. Wenn möglich, während der Bearbeitung Luft-Kühlung einsetzen, um die dicken & schweren Späne gut abzuleiten bzw. aus der Folge-Bearbeitung fernzuhalten. Verbleibende Späne könnten die WSP beschädigen. Wir empfehlen, wenn möglich, die Luft durch das Werkzeug/den Halter zu fördern. Bitte aufpassen bei vertikalen Bearbeitungen (von Zeit zu Zeit ist die Maschine zu stoppen, um Späne zu entsorgen).
3. Um den Prozess zu sichern, bitte vor der Bearbeitung die Späne-Entsorgung bedenken (eventuell horizontal spannen).
4. Da Späne Schnittverletzungen, Verbrennungen und Augenschäden verursachen können, muss während der Bearbeitung die Schutztür der Maschine geschlossen sein und eine Schutzbrille getragen werden.
5. Um Wendeplatten-Brüche zu vermeiden, ist es wichtig, die Platten bei auftretendem Verschleiß zu wechseln/zu drehen.

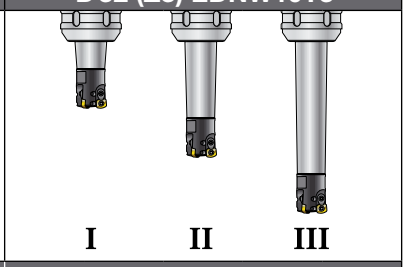


No. 317.3 | ASR | 2020-03

# ASR | Recommended Cutting Conditions



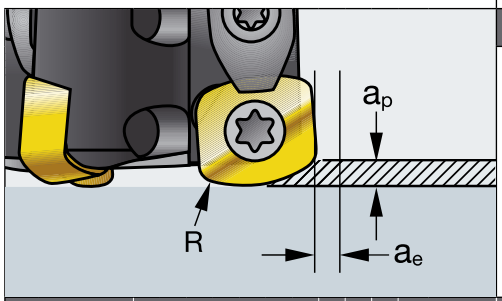




| Work piece material | | Recommend grade & Target hardness (HRC) 30 | 40 | 50 | Emulsion | Mist | Air | Parameter | | Modular Type D32mm (Z2) EDNW13T4 Overhang <3D General | <3D High Speed | I 3D–5D | II 5D–7D | III >7D | Modular Type D32 (Z3) EDNW10T3 Overhang <3D General | <3D High Speed | I 3D–5D | II 5D–7D | III >7D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I II | Carbon steel Alloy steel (<30HRC) | CY250 | | | | | • | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 | 90 | 180 | 130 | 130 | 90 |
| | | | | | | | | n | min$^{-1}$ | 900 | 1,800 | 1,300 | 1,300 | 900 | 900 | 1,800 | 1,300 | 1,300 | 900 |
| | | TB6045 | | | | | • | $f_z$ | mm/t | 1.5 | 2.0 | 1.2 | 1.2 | 1.2 | 1.2 | 1.6 | 1.0 | 1.0 | 1.0 |
| | | | | | | | • | $V_f$ | mm/min | 2,700 | 7,200 | 3,120 | 3,120 | 2,160 | 3,240 | 8,640 | 3,900 | 3,900 | 2,700 |
| | | | | | | | | $a_p$ | mm | 1.2 | 0.8 | 1.0 | 0.6 | 0.5 | 1.0 | 0.5 | 0.8 | 0.6 | 0.4 |
| | | | | | | | | $a_e$ | mm | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 |
| III | Alloy steel Tool steel (30-40HRC) | | | | | | | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 | 90 | 180 | 130 | 130 | 90 |
| | | | | | | | | n | min$^{-1}$ | 900 | 1,800 | 1,300 | 1,300 | 900 | 900 | 1,800 | 1,300 | 1,300 | 900 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 1.5 | 2.0 | 1.2 | 1.2 | 1.2 | 1.2 | 1.6 | 1.0 | 1.0 | 1.0 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 2,700 | 7,200 | 3,120 | 3,120 | 2,160 | 3,240 | 8,640 | 3,900 | 3,900 | 2,700 |
| | | | | | | | | $a_p$ | mm | 1.0 | 0.6 | 0.8 | 0.6 | 0.5 | 0.8 | 0.4 | 0.6 | 0.5 | 0.35 |
