



**WINSFEED**

**HIPOSSFEED<sup>V</sup>**

CUTTERS AND INSERTS OF FNKT05 LINE  
FOR MINIATURE MACHINING

**MINI SIZED 90° END MILL AND  
HIGH FEED MILL WITH STRONG  
V-SHAPED INSERT**

- *Minimum tool diameter: Ø6 mm*
- *Strong insert clamping*
- *Increased productivity*
- *Excellent chip evacuation*
- *Improved tool life*
- *Wide range of applications*



## Product Overview

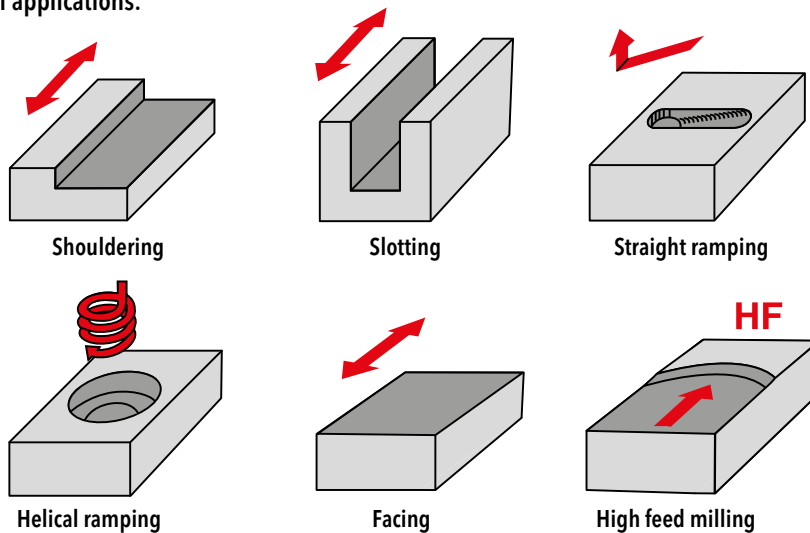
Ingersoll has released a new line of cutters and inserts for miniature machining in the Ø6 - Ø20 mm diameter range – the **HiPosSFeed<sup>V</sup>** line.

The new **HiPosSFeed<sup>V</sup>** family is ideal for small parts and the miniature industry. It is also designed to replace the machining range of solid carbide end mills from Ø6 mm. This family of cutters and inserts improves productivity and reduces costs due to the advantages of exchangeable inserts compared to solid carbide end mills.

## Application Range

Designed for various applications, it is equipped with the pressed type **FNKT05** insert for general applications, side ground type **FNHT05** insert for finishing with low cutting force and the high feed **UNKT05** insert for shallow depth of cut but high feed per tooth. In addition, the **FNCT050202R-AL** is an insert for machining non-ferrous metals

Covers a wide variety of applications:

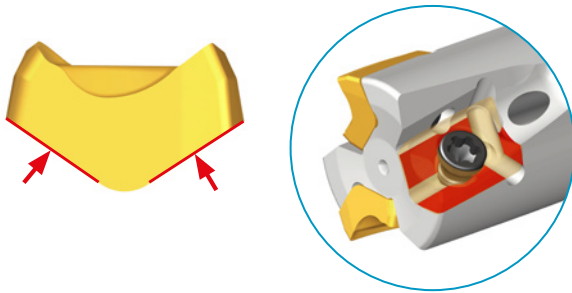


**Technical Features & Advantages**

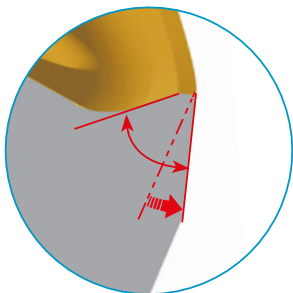
- Minimum tool diameter: Ø6, Z=1 and Ø8, Z=2



- Unique V shape insert bottom design
  - Increased insert rigidity
  - Improved self-positioning for strong insert clamping

