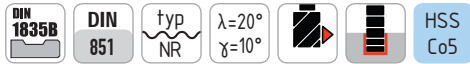
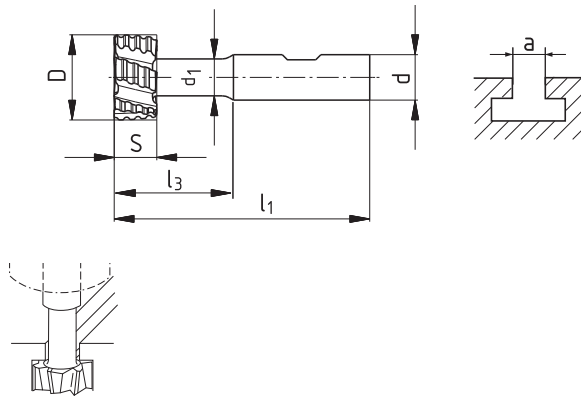


EN T - slot cutters | NR  
 DE T - Nutenfräser | NR  
 RU Фрезы для т - пазов | NR



3142N



HSS/SC

| D<br>d 11 | d<br>h 6 | S<br>d 11 | l <sub>3</sub> | l <sub>1</sub> | Z | d <sub>1</sub> | a    | 314215N |
|-----------|----------|-----------|----------------|----------------|---|----------------|------|---------|
| 12,5      | 10       | 6         | 17             | 57             | 6 | 5              | 6    | .125    |
| 16        | 10       | 8         | 22             | 62             | 6 | 7              | 8    | .160    |
| 18        | 12       | 8         | 25             | 70             | 6 | 8              | 10   | .180    |
| 19**      | 12       | 9         | 26             | 71             | 6 | 8              | >8*  | .190    |
| 21        | 12       | 9         | 29             | 74             | 6 | 10             | 12   | .210    |
| 22**      | 12       | 10        | 30             | 75             | 6 | 10             | >10* | .220    |
| 25        | 16       | 11        | 34             | 82             | 8 | 12             | 14   | .250    |
| 28**      | 16       | 12        | 37             | 85             | 8 | 13             | >13* | .280    |
| 32        | 16       | 14        | 42             | 90             | 8 | 15             | 18   | .320    |
| 36**      | 25       | 16        | 47             | 103            | 8 | 17             | >17* | .360    |
| 40        | 25       | 18        | 52             | 108            | 8 | 19             | 22   | .400    |

\*) ≠ DIN 650, \*\*) ≠ DIN 851

## Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

| Material      | A <sub>p</sub>              | A <sub>e</sub> | V <sub>c</sub> | f <sub>z</sub> (mm/z) |        |        |        |        |        |        |        |
|---------------|-----------------------------|----------------|----------------|-----------------------|--------|--------|--------|--------|--------|--------|--------|
|               |                             |                |                | Ø 3                   | Ø 6    | Ø 8    | Ø 10   | Ø 12   | Ø 16   | Ø 18   | Ø 20   |
| <b>120518</b> |                             |                |                |                       |        |        |        |        |        |        |        |
| P.1           | ≤ 600 N/mm <sup>2</sup>     |                | 45             | 0,006                 | 0,015  | 0,021  | 0,028  | 0,034  | 0,044  | 0,051  | 0,057  |
| P.2           | ≤ 850 N/mm <sup>2</sup>     |                | 39             | 0,006                 | 0,015  | 0,021  | 0,028  | 0,034  | 0,044  | 0,051  | 0,057  |
| P.3           | ≤ 1100 N/mm <sup>2</sup>    |                | 24             | 0,006                 | 0,015  | 0,021  | 0,028  | 0,034  | 0,044  | 0,051  | 0,057  |
| P.4           | ≤ 900 N/mm <sup>2</sup>     |                | 30             | 0,006                 | 0,015  | 0,021  | 0,028  | 0,034  | 0,044  | 0,051  | 0,057  |
| P.6           | > 1100 N/mm <sup>2</sup>    |                | 20             | 0,0042                | 0,0105 | 0,0147 | 0,0196 | 0,0238 | 0,0308 | 0,0357 | 0,0399 |
| M.2           | 750 - 850 N/mm <sup>2</sup> |                | 15             | 0,006                 | 0,015  | 0,021  | 0,028  | 0,034  | 0,044  | 0,051  | 0,057  |
| K.1           | < 240 HB                    |                | 35             | 0,006                 | 0,015  | 0,021  | 0,028  | 0,034  | 0,044  | 0,051  | 0,057  |
| S.1           | ≤ 1500 N/mm <sup>2</sup>    |                | 160-300        | 0,0078                | 0,0195 | 0,0273 | 0,0364 | 0,0442 | 0,0572 | 0,0663 | 0,0741 |

- EN T - slot cutters | NR-F
- DE T - Nutenfräser | NR-F
- RU Фрезы для т - пазов | NR-F

DIN 1835B

DIN 851

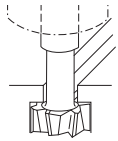
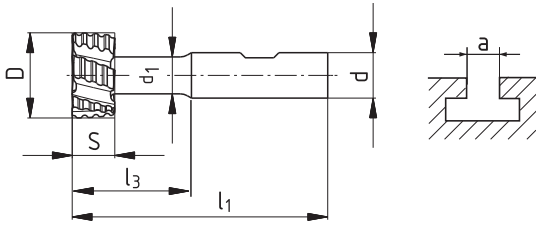
typ NR-F

λ=20°  
γ=10°

HSS Co5

## 3142PH

## 3142P



| D<br>d 11 | d<br>h 6 | S<br>d 11 | l <sub>3</sub> | l <sub>1</sub> | Z      |       | d <sub>1</sub> | a    |          |         |
|-----------|----------|-----------|----------------|----------------|--------|-------|----------------|------|----------|---------|
|           |          |           |                |                | 3142PH | 3142P |                |      | 314215PH | 314215P |
| 12,5      | 10       | 6         | 17             | 57             | 6      |       | 5              | 6    | .125     |         |
| 16        | 10       | 8         | 22             | 62             | 6      |       | 7              | 8    | .160     |         |
| 18        | 12       | 8         | 25             | 70             | 6      |       | 8              | 10   | .180     |         |
| 19**      | 12       | 9         | 26             | 71             | 6      |       | 8              | >8*  | .190     |         |
| 21        | 12       | 9         | 29             | 74             | 8      | 6     | 10             | 12   | .210     | .210    |
| 22**      | 12       | 10        | 30             | 75             | 8      | 6     | 10             | >10* | .220     | .220    |
| 25        | 16       | 11        | 34             | 82             | 8      | 6     | 12             | 14   | .250     | .250    |
| 28**      | 16       | 12        | 37             | 85             | 8      |       | 13             | >13* | .280     |         |
| 32        | 16       | 14        | 42             | 90             | 8      | 6     | 15             | 18   | .320     | .320    |
| 36**      | 25       | 16        | 47             | 103            | 10     |       | 17             | >17* | .360     |         |
| 40        | 25       | 18        | 52             | 108            | 10     | 8     | 19             | 22   | .400     | .400    |
| 45**      | 25       | 20        | 57             | 113            | 10     |       | 21             | >21* | .450     |         |