| | | | | | | | | $a_e$ | mm | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 |
| IV | Pre-Hardened Steel Tool steel (40-50HRC) | | | | | | | $V_c$ | m/min | 90 | 130 | 90 | 90 | 90 | 90 | 130 | 90 | 90 | 90 |
| | | | | | | | | n | min$^{-1}$ | 900 | 1,300 | 900 | 900 | 900 | 900 | 1,300 | 900 | 900 | 900 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 1.2 | 1.6 | 1.0 | 1.0 | 1.0 | 0.8 | 1.4 | 0.8 | 0.8 | 0.8 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 2,160 | 4,160 | 1,800 | 1,800 | 1,800 | 2,160 | 5,460 | 2,160 | 2,160 | 2,160 |
| | | | | | | | | $a_p$ | mm | 0.8 | 0.5 | 0.6 | 0.5 | 0.4 | 0.6 | 0.35 | 0.5 | 0.4 | 0.25 |
| | | | | | | | | $a_e$ | mm | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 |
| VIII | Cast iron GG GGG | | | | | | | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 | 90 | 180 | 130 | 130 | 90 |
| | | | | | | | | n | min$^{-1}$ | 900 | 1,800 | 1,300 | 1,300 | 900 | 900 | 1,800 | 1,300 | 1,300 | 900 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 2.0 | 2.5 | 1.6 | 1.6 | 1.6 | 1.4 | 1.8 | 1.4 | 1.4 | 1.4 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 3,600 | 9,000 | 4,160 | 4,160 | 2,880 | 3,780 | 9,720 | 5,460 | 5,460 | 3,780 |
| | | | | | | | | $a_p$ | mm | 1.4 | 0.8 | 1.0 | 0.8 | 0.5 | 1.25 | 1.0 | 0.8 | 0.6 | 0.4 |
| | | | | | | | | $a_e$ | mm | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 | <22 |
| Maximum $f_z$ (mm/tooth) | | | | | | | | | | <3.0 | | | | | <2.5 | | | | |
| Maximum $a_p$ (mm) | | | | | | | | | | <2.0 | | | | | <1.2 | | | | |

## Observaciones

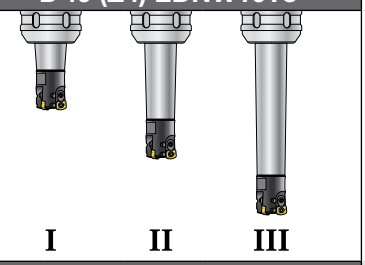
1. Elegir de la tabla las condiciones de corte que más se adecuen al trabajo. (Para voladizos hasta 3D la velocidad de corte debe ser $V_c$=180-200 m/min. Para Voladizos de mas de 3D; $V_c$ = 90-130 m/min.)
2. Esta herramienta produce virutas gruesas y pesadas. Se debe asegurar la evacuación de la viruta para evitar roturas de placa. Se recomienda el soplado de aire a través del cabezal. (Se debe prestar especial atención a la evacuación de viruta al mecanizar cajeras en centros verticales)
3. Antes de dejar la máquina trabajando sola asegurarse de sacar las virutas y de utilizar condiciones de corte de seguridad.
4. Las virutas pueden provocar cortes, quemadas y heridas oculares. Asegurarse de tener instalada la protección de seguridad (puerta o similar.) mientras la herramienta trabaja y de llevar gafas durante las manipulaciones.
5. Sustituir las placas de forma preventiva para evitar roturas por desgaste.