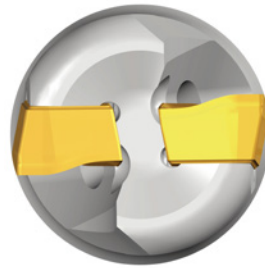


- Enhanced cutting edge design improves tool life and productivity



- Increased productivity due to high ramping angle
- Covers a wide variety of applications

- Finer pitch cutter maximizes productivity compared to the competition

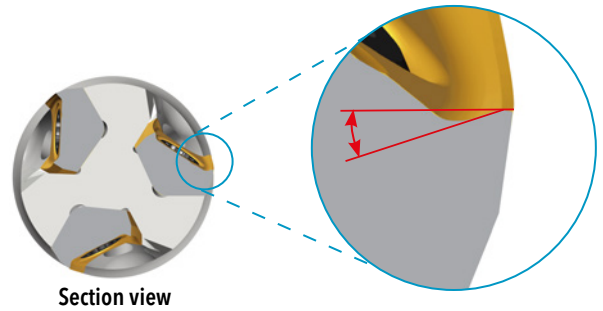


Competition (Ø10, Z=2)

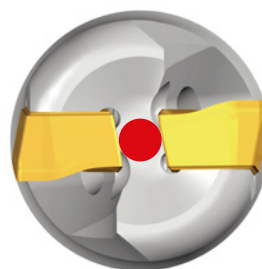


Ingersoll (Ø10, Z=3)

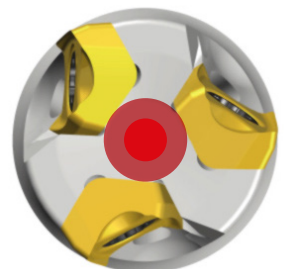
- High-rake angle design reduces cutting loads, which results in excellent chip evacuation



- Higher-stiffness core diameter over the competitor's cutter



Competition (Ø10, Z=2)



Ingersoll (Ø10, Z=3)

**FNKT0502\_R-M / FNHT0502\_R-L / FNCT050202R-AL**



|                         |              |              |                |
|-------------------------|--------------|--------------|----------------|
| Insert:                 | FNKT0502_R-M | FNHT0502_R-L | FNCT050202R-AL |
| average chip thickness: | hm = 0,04 mm | hm = 0,03 mm | hm = 0,03 mm   |
| max. cutting depth:     | ap = 5,0 mm  | ap = 5,0 mm  | ap = 5,0 mm    |

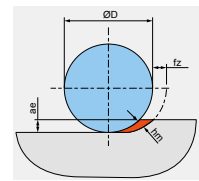
**Recommended cutting data:**

| ISO | material                             | cutting speed Vc [m/min]                                 |            |   |           | feed per tooth fz [mm] |
|-----|--------------------------------------|--|------------|---|-----------|------------------------|
|     |                                      | 1st choice dry machining<br>resp. wear resistant carbide |            | 1st choice wet machining<br>resp. rough carbide |           |                        |
| P   | unalloyed steel                      | IN2505   | 250 - 290  | IN2530  | 200 - 240 | 0,04 - 0,08            |
|     | alloyed steel 800 N/mm <sup>2</sup>  | IN2505   | 210 - 250  | IN2530  | 160 - 200 | 0,04 - 0,06            |
|     | alloyed steel 1100 N/mm <sup>2</sup> | IN2505   | 160 - 180  | IN2530  | 110 - 130 | 0,03                   |
| M   | stainless steel                      | IN2505   | 120 - 180  | IN2530  | 80 - 130  | 0,04 - 0,06            |
| K   | gray cast iron                       | IN2505   | 180 - 250  | IN2530  | 150 - 200 | 0,04 - 0,08            |
|     | nodular cast iron                    | IN2505   | 140 - 210  | IN2530  | 110 - 160 | 0,04 - 0,06            |
| N   | aluminum                             | IN05S  | 800 - 1500 | IN05S   | 500 - 800 | 0,03 - 0,07            |
| S   | high temperature alloys              | IN2505   | 110 - 125  | IN2530  | 60 - 80   | 0,04                   |
|     | titanium alloys                      | IN2505   | 40 - 50    | IN2530  | 30 - 40   | 0,04                   |
| H   | hard machining < 54 HRC              | -  | -          | -   | -         | -                      |
|     | hard machining < 63 HRC              | -  | -          | -   | -         | -                      |