\*) ≠ DIN 650, \*\*) ≠ DIN 851

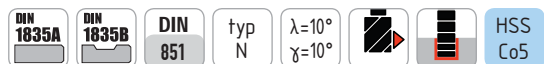
### Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

| Material | A <sub>p</sub>           | A <sub>e</sub> | V <sub>c</sub> | f <sub>z</sub> (mm/z) |       |       |       |
|----------|--------------------------|----------------|----------------|-----------------------|-------|-------|-------|
|          |                          |                |                | Ø 21                  | Ø 25  | Ø 40  | Ø 50  |
| P.1      | ≤ 600 N/mm <sup>2</sup>  |                | 37,5           | 0,07                  | 0,08  | 0,040 | 0,050 |
| P.2      | ≤ 850 N/mm <sup>2</sup>  |                | 32,5           | 0,07                  | 0,08  | 0,040 | 0,050 |
| P.3      | ≤ 1100 N/mm <sup>2</sup> |                | 18             | 0,07                  | 0,08  | 0,040 | 0,050 |
| S.2      | ≤ 1250 N/mm <sup>2</sup> |                | 9              | 0,049                 | 0,056 | 0,028 | 0,035 |

# Frézy pro drážky T

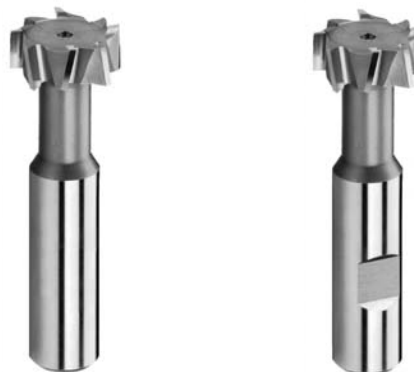
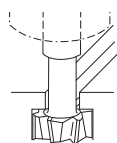
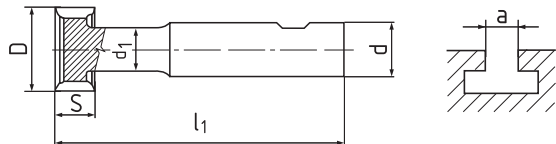


- EN T - slot cutters
- DE T - Nutenfräser
- RU Фрезы для Т - пазов



**3102**

**3102**



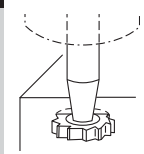
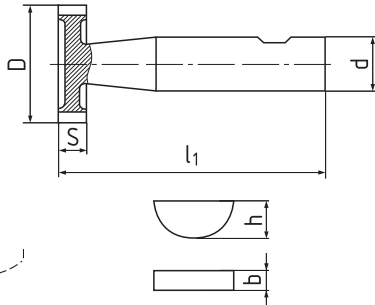
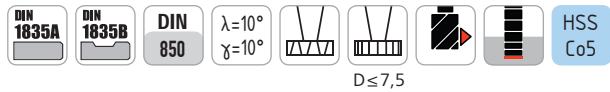
| D<br>d 11 | d<br>h 6 | S<br>d 11 | d <sub>1</sub> | l <sub>1</sub> | Z  | a    | 310205 | 310215 |
|-----------|----------|-----------|----------------|----------------|----|------|--------|--------|
| 11        | 10       | 4         | 4              | 53,5           | 6  | 5    | .110   | .110   |
| 12,5      | 10       | 6         | 5              | 57             | 6  | 6    | .125   | .125   |
| 16        | 10       | 8         | 7              | 62             | 6  | 8    | .160   | .160   |
| 18        | 12       | 8         | 8              | 70             | 6  | 10   | .180   | .180   |
| 19**      | 12       | 9         | 8              | 71             | 6  | >8*  | .190   | .190   |
| 21        | 12       | 9         | 10             | 74             | 6  | 12   | .210   | .210   |
| 22**      | 12       | 10        | 10             | 75             | 6  | >10* | .220   | .220   |
| 25        | 16       | 11        | 12             | 82             | 8  | 14   | .250   | .250   |
| 28**      | 16       | 12        | 13             | 85             | 8  | >13* | .280   | .280   |
| 32        | 16       | 14        | 15             | 90             | 8  | 18   | .320   | .320   |
| 36**      | 25       | 16        | 17             | 103            | 8  | >17* | .360   | .360   |
| 40        | 25       | 18        | 19             | 108            | 10 | 22   | .400   | .400   |
| 45**      | 25       | 20        | 21             | 113            | 10 | >21* | .450   | .450   |
| 50        | 32       | 22        | 25             | 124            | 10 | 28   | .500   | .500   |
| 60        | 32       | 28        | 30             | 139            | 10 | 36   | .600   | .600   |

\*) ≠ DIN 650, \*\*) ≠ DIN 851

## Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

| Material                     | A <sub>p</sub> | A <sub>e</sub> | V <sub>c</sub> | f <sub>z</sub> (mm/z) |       |       |       |
|------------------------------|----------------|----------------|----------------|-----------------------|-------|-------|-------|
|                              |                |                |                | Ø 21                  | Ø 25  | Ø 40  | Ø 50  |
| P.1 ≤ 600 N/mm <sup>2</sup>  |                |                | 37,5           | 0,07                  | 0,08  | 0,040 | 0,050 |
| P.2 ≤ 850 N/mm <sup>2</sup>  |                |                | 32,5           | 0,07                  | 0,08  | 0,040 | 0,050 |
| P.3 ≤ 1100 N/mm <sup>2</sup> |                |                | 18             | 0,07                  | 0,08  | 0,040 | 0,050 |
| S.2 ≤ 1250 N/mm <sup>2</sup> |                |                | 9              | 0,049                 | 0,056 | 0,028 | 0,035 |