# ASR | Recommended Cutting Conditions




**Modular Type**

**D 40 (Z4) EDNW10T3**




| Work piece material | | Recommend grade & Target hardness (HRC) 30 40 50 | Emulsion | Mist | Air | Parameter | | Overhang <3D General | Overhang <3D High Speed | Overhang I 3D–5D | Overhang II 5D–7D | Overhang III >7D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I II | Carbon steel Alloy steel (<30HRC) | CY250 | | | • | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 |
| | | | | | | n | min$^{-1}$ | 720 | 1,440 | 1,040 | 1,040 | 720 |
| | | | | | | $f_z$ | mm/t | 1.2 | 1.6 | 1.0 | 1.0 | 1.0 |
| | | | | | | $V_f$ | mm/min | 3,460 | 9,220 | 4,160 | 4,160 | 2,880 |
| | | | | | | $a_p$ | mm | 1.0 | 0.5 | 0.8 | 0.6 | 0.4 |
| | | | | | | $a_e$ | mm | <28 | <28 | <28 | <28 | <28 |
| III | Alloy steel Tool steel (30-40HRC) | | | | | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 |
| | | | | | | n | min$^{-1}$ | 720 | 1,440 | 1,040 | 1,040 | 720 |
| | | CY250 | | | • | $f_z$ | mm/t | 1.2 | 1.6 | 1.0 | 1.0 | 1.0 |
| | | | | | | $V_f$ | mm/min | 3,460 | 9,220 | 4,160 | 4,160 | 2,880 |
| | | | | | | $a_p$ | mm | 0.8 | 0.4 | 0.6 | 0.5 | 0.35 |
| | | | | | | $a_e$ | mm | <28 | <28 | <28 | <28 | <28 |
| IV | Pre-Hardened Steel Tool steel (40-50HRC) | | | | | $V_c$ | m/min | 90 | 130 | 90 | 90 | 90 |
| | | | | | | n | min$^{-1}$ | 720 | 1,040 | 720 | 720 | 720 |
| | | CY250 | | | • | $f_z$ | mm/t | 0.8 | 1.4 | 0.8 | 0.8 | 0.8 |
| | | | | | | $V_f$ | mm/min | 2,310 | 5,830 | 2,310 | 2,310 | 2,310 |
| | | | | | | $a_p$ | mm | 0.6 | 0.35 | 0.5 | 0.4 | 0.25 |
| | | | | | | $a_e$ | mm | <28 | <28 | <28 | <28 | <28 |
| VIII | Cast iron GG GGG | | | | | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 |
| | | | | | | n | min$^{-1}$ | 720 | 1,440 | 1,040 | 1,040 | 720 |
| | | CY250 | | | • | $f_z$ | mm/t | 1.4 | 1.8 | 1.4 | 1.4 | 1.4 |
| | | | | | | $V_f$ | mm/min | 4,040 | 10,370 | 5,830 | 5,830 | 4,040 |
| | | | | | | $a_p$ | mm | 1.25 | 1.0 | 0.8 | 0.6 | 0.4 |
| | | | | | | $a_e$ | mm | <28 | <28 | <28 | <28 | <28 |
| Maximum $f_z$ (mm/tooth) | | | | | | | | <2.5 | | | | |
| Maximum $a_p$ (mm) | | | | | | | | <1.2 | | | | |

## Importante:

1. Selezionare le migliori condizioni di taglio, in riferimento alla tabella sopra riportata (per sporgenze utensile di 3D o minore, la velocità di taglio raccomandata è di 180-200 m/min, per sporgenze superiori la velocità di taglio raccomandata è di 90-130 m/min).
2. Questo utensile genera trucioli spessi e pesanti. Accertarsi una buona rimozione degli stessi per mezzo di aria, per evitare danni causati dal blocco dei trucioli. Il metodo raccomandato è l'adduzione interna dell'aria nel mandrino. (Porre maggior attenzione nel caso di lavorazioni in cavità con macchine ad asse verticale).
3. Prima di eseguire lavorazione non presidiate, assicurarsi che la rimozione dei trucioli e le condizioni di taglio siano garantite in sicurezza.
4. I trucioli possono causare tagli, scottature o danni agli occhi. Assicurarsi di installare una copertura di sicurezza intorno all'utensile e di indossare gli occhiali di sicurezza prima di eseguire la lavorazione.
5. Sostituire l'inserto in tempo, allo scopo di evitare che una maggiore usura possa danneggiare il corpo fresa.