**Tips:**

- The worse the material machinability, the smaller the tool engagement should be chosen.
- The smaller the cutting tool diameter, the higher the cutting speed can be.
- If tool engagement is less than 1/3 of cutting tool diameter, the feed per tooth should be calculated with the following formula:

$$fz = hm \times \sqrt{\frac{D}{ae}}$$



**Ramping data and circular interpolation:**

| tool diameter [mm] | max. ramp. angle [°] | min. bore dia. uneven ground [mm] | max. ap/rev. [mm] | min. bore dia. even ground [mm] | max. ap/rev. [mm] | max. bore dia. even ground [mm] | max. ap/rev. [mm] |
|--------------------|----------------------|-----------------------------------|-------------------|---------------------------------|-------------------|---------------------------------|-------------------|
| 6                  | 2,50                 | 7,9                               | 0,2               | 10,8                            | 0,6               | 11,5                            | 0,7               |
| 8                  | 1,90                 | 12,0                              | 0,4               | 14,9                            | 0,7               | 15,5                            | 0,7               |
| 9                  | 1,70                 | 13,8                              | 0,4               | 16,9                            | 0,7               | 17,5                            | 0,7               |
| 10                 | 1,50                 | 15,7                              | 0,4               | 18,9                            | 0,7               | 19,5                            | 0,7               |
| 11                 | 1,20                 | 17,7                              | 0,4               | 20,9                            | 0,6               | 21,5                            | 0,6               |
| 12                 | 1,10                 | 19,6                              | 0,4               | 22,9                            | 0,6               | 23,5                            | 0,6               |
| 13                 | 1,00                 | 21,6                              | 0,4               | 24,9                            | 0,6               | 25,5                            | 0,6               |
| 14                 | 1,00                 | 23,5                              | 0,5               | 26,9                            | 0,7               | 27,5                            | 0,7               |
| 15                 | 0,80                 | 25,4                              | 0,4               | 28,9                            | 0,6               | 29,5                            | 0,6               |
| 16                 | 0,75                 | 27,4                              | 0,4               | 30,9                            | 0,6               | 31,5                            | 0,6               |
| 20                 | 0,60                 | 35,4                              | 0,5               | 38,9                            | 0,6               | 39,5                            | 0,6               |

**General information:**

Insert screw size 436: **SM18-033-00**

Torque: **0,5 Nm**

Torque wrench: **DTN005S with bit DS-TP06TB**

**UNKT0502TR-HF**



|                         |               |
|-------------------------|---------------|
| Insert:                 | UNKT0502TR-HF |
| average chip thickness: | hm = 0,2 mm   |
| max. cutting depth:     | ap = 0,5 mm   |

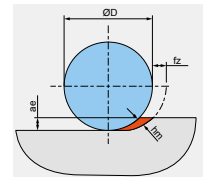
**Recommended cutting data:**

| ISO | material                             | cutting speed Vc [m/min]                                 |           |   |           | feed per tooth fz [mm] |
|-----|--------------------------------------|--|-----------|---|-----------|------------------------|
|     |                                      | 1st choice dry machining<br>resp. wear resistant carbide |           | 1st choice wet machining<br>resp. rough carbide |           |                        |
| P   | unalloyed steel                      | IN2505   | 250 - 290 | IN2530  | 200 - 240 | 0,2 - 0,4              |
|     | alloyed steel 800 N/mm <sup>2</sup>  | IN2505   | 210 - 250 | IN2530  | 160 - 200 | 0,2 - 0,3              |
|     | alloyed steel 1100 N/mm <sup>2</sup> | IN2505   | 160 - 180 | IN2530  | 110 - 130 | 0,2                    |
| M   | stainless steel                      | IN2505   | 120 - 180 | IN2530  | 80 - 130  | 0,2 - 0,3              |
| K   | gray cast iron                       | IN2505   | 180 - 250 | IN2530  | 150 - 200 | 0,2 - 0,4              |
|     | nodular cast iron                    | IN2505   | 140 - 210 | IN2530  | 110 - 160 | 0,2 - 0,3              |
| N   | aluminum                             | -  | -         | -   | -         | -                      |
| S   | high temperature alloys              | IN2505   | 110 - 125 | IN2530  | 60 - 80   | 0,2                    |
|     | titanium alloys                      | IN2505   | 40 - 50   | IN2530  | 30 - 40   | 0,2                    |
| H   | hard machining < 54 HRC              | IN2504   | 130 - 150 | -   | -         | 0,2                    |
|     | hard machining < 63 HRC              | IN2504   | 110 - 130 | -   | -         | 0,2                    |