- EN Woodruff keyseat cutters
- DE Schlitzfräser für Woodruffnuten
- RU Фрезы для пазов сегментных шпонок



| D<br>h12 | d<br>h 6 | S<br>e 8 | l <sub>1</sub> | Z  | b   | h   |
|----------|----------|----------|----------------|----|-----|-----|
| 4,5      | 6        | 1        | 50             | 6  | 1   | 1,4 |
| 7,5      | 6        | 1,5      | 50             | 6  | 1,5 | 2,6 |
| 7,5      | 6        | 2        | 50             | 6  | 2   | 2,6 |
| 10,5     | 6        | 2        | 50             | 6  | 2   | 3,7 |
| 10,5     | 6        | 2,5      | 50             | 6  | 2,5 | 3,7 |
| 10,5     | 6        | 3        | 50             | 6  | 3   | 3,7 |
| 13,5     | 10       | 2        | 56             | 6  |     |     |
| 13,5     | 10       | 3        | 56             | 6  | 3   | 5   |
| 13,5     | 10       | 4        | 56             | 6  | 4   | 5   |
| 16,5     | 10       | 3        | 56             | 6  | 3   | 6,5 |
| 16,5     | 10       | 4        | 56             | 6  | 4   | 6,5 |
| 16,5     | 10       | 5        | 56             | 6  | 5   | 6,5 |
| 19,5     | 10       | 3        | 63             | 8  |     |     |
| 19,5     | 10       | 4        | 63             | 8  | 4   | 7,5 |
| 19,5     | 10       | 5        | 63             | 8  | 5   | 7,5 |
| 19,5     | 10       | 6        | 63             | 8  | 6   | 7,5 |
| 22,5     | 10       | 4        | 63             | 8  |     |     |
| 22,5     | 10       | 5        | 63             | 8  | 5   | 9   |
| 22,5     | 10       | 6        | 63             | 8  | 6   | 9   |
| 22,5     | 10       | 8        | 63             | 8  | 8   | 9   |
| 25,5     | 10       | 5        | 63             | 10 |     |     |
| 25,5     | 10       | 6        | 63             | 10 | 6   | 10  |

| 320005  | 320015  |
|---------|---------|
| .045010 | .045010 |
| .075015 | .075015 |
| .075020 | .075020 |
| .105020 | .105020 |
| .105025 | .105025 |
| .105030 | .105030 |
| .135020 | .135020 |
| .135030 | .135030 |
| .135040 | .135040 |
| .165030 | .165030 |
| .165040 | .165040 |
| .165050 | .165050 |
| .195030 | .195030 |
| .195040 | .195040 |
| .195050 | .195050 |
| .195060 | .195060 |
| .225040 | .225040 |
| .225050 | .225050 |
| .225060 | .225060 |
| .225080 | .225080 |
| .255050 | .255050 |
| .255060 | .255060 |

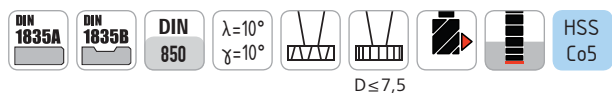
### Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

| Material                     | A <sub>p</sub> | A <sub>e</sub> | V <sub>c</sub> | f <sub>z</sub> (mm/z) |        |        |        |        |
|------------------------------|----------------|----------------|----------------|-----------------------|--------|--------|--------|--------|
|                              |                |                |                | Ø 7,5                 | Ø 16,5 | Ø 22,5 | Ø 32,5 | Ø 45,5 |
| P.1 ≤ 600 N/mm <sup>2</sup>  |                |                | 37,5           | 0,04                  | 0,07   | 0,075  | 0,090  | 0,100  |
| P.2 ≤ 850 N/mm <sup>2</sup>  |                |                | 32,5           | 0,04                  | 0,07   | 0,075  | 0,090  | 0,100  |
| P.3 ≤ 1100 N/mm <sup>2</sup> |                |                | 18             | 0,04                  | 0,07   | 0,075  | 0,090  | 0,100  |
| S.2 ≤ 1250 N/mm <sup>2</sup> |                |                | 9              | 0,028                 | 0,049  | 0,0525 | 0,063  | 0,070  |

# Frézy pro drážky úsečových per

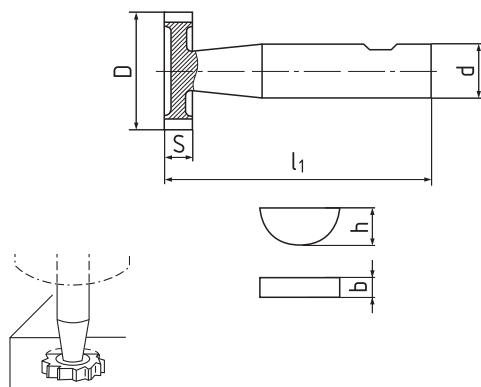


- EN Woodruff keyseat cutters
- DE Schlitzfräser für Woodruffnuten
- RU Фрезы для пазов сегментных шпонок



3200

3200



HSS/SC

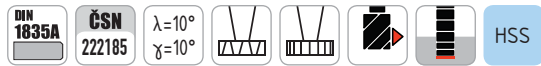
| D    | d   | S   | l <sub>1</sub> | Z  | b  | h  |
|------|-----|-----|----------------|----|----|----|
| h12  | h 6 | e 8 |                |    |    |    |
| 28,5 | 10  | 6   | 63             | 10 | 6  | 11 |
| 28,5 | 10  | 8   | 63             | 10 | 8  | 11 |
| 28,5 | 12  | 10  | 71             | 10 | 10 | 11 |
| 32,5 | 12  | 6   | 71             | 10 |    |    |
| 32,5 | 12  | 7   | 71             | 10 |    |    |
| 32,5 | 12  | 8   | 71             | 10 | 8  | 13 |
| 32,5 | 12  | 10  | 71             | 10 | 10 | 13 |
| 38,5 | 12  | 8   | 71             | 10 |    |    |
| 45,5 | 12  | 8   | 71             | 12 |    |    |
| 45,5 | 12  | 10  | 71             | 12 | 10 | 16 |

| 320005  | 320015  |
|---------|---------|
| .285060 | .285060 |
| .285080 | .285080 |
| .285100 | .285100 |
| .325060 | .325060 |
| .325070 | .325070 |
| .325080 | .325080 |
| .325100 | .325100 |
| .385080 | .385080 |
| .455080 | .455080 |
| .455100 | .455100 |

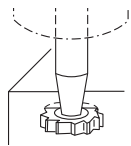
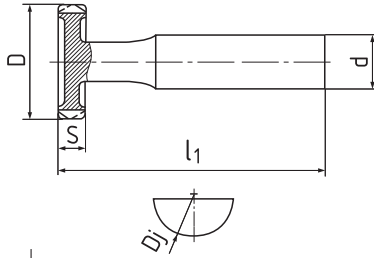
## Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

| Material | A <sub>p</sub>           | A <sub>e</sub> | V <sub>c</sub> | fz (mm/z) |        |        |        |        |
|----------|--------------------------|----------------|----------------|-----------|--------|--------|--------|--------|
|          |                          |                |                | Ø 7,5     | Ø 16,5 | Ø 22,5 | Ø 32,5 | Ø 45,5 |
| P.1      | ≤ 600 N/mm <sup>2</sup>  |                | 37,5           | 0,04      | 0,07   | 0,075  | 0,090  | 0,100  |
| P.2      | ≤ 850 N/mm <sup>2</sup>  |                | 32,5           | 0,04      | 0,07   | 0,075  | 0,090  | 0,100  |
| P.3      | ≤ 1100 N/mm <sup>2</sup> |                | 18             | 0,04      | 0,07   | 0,075  | 0,090  | 0,100  |
| S.2      | ≤ 1250 N/mm <sup>2</sup> |                | 9              | 0,028     | 0,049  | 0,0525 | 0,063  | 0,070  |