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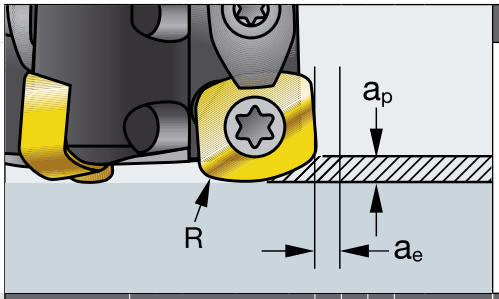
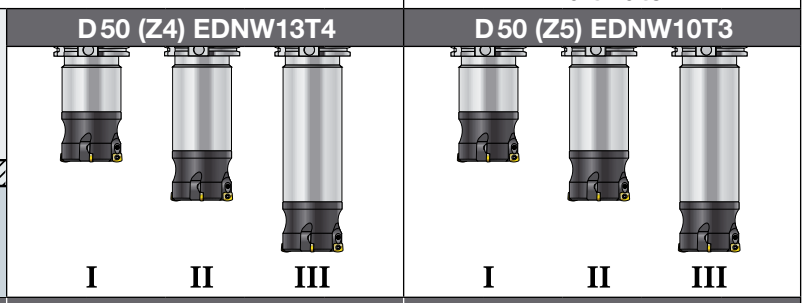
# ASR | Recommended Cutting Conditions




| Work piece material | | Recommend grade & Target hardness (HRC) 30 | 40 | 50 | Emulsion | Mist | Air | Parameter | | Multiflute D50 (Z4) EDNW13T4 Overhang <3D General | <3D High Speed | I 3D–5D | II 5D–7D | III >7D | Multiflute D50 (Z5) EDNW10T3 Overhang <3D General | <3D High Speed | I 3D–5D | II 5D–7D | III >7D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I II | Carbon steel Alloy steel (<30HRC) | | | | | | | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 | 90 | 180 | 130 | 130 | 90 |
| | | | | | | | | n | $min^{-1}$ | 580 | 1,150 | 830 | 830 | 580 | 580 | 1,150 | 830 | 830 | 580 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 1.6 | 2.0 | 1.2 | 1.2 | 1.2 | 1.2 | 1.6 | 1.0 | 1.0 | 1.0 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 3,720 | 9,200 | 3,990 | 3,990 | 2,790 | 3,480 | 9,200 | 4,150 | 4,150 | 2,900 |
| | | | | | | | | $a_p$ | mm | 1.5 | 1.0 | 1.2 | 1.0 | 0.8 | 1.0 | 0.5 | 0.8 | 0.6 | 0.4 |
| | | | | | | | | $a_e$ | mm | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 |
| III | Alloy steel Tool steel (30-40HRC) | | | | | | | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 | 90 | 180 | 130 | 130 | 90 |
| | | | | | | | | n | $min^{-1}$ | 580 | 1,150 | 830 | 830 | 580 | 580 | 1,150 | 830 | 830 | 580 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 1.6 | 2.0 | 1.2 | 1.2 | 1.2 | 1.2 | 1.6 | 1.0 | 1.0 | 1.0 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 3,720 | 9,200 | 3,990 | 3,990 | 2,790 | 3,480 | 9,200 | 4,150 | 4,150 | 2,900 |
| | | | | | | | | $a_p$ | mm | 1.2 | 0.8 | 1.0 | 0.8 | 0.6 | 0.8 | 0.4 | 0.6 | 0.5 | 0.35 |
| | | | | | | | | $a_e$ | mm | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 |
| IV | Pre-Hardened Steel Tool steel (40-50HRC) | | | | | | | $V_c$ | m/min | 90 | 130 | 90 | 90 | 90 | 90 | 130 | 90 | 90 | 90 |
| | | | | | | | | n | $min^{-1}$ | 580 | 830 | 580 | 580 | 580 | 580 | 830 | 580 | 580 | 580 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 1.0 | 1.2 | 0.8 | 0.8 | 0.8 | 0.8 | 1.4 | 0.8 | 0.8 | 0.8 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 2,320 | 3,990 | 1,860 | 1,860 | 1,860 | 2,320 | 5,810 | 2,320 | 2,320 | 2,320 |
| | | | | | | | | $a_p$ | mm | 1.0 | 0.75 | 0.6 | 0.5 | 0.4 | 0.6 | 0.35 | 0.5 | 0.4 | 0.25 |
| | | | | | | | | $a_e$ | mm | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 |
| VIII | Cast iron GG GGG | | | | | | | $V_c$ | m/min | 90 | 180 | 130 | 130 | 90 | 90 | 180 | 130 | 130 | 90 |
| | | | | | | | | n | $min^{-1}$ | 580 | 1,150 | 830 | 830 | 580 | 580 | 1,150 | 830 | 830 | 580 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 2.0 | 2.5 | 1.6 | 1.6 | 1.6 | 1.4 | 1.8 | 1.4 | 1.4 | 1.4 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 4,640 | 11,500 | 5,320 | 5,320 | 3,720 | 4,060 | 10,350 | 5,810 | 5,810 | 4,060 |
| | | | | | | | | $a_p$ | mm | 1.5 | 1.2 | 1.0 | 0.8 | 0.5 | 1.25 | 1.0 | 0.8 | 0.6 | 0.4 |
| | | | | | | | | $a_e$ | mm | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 | <35 |
| Maximum $f_z$ (mm/tooth) | | | | | | | | | | <3.5 | | | | | <2.5 | | | | |
| Maximum $a_p$ (mm) | | | | | | | | | | <2.0 | | | | | <1.2 | | | | |