**Tips:**

- The worse the material machinability, the smaller the tool engagement should be chosen.
- The smaller the cutting tool diameter, the higher the cutting speed can be.
- If tool engagement is less than 1/3 of cutting tool diameter, the feed per tooth should be calculated with the following formula:

$$fz = hm \times \sqrt{\frac{D}{ae}}$$



**Ramping data and circular interpolation:**

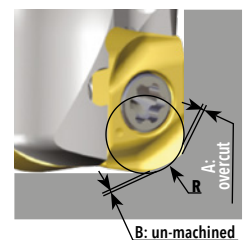
| tool diameter [mm] | max. ramp. angle [°] | min. bore dia. [mm] | max. ap/rev. [mm] | max. bore dia. [mm] | max. ap/rev. [mm] |
|--------------------|----------------------|---------------------|-------------------|---------------------|-------------------|
| 6                  | 0,20                 | 8                   | 0,0               | 12                  | 0,1               |
| 8                  | 0,40                 | 12                  | 0,1               | 16                  | 0,1               |
| 9                  | 0,50                 | 14                  | 0,1               | 18                  | 0,2               |
| 10                 | 0,30                 | 16                  | 0,1               | 20                  | 0,1               |
| 11                 | 0,35                 | 18                  | 0,1               | 22                  | 0,2               |
| 12                 | 0,65                 | 20                  | 0,2               | 24                  | 0,4               |
| 13                 | 0,70                 | 22                  | 0,3               | 26                  | 0,4               |
| 14                 | 0,80                 | 24                  | 0,4               | 28                  | 0,5               |
| 15                 | 0,75                 | 26                  | 0,4               | 30                  | 0,5               |
| 16                 | 0,65                 | 28                  | 0,4               | 32                  | 0,5               |
| 20                 | 0,50                 | 36                  | 0,4               | 40                  | 0,5               |

**Programming Tips:**

Please use a corner radius of 0.8 up to 1 mm in your NC-program when machining 3D-contours. Refer to the following table for max. allowance resp. over cut:

|               | R program | A over cut | B un-machined |
|---------------|-----------|------------|---------------|
| UNKT0502TR-HF | 0,8       | 0          | 0,21          |
|               | 0,9       | 0          | 0,18          |
|               | 1,0       | 0,02       | 0,14          |

Recommended program 'R'