- EN Woodruff keyseat cutters
- DE Schlitzfräser für Woodruffnuten
- RU Фрезы для пазов сегментных шпонок



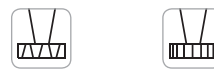
## 3201



HSS/SC

| D<br>h 11 | d<br>h 8 | S<br>e 8 | l <sub>1</sub> | Z  | Dj |
|-----------|----------|----------|----------------|----|----|
| 7,5       | 6        | 1,5      | 48             | 8  | 7  |
| 7,5       | 6        | 2        | 48             | 8  | 7  |
| 10,8      | 8        | 1        | 45             | 8  | 10 |
| 10,8      | 8        | 1,6      | 45             | 8  | 10 |
| 10,8      | 8        | 2,5      | 45             | 8  | 10 |
| 10,8      | 8        | 3        | 45             | 8  | 10 |
| 14        | 8        | 3        | 45             | 8  | 13 |
| 14        | 10       | 4        | 50             | 8  | 13 |
| 17,2      | 10       | 1,6      | 50             | 8  | 16 |
| 17,2      | 10       | 2        | 50             | 8  | 16 |
| 17,2      | 10       | 3        | 50             | 8  | 16 |
| 17,2      | 10       | 4        | 50             | 8  | 16 |
| 17,2      | 12       | 5        | 60             | 8  | 16 |
| 20,5      | 10       | 4        | 50             | 8  | 19 |
| 20,5      | 12       | 5        | 60             | 8  | 19 |
| 23,7      | 12       | 5        | 60             | 8  | 22 |
| 23,7      | 12       | 6        | 60             | 8  | 22 |
| 27        | 12       | 2        | 60             | 10 | 25 |

| 320100  | 320100  |
|---------|---------|
|         | .070015 |
|         | .070020 |
|         | .100010 |
|         | .100016 |
|         | .100025 |
|         | .100030 |
|         | .130030 |
| .130040 |         |
|         | .160016 |
|         | .160020 |
|         | .160030 |
| .160040 |         |
| .160050 |         |
| .190040 |         |
| .190050 |         |
| .220050 |         |
| .220060 |         |
|         | .250020 |



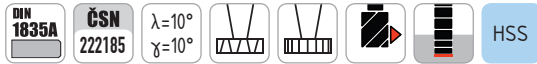
### Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

| Material                    | A <sub>p</sub> | A <sub>e</sub> | V <sub>c</sub> | f <sub>z</sub> (mm/z) |      |        |      |        |
|-----------------------------|----------------|----------------|----------------|-----------------------|------|--------|------|--------|
|                             |                |                |                | Ø 7,5                 | Ø 14 | Ø 20,5 | Ø 27 | Ø 48,6 |
| P.1 ≤ 600 N/mm <sup>2</sup> |                |                | 30             | 0,04                  | 0,06 | 0,07   | 0,08 | 0,11   |
| P.2 ≤ 850 N/mm <sup>2</sup> |                |                | 26             | 0,04                  | 0,06 | 0,07   | 0,08 | 0,11   |

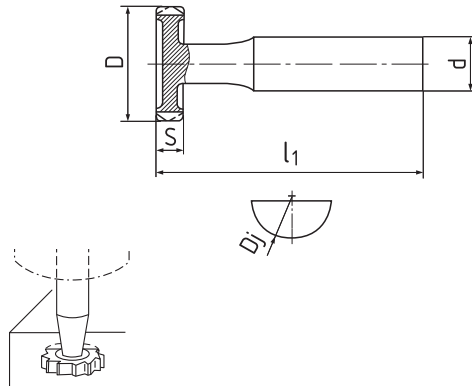


# Frézy pro drážky úsečových per

- EN Woodruff keyseat cutters
- DE Schlitzfräser für Woodruffnuten
- RU Фрезы для пазов сегментных шпонок



## 3201



HSS/SC

| D<br>h 11 | d<br>h 8 | S<br>e 8 | l <sub>1</sub> | Z  | Dj | 320100  | 320100  |
|-----------|----------|----------|----------------|----|----|---------|---------|
| 27        | 12       | 3        | 60             | 10 | 25 |         | .250030 |
| 27        | 12       | 6        | 60             | 10 | 25 | .250060 |         |
| 30,2      | 12       | 6        | 60             | 10 | 28 | .280060 |         |
| 30,2      | 16       | 8        | 70             | 10 | 28 | .280080 |         |
| 34,5      | 16       | 6        | 70             | 10 | 32 | .320060 |         |
| 34,5      | 16       | 8        | 70             | 10 | 32 | .320080 |         |
| 41        | 16       | 8        | 70             | 10 | 38 | .380080 |         |
| 48,6      | 16       | 8        | 70             | 10 | 45 | .450080 |         |
| 48,6      | 16       | 10       | 70             | 10 | 45 | .450100 |         |



### Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

| Material | A <sub>p</sub>          | A <sub>e</sub> | V <sub>c</sub> | fz (mm/z) |      |        |      |        |
|----------|-------------------------|----------------|----------------|-----------|------|--------|------|--------|
|          |                         |                |                | Ø 7,5     | Ø 14 | Ø 20,5 | Ø 27 | Ø 48,6 |
| P.1      | ≤ 600 N/mm <sup>2</sup> |                | 30             | 0,04      | 0,06 | 0,07   | 0,08 | 0,11   |
| P.2      | ≤ 850 N/mm <sup>2</sup> |                | 26             | 0,04      | 0,06 | 0,07   | 0,08 | 0,11   |

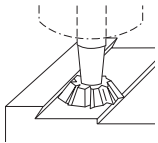
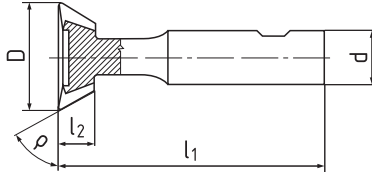


- EN Dovetail milling cutters
- DE Winkel-Stirnfräser
- RU Фрезы угловые торцовые