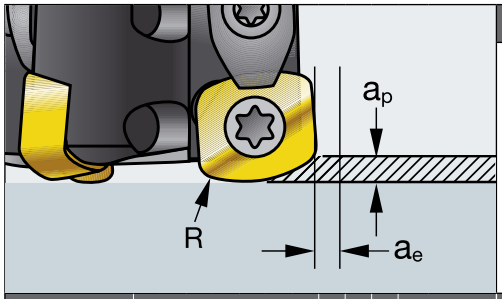
## Notes

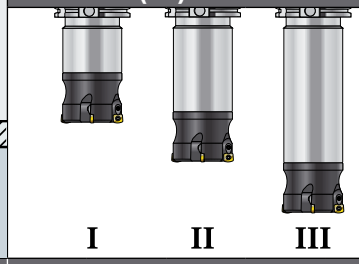
1. Référez vous au tableau ci-dessus pour les meilleurs conditions de coupe (Porte à faux de 3xD ou moins $V_c$=180~200 m/min; plus de 3D $V_c$=90~130 m/min).
2. Utilisez de l´air pour évacuer les copeaux lourds et épais quand vous usinez avec cet outil. Le ré-usinage des copeaux peut endommager l´outil. La méthode recommandée est l´utilisation d´une broche avec refroidissement par le centre. (Accordez beaucoup d´attention à l´évacuation des copeaux avec les centres verticaux)
3. Pour sauvegarder les conditions de coupe assurez vous de la bonne évacuation des copeaux avant de lancer l´usinage.
4. Les copeaux peuvent causer des coupures, des brûlures et des blessures aux yeux. Lorsque la machine est en fonctionnement, assurez-vous qu'elle soit entourée de panneaux de protection et portez des lunettes de sécurité.
5. Pour prévenir la cassa d´outil, il est important de remplacer les plaquettes dés l´apparition de signe d´usure.