**General information:**

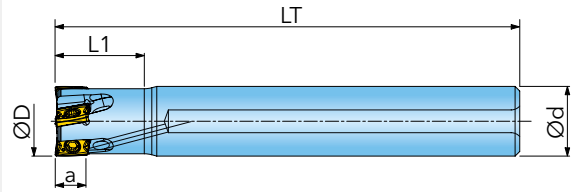
Insert screw: **SM18-033-00**

Torque: **0,5 Nm**

Torque wrench: **DTN005S with bit DS-TP06TB**

# HIPOSSPEED<sup>V</sup> END MILL 12J1A...T

ADAPTION ACC. TO 1835 A



| Designation      | D  | d  | LT | L1 | a | Z |     |   |      |
|------------------|----|----|----|----|---|---|-----|---|------|
| 12J1A006012T7R00 | 6  | 6  | 60 | 12 | 5 | 1 | 2,5 | ✓ | 0,01 |
| 12J1A008012T0R00 | 8  | 8  | 80 | 12 | 5 | 2 | 1,9 | ✓ | 0,03 |
| 12J1A009012T0R00 | 9  | 8  | 80 | 12 | 5 | 2 | 1,7 | ✓ | 0,03 |
| 12J1A010015T1R00 | 10 | 10 | 80 | 15 | 5 | 3 | 1,5 | ✓ | 0,04 |
| 12J1A011012T1R00 | 11 | 10 | 80 | 12 | 5 | 3 | 1,2 | ✓ | 0,04 |
| 12J1A012015T2R00 | 12 | 12 | 80 | 15 | 5 | 4 | 1,1 | ✓ | 0,06 |
| 12J1A013012T2R00 | 13 | 12 | 80 | 12 | 5 | 4 | 1,0 | ✓ | 0,06 |
| 12J1A014012T2R00 | 14 | 12 | 80 | 12 | 5 | 4 | 1,0 | ✓ | 0,06 |

| FNKT050202R-M  | FNKT050204R-M | FNHT050202R-L |
|----------------|---------------|---------------|
|                |               |               |
| FNCT050202R-AL | UNKT0502TR-HF |               |
|                |               |               |

| Designation                 | fz(min/max) | Design                              | Grade | IN05S | IN2005 | IN2504 | IN2505 | IN2530 |  |  |
|-----------------------------|-------------|-------------------------------------|-------|-------|--------|--------|--------|--------|--|--|
| FNKT050202R-M               | 0,04/0,08   | positive geometry R0,2              |       |       |        |        |        |        |  |  |
| FNKT050204R-M               | 0,04/0,08   | positive geometry R0,4              |       |       |        |        |        |        |  |  |
| FNHT050202R-L               | 0,03/0,07   | sharp geometry R0,2                 |       |       |        |        |        |        |  |  |
| FNCT050202R-AL              | 0,03/0,07   | non-ferrous geometry, polished R0,2 |       |       |        |        |        |        |  |  |
| UNKT0502TR-HF <sup>1)</sup> | 0,20/0,40   | positive high feed geometry         |       |       |        |        |        |        |  |  |

<sup>1)</sup>Cutter body has to be modified

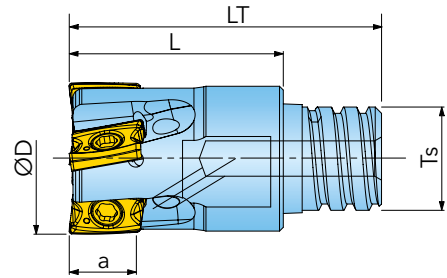
● = P ● = M ● = K ● = N ● = S ○ = H

| SPARE PARTS | 1                   | 2             |
|-------------|---------------------|---------------|
|             |                     |               |
|             | SM18-033-00 (0,5Nm) | TXPLUS06x90-B |

1 = Insert screw 2 = Torx-bit

# HIPOSSFEED<sup>V</sup> END MILL 12J1A...

FOR EXCHANGEABLE HEAD SYSTEM



| Designation      | D  | LT   | L  | a | Ts | Z |     |   |      |
|------------------|----|------|----|---|----|---|-----|---|------|
| 12J1A008010TQR00 | 8  | 16,8 | 10 | 5 | T5 | 2 | 1,9 | ✓ | 0,01 |
| 12J1A010016T6R00 | 10 | 22,8 | 16 | 5 | T6 | 3 | 1,5 | ✓ | 0,01 |
| 12J1A012017T8R00 | 12 | 24,8 | 17 | 5 | T8 | 4 | 1,1 | ✓ | 0,01 |

| FNKT050202R-M  | FNKT050204R-M | FNHT050202R-L |
|----------------|---------------|---------------|
|                |               |               |
| FNCT050202R-AL | UNKT0502TR-HF |               |
|                |               |               |

| Designation                 | fz(min/max) | Design                              | Grade | IN05S | IN2005 | IN2504 | IN2505 | IN2530 |  |  |  |
|-----------------------------|-------------|-------------------------------------|-------|-------|--------|--------|--------|--------|--|--|--|
| FNKT050202R-M               | 0,04/0,08   | positive geometry R0,2              |       |       |        |        |        |        |  |  |  |
| FNKT050204R-M               | 0,04/0,08   | positive geometry R0,4              |       |       |        |        |        |        |  |  |  |
| FNHT050202R-L               | 0,03/0,07   | sharp geometry R0,2                 |       |       |        |        |        |        |  |  |  |
| FNCT050202R-AL              | 0,03/0,07   | non-ferrous geometry, polished R0,2 |       |       |        |        |        |        |  |  |  |
| UNKT0502TR-HF <sup>1)</sup> | 0,20/0,40   | positive high feed geometry         |       |       |        |        |        |        |  |  |  |