## 3302

## 3302



| $\rho$<br>± 30' | D<br>js 16 | d<br>h 6 | l <sub>1</sub> | l <sub>2</sub> | Z  |
|-----------------|------------|----------|----------------|----------------|----|
| 45              | 16         | 12       | 60             | 4              | 10 |
| 45              | 20         | 12       | 63             | 5              | 10 |
| 45              | 25         | 12       | 67             | 6,3            | 10 |
| 45              | 32         | 16       | 71             | 8              | 12 |
| 45              | 36         | 16       | 80             | 8              | 12 |
| 45              | 40         | 16       | 80             | 10             | 12 |
| 50              | 16         | 12       | 60             | 5              | 10 |
| 50              | 20         | 12       | 63             | 6,3            | 10 |
| 50              | 25         | 12       | 67             | 8              | 10 |
| 55              | 16         | 12       | 60             | 5,6            | 10 |
| 55              | 20         | 12       | 63             | 7,1            | 10 |
| 55              | 25         | 12       | 67             | 9              | 10 |
| 60              | 16         | 12       | 60             | 6,3            | 10 |
| 60              | 20         | 12       | 63             | 8              | 10 |
| 60              | 25         | 12       | 67             | 10             | 10 |
| 60              | 32         | 16       | 71             | 12,5           | 12 |
| 60              | 40         | 16       | 80             | 16             | 12 |

| 330205  | 330215  |
|---------|---------|
| .045160 | .045160 |
| .045200 | .045200 |
| .045250 | .045250 |
| .045320 | .045320 |
| .045360 | .045360 |
| .045400 | .045400 |
| .050160 | .050160 |
| .050200 | .050200 |
| .050250 | .050250 |
| .055160 | .055160 |
| .055200 | .055200 |
| .055250 | .055250 |
| .060160 | .060160 |
| .060200 | .060200 |
| .060250 | .060250 |
| .060320 | .060320 |
| .060400 | .060400 |

### Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

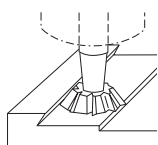
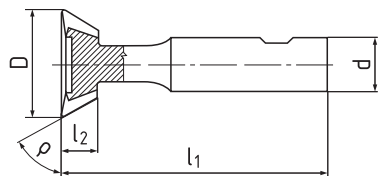
| Material      | A <sub>p</sub>           | A <sub>e</sub> | V <sub>c</sub> | f <sub>z</sub> (mm/z) |        |       |       |
|---------------|--------------------------|----------------|----------------|-----------------------|--------|-------|-------|
|               |                          |                |                | Ø 16                  | Ø 20   | Ø 25  | Ø 32  |
| <b>330205</b> |                          |                |                |                       |        |       |       |
| P.1           | ≤ 600 N/mm <sup>2</sup>  |                | 37,5           | 0,07                  | 0,075  | 0,08  | 0,090 |
| P.2           | ≤ 850 N/mm <sup>2</sup>  |                | 32,5           | 0,07                  | 0,075  | 0,08  | 1,090 |
| P.3           | ≤ 1100 N/mm <sup>2</sup> |                | 18             | 0,07                  | 0,075  | 0,08  | 2,090 |
| S.2           | ≤ 1250 N/mm <sup>2</sup> |                | 9              | 0,049                 | 0,0525 | 0,056 | 5,090 |

- EN Dovetail milling cutters
- DE Winkel-Stirnfräser
- RU Фрезы угловые торцовые



3302

3302



HSS/SC

| $\rho$<br>± 30' | $D$<br>js 16 | $d$<br>h 6 | $l_1$ | $l_2$ | $Z$ |
|-----------------|--------------|------------|-------|-------|-----|
| 65*             | 16           | 12         | 60    | 6,3   | 10  |
| 65*             | 25           | 12         | 67    | 10    | 12  |
| 70*             | 16           | 12         | 60    | 7     | 10  |
| 70*             | 20           | 12         | 63    | 9     | 10  |
| 70*             | 25           | 16         | 67    | 11    | 10  |
| 75*             | 16           | 12         | 60    | 8     | 10  |
| 75*             | 25           | 12         | 67    | 10    | 12  |
| 80*             | 16           | 12         | 60    | 8     | 10  |
| 80*             | 25           | 12         | 67    | 10    | 12  |
| 85*             | 16           | 12         | 60    | 8     | 10  |
| 85*             | 25           | 12         | 67    | 10    | 12  |

| 330205  | 330215  |
|---------|---------|
| .065160 | .065160 |
| .065250 | .065250 |
| .070160 | .070160 |
| .070200 | .070200 |
| .070250 | .070250 |
| .075160 | .075160 |
| .075250 | .075250 |
| .080160 | .080160 |
| .080250 | .080250 |
| .085160 | .085160 |
| .085250 | .085250 |

\*) ≠ DIN 1833

### Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

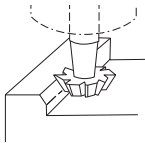
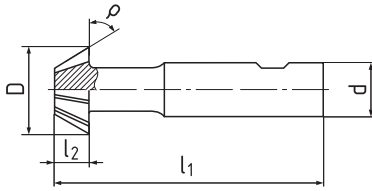
| Material      | $A_p$                    | $A_e$ | $V_c$ | $f_z$ (mm/z) |        |       |       |
|---------------|--------------------------|-------|-------|--------------|--------|-------|-------|
|               |                          |       |       | Ø 16         | Ø 20   | Ø 25  | Ø 32  |
| <b>330205</b> |                          |       |       |              |        |       |       |
| <b>P.1</b>    | ≤ 600 N/mm <sup>2</sup>  |       | 37,5  | 0,07         | 0,075  | 0,08  | 0,090 |
| <b>P.2</b>    | ≤ 850 N/mm <sup>2</sup>  |       | 32,5  | 0,07         | 0,075  | 0,08  | 1,090 |
| <b>P.3</b>    | ≤ 1100 N/mm <sup>2</sup> |       | 18    | 0,07         | 0,075  | 0,08  | 2,090 |
| <b>S.2</b>    | ≤ 1250 N/mm <sup>2</sup> |       | 9     | 0,049        | 0,0525 | 0,056 | 5,090 |

- EN Inverted dovetail milling cutters
- DE Winkel-Stirnfräser
- RU Фрезы угловые торцовые