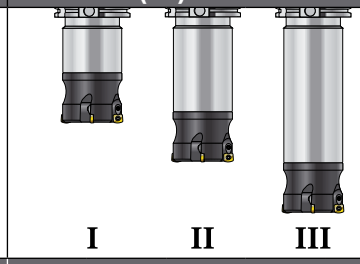
## Notas

1. Consulte a lista acima para encontrar as melhores condições de corte (Para altura total de ferramenta de 3xD ou menos, a velocidade de corte é $V_c$=180~200 m/min; para 3xD ou mais, considere $V_c$=90~130 m/min).
2. Certifique-se de usar sopro de ar para remover as aparas grossas e pesadas produzidas com o uso desta ferramenta. A obstrução com aparas pode resultar na quebra da ferramenta. Recomenda-se o método "jato de ar no eixo-árvore". (Preste bastante atenção à remoção de aparas aquando do uso de centros de maquinação verticais).
3. Para manter condições de corte seguras, garanta uma boa remoção de aparas antes de maquinar sem operador.
4. As aparas podem causar cortes, queimaduras e outros danos nos olhos. Assegure-se de ter instalada a proteção da máquina (porta ou similar) e de utilizar óculos de segurança durante o funcionamento da mesma.
5. Para evitar a quebra da ferramenta, é importante substituir as plaquetes quando ocorre desgaste.

# ASR | Recommended Cutting Conditions




| Work piece material | | Recommend grade & Target hardness (HRC) 30 40 50 | Emulsion | Mist | Air | Parameter | | Multiflute D63 (Z4) EDNW15T4 Overhang <3D General | <3D High Speed | I 3D–5D | II 5D–7D | III >7D | Multiflute D63 (Z6) EDNW10T3 Overhang <3D General | <3D High Speed | I 3D–5D | II 5D–7D | III >7D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I II | Carbon steel Alloy steel (<30HRC) | CY250 | | | • | $f_z$ | mm/t | 1.6 | 2.0 | 1.2 | 1.2 | 1.2 | 1.2 | 1.6 | 1.0 | 1.0 | 1.0 |
| | | TB6045 | | | • | $V_f$ | mm/min | 2,950 | 7,280 | 3,170 | 3,170 | 2,210 | 3,320 | 8,740 | 3,960 | 3,960 | 2,760 |
| | | | | | | $a_p$ | mm | 1.5 | 1.0 | 1.2 | 1.0 | 0.8 | 1.0 | 0.5 | 0.8 | 0.6 | 0.4 |
| | | | | | | $a_e$ | mm | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 |
| III | Alloy steel Tool steel (30-40HRC) | CY250 | | | • | $f_z$ | mm/t | 1.6 | 2.0 | 1.2 | 1.2 | 1.2 | 1.2 | 1.6 | 1.0 | 1.0 | 1.0 |
| | | TB6045 | | | • | $V_f$ | mm/min | 2,950 | 7,280 | 3,170 | 3,170 | 2,210 | 3,320 | 8,740 | 3,960 | 3,960 | 2,760 |
| | | | | | | $a_p$ | mm | 1.2 | 1.0 | 0.8 | 0.6 | 0.4 | 0.8 | 0.4 | 0.6 | 0.5 | 0.35 |
| | | | | | | $a_e$ | mm | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 |
| IV | Pre-Hardened Steel Tool steel (40-50HRC) | CY250 | | | • | $f_z$ | mm/t | 1.0 | 1.2 | 0.8 | 0.8 | 0.8 | 0.8 | 1.4 | 0.8 | 0.8 | 0.8 |
| | | TB6045 | | | • | $V_f$ | mm/min | 1,840 | 3,170 | 1,480 | 1,480 | 1,480 | 2,210 | 5,550 | 2,210 | 2,210 | 2,210 |
| | | | | | | $a_p$ | mm | 1.0 | 0.75 | 0.6 | 0.5 | 0.4 | 0.6 | 0.35 | 0.5 | 0.4 | 0.25 |
| | | | | | | $a_e$ | mm | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 |
| VIII | Cast iron GG GGG | CY250 | | | • | $f_z$ | mm/t | 2.0 | 2.5 | 1.6 | 1.6 | 1.6 | 1.4 | 1.8 | 1.4 | 1.4 | 1.4 |
| | | TB6045 | | | • | $V_f$ | mm/min | 3,680 | 9,100 | 4,230 | 4,230 | 2,950 | 3,870 | 9,830 | 5,550 | 5,550 | 3,870 |
| | | | | | | $a_p$ | mm | 1.5 | 1.2 | 1.0 | 0.8 | 0.5 | 1.25 | 1.0 | 0.8 | 0.6 | 0.4 |
| | | | | | | $a_e$ | mm | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 | <45 |
| Maximum $f_z$ (mm/tooth) | | | | | | | | <3.5 | | | | | <2.5 | | | | |
| Maximum $a_p$ (mm) | | | | | | | | <2.0 | | | | | <1.2 | | | | |