<sup>1)</sup> Cutter body has to be modified

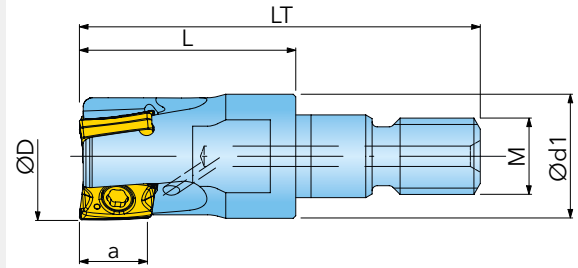
● = P ● = M ● = K ● = N ● = S ○ = H

| SPARE PARTS | 1                   | 2             |
|-------------|---------------------|---------------|
|             |                     |               |
|             | SM18-033-00 (0,5Nm) | TXPLUS06x90-B |

1 = Insert screw 2 = Torx-bit

# HIPOSSFEED<sup>V</sup> END MILL 12J1A...X

SCREW-IN TYPE ADAPTION



| Designation      | D  | d1   | LT   | L  | a | M   | Z |      |   |      |
|------------------|----|------|------|----|---|-----|---|------|---|------|
| 12J1A010017X4R00 | 10 | 9,8  | 31,5 | 17 | 5 | M6  | 3 | 1,50 | ✓ | 0,01 |
| 12J1A012017X4R00 | 12 | 11,8 | 31,5 | 17 | 5 | M6  | 4 | 1,10 | ✓ | 0,01 |
| 12J1A015023X5R00 | 15 | 12,8 | 40,8 | 23 | 5 | M8  | 5 | 0,80 | ✓ | 0,01 |
| 12J1A016023X5R00 | 16 | 12,8 | 40,8 | 23 | 5 | M8  | 5 | 0,75 | ✓ | 0,01 |
| 12J1A020030X6R00 | 20 | 17,8 | 49,8 | 30 | 5 | M10 | 6 | 0,60 | ✓ | 0,01 |

|                           |                          |                          |
|---------------------------|--------------------------|--------------------------|
| <b>FNKT050202R-M</b><br>  | <b>FNKT050204R-M</b><br> | <b>FNHT050202R-L</b><br> |
| <b>FNCT050202R-AL</b><br> | <b>UNKT0502TR-HF</b><br> |                          |

| Designation                 | fz(min/max) | Design                              | Grade | IN05S | IN2005 | IN2504 | IN2505 | IN2530 |  |  |
|-----------------------------|-------------|-------------------------------------|-------|-------|--------|--------|--------|--------|--|--|
| FNKT050202R-M               | 0,04/0,08   | positive geometry R0,2              |       |       |        |        |        |        |  |  |
| FNKT050204R-M               | 0,04/0,08   | positive geometry R0,4              |       |       |        |        |        |        |  |  |
| FNHT050202R-L               | 0,03/0,07   | sharp geometry R0,2                 |       |       |        |        |        |        |  |  |
| FNCT050202R-AL              | 0,03/0,07   | non-ferrous geometry, polished R0,2 |       |       |        |        |        |        |  |  |
| UNKT0502TR-HF <sup>1)</sup> | 0,20/0,40   | positive high feed geometry         |       |       |        |        |        |        |  |  |

<sup>1)</sup>Cutter body has to be modified

● = P ● = M ● = K ● = N ● = S ○ = H

| SPARE PARTS | 1                   | 2             |
|-------------|---------------------|---------------|
|             |                     |               |
|             | SM18-033-00 (0,5Nm) | TXPLUS06x90-B |

1 = Insert screw 2 = Torx-bit

## Ingersoll Werkzeuge GmbH

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