3500

3500



| $\rho$<br>± 30' | D<br>js 16 | d<br>h 6 | l <sub>1</sub> | l <sub>2</sub> | Z  |
|-----------------|------------|----------|----------------|----------------|----|
| 45              | 16         | 12       | 60             | 4              | 10 |
| 45              | 20         | 12       | 63             | 5              | 10 |
| 45              | 25         | 12       | 67             | 6,3            | 10 |
| 45              | 32         | 16       | 71             | 8              | 12 |
| 45              | 40         | 16       | 80             | 10             | 12 |
| 50              | 16         | 12       | 60             | 5              | 12 |
| 50              | 20         | 12       | 63             | 6,3            | 12 |
| 50              | 25         | 12       | 67             | 8              | 12 |
| 55              | 16         | 12       | 60             | 5,6            | 10 |
| 55              | 20         | 12       | 63             | 7,1            | 10 |
| 55              | 25         | 12       | 67             | 9              | 12 |
| 60              | 16         | 12       | 60             | 6,3            | 10 |
| 60              | 20         | 12       | 63             | 8              | 10 |
| 60              | 25         | 12       | 67             | 10             | 10 |
| 65*             | 16         | 12       | 60             | 6,3            | 10 |
| 65*             | 25         | 12       | 67             | 10             | 12 |
| 70*             | 16         | 12       | 60             | 7              | 10 |
| 70*             | 20         | 12       | 63             | 9              | 10 |
| 70*             | 25         | 16       | 67             | 11             | 10 |
| 75*             | 16         | 12       | 60             | 8              | 10 |
| 75*             | 25         | 12       | 67             | 10             | 12 |

| 350005  | 350015  |
|---------|---------|
| .045160 | .045160 |
| .045200 | .045200 |
| .045250 | .045250 |
| .045320 | .045320 |
| .045400 | .045400 |
| .050160 | .050160 |
| .050200 | .050200 |
| .050250 | .050250 |
| .055160 | .055160 |
| .055200 | .055200 |
| .055250 | .055250 |
| .060160 | .060160 |
| .060200 | .060200 |
| .060250 | .060250 |
| .065160 | .065160 |
| .065250 | .065250 |
| .070160 | .070160 |
| .070200 | .070200 |
| .070250 | .070250 |
| .075160 | .075160 |
| .075250 | .075250 |

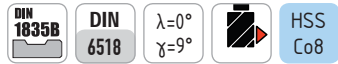
\*) ≠ DIN 1833

### Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

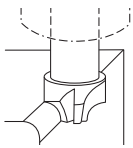
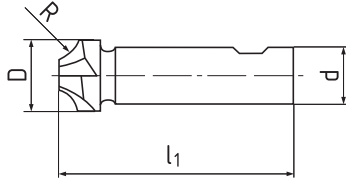
| Material | A <sub>p</sub>           | A <sub>e</sub> | V <sub>c</sub> | f <sub>z</sub> (mm/z) |        |       |
|----------|--------------------------|----------------|----------------|-----------------------|--------|-------|
|          |                          |                |                | Ø 16                  | Ø 20   | Ø 25  |
| P.1      | ≤ 600 N/mm <sup>2</sup>  | 1xb            | 37,5           | 0,07                  | 0,075  | 0,08  |
| P.2      | ≤ 850 N/mm <sup>2</sup>  | 1xb            | 32,5           | 0,07                  | 0,075  | 0,08  |
| P.3      | ≤ 1100 N/mm <sup>2</sup> | 1xb            | 18             | 0,07                  | 0,075  | 0,08  |
| S.2      | ≤ 1250 N/mm <sup>2</sup> | 1xb            | 9              | 0,049                 | 0,0525 | 0,056 |



- EN Corner rounding concave cutters
- DE Viertelrund-Profilfräser konkav
- RU Фрезы секторные выгнутые



## 3600



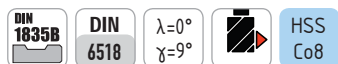
HSS/SC

| R    | D     | d   | l <sub>1</sub> | Z | 360018 |
|------|-------|-----|----------------|---|--------|
| H 11 | js 15 | h 6 |                |   |        |
| 1    | 8     | 10  | 60             | 4 | .010   |
| 1,25 | 9     | 10  | 60             | 4 | .0125  |
| 1,5  | 9     | 10  | 60             | 4 | .015   |
| 1,6  | 9,2   | 10  | 60             | 4 | .016   |
| 2    | 10    | 10  | 60             | 4 | .020   |
| 2,5  | 11    | 10  | 60             | 4 | .025   |
| 3    | 12    | 12  | 60             | 4 | .030   |
| 3,5  | 13    | 12  | 60             | 4 | .035   |
| 4    | 14    | 12  | 60             | 4 | .040   |
| 4,5  | 15    | 12  | 60             | 4 | .045   |
| 5    | 16    | 12  | 60             | 4 | .050   |
| 5,5  | 19    | 16  | 67             | 4 | .055   |
| 6    | 20    | 16  | 67             | 4 | .060   |
| 6,3  | 20,6  | 16  | 71             | 4 | .063   |
| 6,5  | 21    | 16  | 71             | 4 | .065   |
| 7    | 22    | 16  | 71             | 4 | .070   |
| 7,5  | 23    | 16  | 71             | 4 | .075   |
| 8    | 24    | 16  | 71             | 4 | .080   |
| 8,5  | 25    | 25  | 85             | 4 | .085   |
| 9    | 26    | 25  | 85             | 4 | .090   |

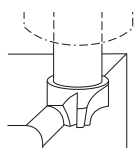
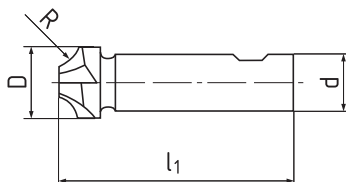
### Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

| Material | A <sub>p</sub>           | A <sub>e</sub> | V <sub>c</sub> | f <sub>z</sub> (mm/z) |       |       |        |       |
|----------|--------------------------|----------------|----------------|-----------------------|-------|-------|--------|-------|
|          |                          |                |                | Ø 8                   | Ø 10  | Ø 12  | Ø 16   | Ø 20  |
| P.1      | ≤ 600 N/mm <sup>2</sup>  |                | 45             | 0,04                  | 0,05  | 0,06  | 0,065  | 0,07  |
| P.2      | ≤ 850 N/mm <sup>2</sup>  |                | 39             | 0,04                  | 0,05  | 0,06  | 0,065  | 0,07  |
| P.3      | ≤ 1100 N/mm <sup>2</sup> |                | 24             | 0,04                  | 0,05  | 0,06  | 0,065  | 0,07  |
| S.2      | ≤ 1250 N/mm <sup>2</sup> |                | 12             | 0,028                 | 0,035 | 0,042 | 0,0455 | 0,049 |

- EN Corner rounding concave cutters
- DE Viertelrund-Profilfräser konkav
- RU Фрезы секторные выгнутые