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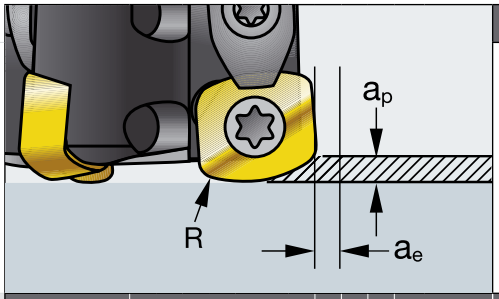
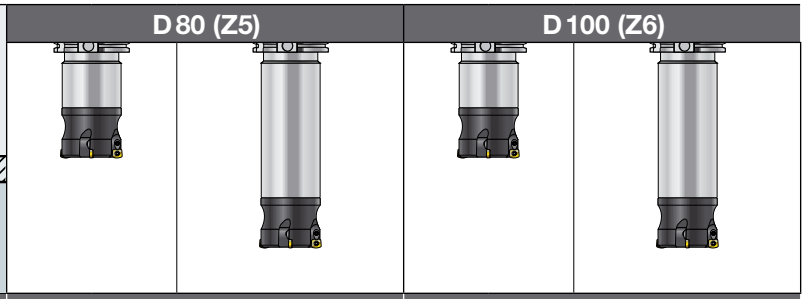
# ASR | Recommended Cutting Conditions