## 3600



HSS/SC

| R    | D     | d   | l <sub>1</sub> | Z | 360018 |
|------|-------|-----|----------------|---|--------|
| H 11 | js 15 | h 6 |                |   |        |
| 9,5  | 27    | 25  | 85             | 4 | .095   |
| 10   | 28    | 25  | 85             | 4 | .100   |
| 10,5 | 31    | 25  | 90             | 4 | .105   |
| 11   | 32    | 25  | 90             | 4 | .110   |
| 12   | 34    | 25  | 90             | 4 | .120   |
| 12,5 | 41    | 25  | 100            | 6 | .125   |
| 13   | 42    | 25  | 100            | 6 | .130   |
| 14   | 44    | 25  | 100            | 6 | .140   |
| 15   | 46    | 25  | 100            | 6 | .150   |
| 16   | 48    | 25  | 100            | 6 | .160   |
| 17   | 50    | 32  | 112            | 6 | .170   |
| 18   | 52    | 32  | 112            | 6 | .180   |
| 19   | 56    | 32  | 112            | 6 | .190   |
| 20   | 56    | 32  | 112            | 6 | .200   |

### Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

| Material                            | A <sub>p</sub> | A <sub>e</sub> | V <sub>c</sub> | f <sub>z</sub> (mm/z) |       |       |        |       |
|-------------------------------------|----------------|----------------|----------------|-----------------------|-------|-------|--------|-------|
|                                     |                |                |                | Ø 8                   | Ø 10  | Ø 12  | Ø 16   | Ø 20  |
| <b>P.1</b> ≤ 600 N/mm <sup>2</sup>  |                |                | 45             | 0,04                  | 0,05  | 0,06  | 0,065  | 0,07  |
| <b>P.2</b> ≤ 850 N/mm <sup>2</sup>  |                |                | 39             | 0,04                  | 0,05  | 0,06  | 0,065  | 0,07  |
| <b>P.3</b> ≤ 1100 N/mm <sup>2</sup> |                |                | 24             | 0,04                  | 0,05  | 0,06  | 0,065  | 0,07  |
| <b>S.2</b> ≤ 1250 N/mm <sup>2</sup> |                |                | 12             | 0,028                 | 0,035 | 0,042 | 0,0455 | 0,049 |

- EN Taper shank T - slot cutters
- DE T - Nutenfräser mit MK
- RU Фрезы для Т-пазов с коническим хвостовиком

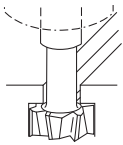
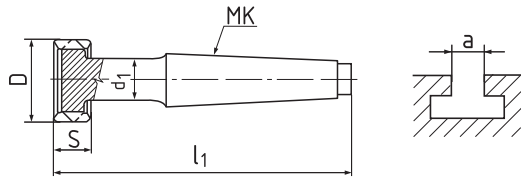
DIN 228A

DIN ~851

typ N

λ=10°  
γ=10°

## 3103



HSS/SC

| D<br>h 12 | MK | S<br>h 12 | d <sub>1</sub> | l <sub>1</sub> | Z  | a  | 310340 |
|-----------|----|-----------|----------------|----------------|----|----|--------|
| 18        | 1  | 8         | 8              | 82             | 8  | 10 | .180   |
| 21        | 2  | 9         | 10             | 102            | 8  | 12 | .210   |
| 25        | 2  | 11        | 12             | 104            | 8  | 14 | .250   |
| 32        | 2  | 14        | 16             | 111            | 8  | 18 | .320   |
| 40        | 3  | 18        | 20             | 138            | 8  | 22 | .400   |
| 50        | 4  | 22        | 25             | 173            | 8  | 28 | .500   |
| 60        | 4  | 28        | 31             | 188            | 10 | 36 | .600   |
| 72        | 5  | 35        | 36             | 229            | 10 | 42 | .720   |

### Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

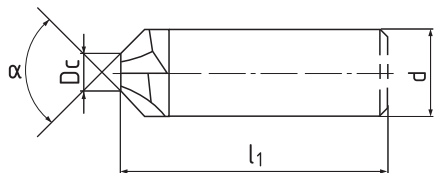
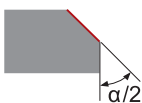
| Material                           | A <sub>p</sub> | A <sub>e</sub> | V <sub>c</sub> | f <sub>z</sub> (mm/z) |      |       |       |
|------------------------------------|----------------|----------------|----------------|-----------------------|------|-------|-------|
|                                    |                |                |                | Ø 21                  | Ø 25 | Ø 40  | Ø 50  |
| <b>P.1</b> ≤ 600 N/mm <sup>2</sup> | 0,1xD          | 1xb            | 37,5           | 0,07                  | 0,08 | 0,040 | 0,050 |
| <b>P.2</b> ≤ 850 N/mm <sup>2</sup> | 0,1xD          | 1xb            | 32,5           | 0,07                  | 0,08 | 0,040 | 0,050 |



- EN Chamfer end Mills | 90°, 60°  
 DE Entgraffräser | 90°, 60°  
 RU Фрезы одноугловые | 90°, 60°



S3500


 HSS/SC  


| $\alpha$ | Dc  | d<br>h 6 | l <sub>1</sub> | Z | S350002 |
|----------|-----|----------|----------------|---|---------|
| 90°      | 1,2 | 6        | 57             | 4 | .090012 |
| 90°      | 1,6 | 8        | 63             | 4 | .090016 |
| 90°      | 2   | 10       | 72             | 4 | .090020 |
| 90°      | 2,4 | 12       | 83             | 4 | .090024 |
| 60°      | 1,2 | 6        | 57             | 4 | .060012 |
| 60°      | 1,6 | 8        | 63             | 4 | .060016 |
| 60°      | 2   | 10       | 72             | 4 | .060020 |
| 60°      | 2,4 | 12       | 83             | 4 | .060024 |

## Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

| Material                               | A <sub>p</sub> | A <sub>e</sub> | V <sub>c</sub> | fz (mm/z) 90° |       |     |       | 60°   |       |      |       |
|--|----------------|----------------|----------------|---------------|-------|-----|-------|-------|-------|------|-------|
|  |                |                |                | Ø 1,2         | Ø 1,6 | Ø 2 | Ø 2,4 | Ø 1,2 | Ø 1,6 | Ø 2  | Ø 2,4 |
| <b>P.1</b> ≤ 600 N/mm <sup>2</sup>     |                |                | 180            | 0,05          | 0,07  | 0,1 | 0,12  | 0,03  | 0,05  | 0,07 | 0,1   |
| <b>P.3</b> ≤ 1100 N/mm <sup>2</sup>    |                |                | 100            | 0,05          | 0,07  | 0,1 | 0,12  | 0,03  | 0,05  | 0,07 | 0,1   |
| <b>P.5</b> ≤ 1100 N/mm <sup>2</sup>    |                |                | 80             | 0,05          | 0,07  | 0,1 | 0,12  | 0,03  | 0,05  | 0,07 | 0,1   |
| <b>M.1</b> ≤ 750 N/mm <sup>2</sup>     |                |                | 90             | 0,05          | 0,07  | 0,1 | 0,12  | 0,03  | 0,05  | 0,07 | 0,1   |
| <b>M.2</b> 750 - 850 N/mm <sup>2</sup> |                |                | 80             | 0,05          | 0,07  | 0,1 | 0,12  | 0,03  | 0,05  | 0,07 | 0,1   |
| <b>K.1</b> < 240 HB                    |                |                | 140            | 0,05          | 0,07  | 0,1 | 0,12  | 0,03  | 0,05  | 0,07 | 0,1   |
| <b>K.2</b> > 240 HB                    |                |                | 100            | 0,05          | 0,07  | 0,1 | 0,12  | 0,03  | 0,05  | 0,07 | 0,1   |
| <b>S.1</b> ≤ 1500 N/mm <sup>2</sup>    |                |                | 50             | 0,05          | 0,07  | 0,1 | 0,12  | 0,03  | 0,05  | 0,07 | 0,1   |
| <b>H.1</b> < 54 HRC                    |                |                | 60             | 0,05          | 0,07  | 0,1 | 0,12  | 0,03  | 0,05  | 0,07 | 0,1   |

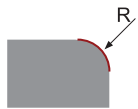
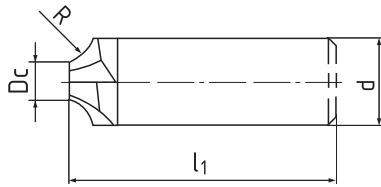
- EN Corner rounding | concave cutters
- DE Viertelrund-Profilfräser | konkav
- RU Фрезы секторные | выгнутые

ZPS-FN Norm
typ N
 $\lambda=0^\circ$   
 $\gamma=0^\circ$ 

DIN 6535 HA


ALTiN
K30

## S3600



| Dc | d <sub>h 6</sub> | l <sub>1</sub> | R   | Z |
|----|------------------|----------------|-----|---|
| 5  | 6                | 57             | 0,5 | 4 |
| 4  | 6                | 57             | 1   | 4 |
| 5  | 8                | 63             | 1,5 | 4 |
| 4  | 8                | 63             | 2   | 4 |
| 5  | 10               | 72             | 2,5 | 4 |
| 4  | 10               | 72             | 3   | 4 |
| 5  | 12               | 83             | 3,5 | 4 |
| 4  | 12               | 83             | 4   | 4 |
| 4  | 14               | 83             | 5   | 4 |

**S360002**

- .005
- .010
- .015
- .020
- .025
- .030
- .035
- .040
- .050

### Řezné podmínky / Cutting conditions / Schnittbedingungen / Условия резания

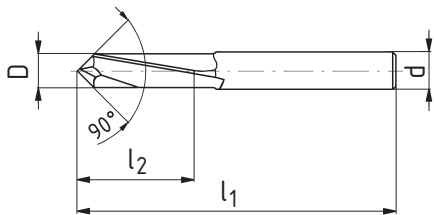
| Material                               | A <sub>p</sub> | A <sub>e</sub> | V <sub>c</sub> | f <sub>z</sub> (mm/z) |       |      |      |       |       |      |       |      |  |
|--|----------------|----------------|----------------|-----------------------|-------|------|------|-------|-------|------|-------|------|--|
|  |                |                |                | Ø 5                   | Ø 5,5 | Ø 6  | Ø 7  | Ø 7,5 | Ø 7,5 | Ø 8  | Ø 8,5 | Ø 9  |  |
| <b>P.1</b> ≤ 600 N/mm <sup>2</sup>     |                |                | 180            | 0,06                  | 0,05  | 0,07 | 0,06 | 0,09  | 0,08  | 0,12 | 0,1   | 0,14 |  |
| <b>P.3</b> ≤ 1100 N/mm <sup>2</sup>    |                |                | 100            | 0,06                  | 0,05  | 0,07 | 0,06 | 0,09  | 0,08  | 0,12 | 0,1   | 0,14 |  |
| <b>P.5</b> ≤ 1100 N/mm <sup>2</sup>    |                |                | 80             | 0,06                  | 0,05  | 0,07 | 0,06 | 0,09  | 0,08  | 0,12 | 0,1   | 0,14 |  |
| <b>M.1</b> ≤ 750 N/mm <sup>2</sup>     |                |                | 90             | 0,06                  | 0,05  | 0,07 | 0,06 | 0,09  | 0,08  | 0,12 | 0,1   | 0,14 |  |
| <b>M.2</b> 750 - 850 N/mm <sup>2</sup> |                |                | 80             | 0,06                  | 0,05  | 0,07 | 0,06 | 0,09  | 0,08  | 0,12 | 0,1   | 0,14 |  |
| <b>K.1</b> < 240 HB                    |                |                | 140            | 0,06                  | 0,05  | 0,07 | 0,06 | 0,09  | 0,08  | 0,12 | 0,1   | 0,14 |  |
| <b>K.2</b> > 240 HB                    |                |                | 100            | 0,06                  | 0,05  | 0,07 | 0,06 | 0,09  | 0,08  | 0,12 | 0,1   | 0,14 |  |
| <b>S.1</b> ≤ 1500 N/mm <sup>2</sup>    |                |                | 50             | 0,06                  | 0,05  | 0,07 | 0,06 | 0,09  | 0,08  | 0,12 | 0,1   | 0,14 |  |
| <b>H.1</b> < 54 HRC                    |                |                | 60             | 0,06                  | 0,05  | 0,07 | 0,06 | 0,09  | 0,08  | 0,12 | 0,1   | 0,14 |  |

- EN** Multifunction end mills
- DE** Multifräser
- RU** Мультифрезы

ZPS-FN Norm
typ N
HA
DM 6535 HA
ALTIN
K30

## S3900

## S3900



HSS/SC

| $\alpha$<br>k 12 | D<br>h 6 | d  | l <sub>1</sub> | l <sub>2</sub> | Z |
|------------------|----------|----|----------------|----------------|---|
| 90°              | 3        | 6  | 50             | 6              | 2 |
| 90°              | 4        | 6  | 54             | 8              | 2 |
| 90°              | 5        | 6  | 57             | 10             | 2 |
| 90°              | 6        | 6  | 57             | 12             | 2 |
| 90°              | 8        | 8  | 63             | 16             | 2 |
| 90°              | 10       | 10 | 72             | 18             | 2 |
| 90°              | 12       | 12 | 83             | 20             | 2 |

| S390002 | S390002    |
|---------|------------|
| .030    | .030 ALTIN |
| .040    | .040 ALTIN |
| .050    | .050 ALTIN |
| .060    | .060 ALTIN |
| .080    | .080 ALTIN |
| .100    | .100 ALTIN |
| .120    | .120 ALTIN |