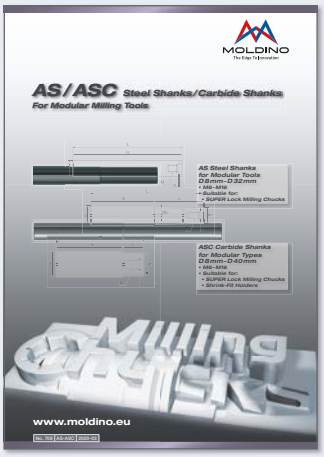




| Work piece material | | Recommend grade & Target hardness (HRC) 30 | 40 | 50 | Emulsion | Mist | Air | Parameter | | Overhang <3D General | Overhang <3D High Speed | Overhang 3D–5D | Overhang <3D General | Overhang <3D High Speed | Overhang 3D–5D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I II | Carbon steel Alloy steel (<30HRC) | CY250 | | | | | • | $V_c$ | m/min | 90 | 180 | 130 | 90 | 180 | 130 |
| | | | | | | | | n | $min^{-1}$ | 360 | 720 | 520 | 290 | 580 | 420 |
| | | | | | | | • | $f_z$ | mm/t | 1.8 | 2.2 | 1.5 | 1.8 | 2.2 | 1.5 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 3,240 | 7,920 | 3,900 | 3,140 | 7,660 | 3,780 |
| | | | | | | | | $a_p$ | mm | 1.5 | 1.2 | 1.0 | 1.5 | 1.2 | 1.0 |
| | | | | | | | | $a_e$ | mm | <56 | <56 | <56 | <70 | <70 | <70 |
| III | Alloy steel Tool steel (30-40HRC) | | | | | | | $V_c$ | m/min | 90 | 180 | 130 | 90 | 180 | 130 |
| | | | | | | | | n | $min^{-1}$ | 360 | 720 | 520 | 290 | 580 | 420 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 1.8 | 2.2 | 1.5 | 1.8 | 2.2 | 1.5 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 3,240 | 7,920 | 3,900 | 3,140 | 7,660 | 3,780 |
| | | | | | | | | $a_p$ | mm | 1.2 | 1.0 | 0.8 | 1.2 | 1.0 | 0.8 |
| | | | | | | | | $a_e$ | mm | <56 | <56 | <56 | <70 | <70 | <70 |
| IV | Pre-Hardened Steel Tool steel (40-50HRC) | | | | | | | $V_c$ | m/min | 90 | 130 | 130 | 90 | 130 | 130 |
| | | | | | | | | n | $min^{-1}$ | 360 | 520 | 520 | 290 | 420 | 420 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 1.6 | 2.0 | 1.5 | 1.6 | 2.0 | 1.5 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 2,880 | 5,200 | 3,900 | 2,790 | 5,040 | 3,780 |
| | | | | | | | | $a_p$ | mm | 1.0 | 0.8 | 0.6 | 1.0 | 0.8 | 0.6 |
| | | | | | | | | $a_e$ | mm | <56 | <56 | <56 | <70 | <70 | <70 |
| VIII | Cast iron GG GGG | | | | | | | $V_c$ | m/min | 90 | 180 | 130 | 90 | 180 | 130 |
| | | | | | | | | n | $min^{-1}$ | 360 | 720 | 520 | 290 | 580 | 420 |
| | | CY250 | | | | | • | $f_z$ | mm/t | 2.2 | 3.0 | 2.0 | 2.2 | 3.0 | 2.0 |
| | | TB6045 | | | | | • | $V_f$ | mm/min | 3,960 | 10,800 | 5,200 | 3,830 | 10,440 | 5,040 |
| | | | | | | | | $a_p$ | mm | 1.5 | 1.2 | 1.0 | 1.5 | 1.2 | 1.0 |
| | | | | | | | | $a_e$ | mm | <56 | <56 | <56 | <70 | <70 | <70 |
| Maximum $f_z$ (mm/tooth) | | | | | | | | | | | <3.5 | | | <3.5 | |
| Maximum $a_p$ (mm) | | | | | | | | | | | <2.0 | | | <2.0 | |

For more information about Modular Tools and available Shanks please check our brochures:

Indexable Modular No. 328.x


AS/ASC Shanks No. 708



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## ⚠ Attentions on Safety

**1. Cautions regarding handling**

(1) When removing the tool from its case (packaging), be careful that the tool does not pop out or is dropped. Be particularly careful regarding contact with the tool flutes.

(2) When handling tools with sharp cutting flutes, be careful not to touch the cutting flutes directly with your bare hands.

**2. Cautions regarding mounting**

(1) Before use, check the outside appearance of the tool for scratches, cracks, etc. and that it is firmly mounted in the collet chuck, etc.

(2) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.

(3) If abnormal chattering, etc. occurs during use, stop the machine immediately and remove the cause of the chattering.

**3. Cautions during use**

(1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.

(2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.

(3) Cutting tools are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be attached when work is performed and safety equipment such as safety goggles should be worn to create a safe environment for work.

(4) There is a risk of fire or inflammation due to sparks, heat due to breakage, and cutting chips. Do not use where there is a risk of fire or explosion. Please caution of fire while using oil base coolant, fire prevention is necessary.

(5) Do not use the tool for any purpose other than that for which it is intended.

**4. Cautions regarding regrinding**

(1) If regrinding is not performed at the proper time, there is a risk of the tool breaking. Replace the tool with one in good condition, or perform regrinding.

(2) Grinding dust will be created when regrinding a tool. When regrinding, be sure to attach a safety cover over the work area and wear safety clothes such as safety goggles, etc.

(3) This product contains the specified chemical substance cobalt and its inorganic compounds. When performing regrinding or similar processing, be sure to handle the processing in accordance with thelocal laws and regulations regarding prevention of hazards due to specified chemical substances.



Specifications for the products listed in this catalog are subject to change without notice due to replacement or modification.

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