

# Laydown Grooving

For Shallow Grooves



METRIC

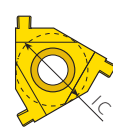

# Laydown Grooving Ordering Code System



See it in action

## Insert

|          |          |          |          |            |          |             |          |            |            |
|----------|----------|----------|----------|------------|----------|-------------|----------|------------|------------|
| <b>5</b> | <b>L</b> | <b>I</b> | <b>R</b> | <b>1.1</b> | <b>-</b> | <b>D472</b> | <b>-</b> | <b>1.3</b> | <b>VKP</b> |
| <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b>   | <b>6</b> | <b>7</b>    | <b>6</b> | <b>8</b>   | <b>9</b>   |

|  |   |   |  |  |
|--|---|---|--|--|
| <b>1 - Insert Size</b><br>5.0L - IC5.0L<br>2 - IC1/4"<br>3 - IC3/8"<br>4 - IC1/2"<br>5 - IC5/8"<br> | <b>2 - Insert Style</b><br>L<br> | <b>4 - RH / LH Insert</b><br>R - Right Hand Insert<br>L - Left Hand Insert<br><b>5 - Groove Std. Width</b><br>0.8 - 2.15 (mm)<br><b>6 - Profile Style</b><br>C - Full Profile | <b>7 - Groove Standard</b><br>DIN 471 Partial<br>DIN 471<br>DIN 472 Partial<br>DIN 472<br>DIN 7993 Partial<br>DIN 7993<br>DIN 76 ST, DIN 76 SH<br>DIN 3770 | <b>8 - Groove Depth</b><br>0.33 - 2.0 (mm)<br><b>9 - Carbide Grade</b><br>VTX<br>VKP (for Mini L)<br>VHX (for Mini L)<br>VKX |
|--|---|---|--|--|

## External Toolholders

|          |          |           |          |          |          |
|----------|----------|-----------|----------|----------|----------|
| <b>A</b> | <b>L</b> | <b>32</b> | <b>-</b> | <b>4</b> |          |
| <b>1</b> | <b>2</b> | <b>3</b>  |          | <b>4</b> | <b>5</b> |

|   |   |  |  |  |
|---|---|--|--|--|
| <b>1 - Anvil</b><br>A - Anvil required<br>N - No Anvil required<br>O - Miniature holder | <b>2 - Holder Style</b><br>L - External<br>V - Miniature Square Shank<br>VR - Miniature Round Shank | <b>3 - Shank Square [mm]</b><br>8, 10, 12, 16, 20, 25, 32,<br>40, 50, 60 | <b>4 - Insert Size</b><br>2 - IC1/4"<br>3 - IC3/8"<br>4 - IC1/2"<br>5 - IC5/8" | <b>5 - RH/LH Holder</b><br>None - Right Hand<br>LH - Left Hand |
|---|---|--|--|--|

## Internal Toolholders

|          |          |           |          |           |          |          |          |          |
|----------|----------|-----------|----------|-----------|----------|----------|----------|----------|
| <b>C</b> | <b>A</b> | <b>VR</b> | <b>C</b> | <b>20</b> |          | <b>-</b> | <b>3</b> |          |
| <b>1</b> | <b>2</b> | <b>3</b>  | <b>4</b> | <b>5</b>  | <b>6</b> |          | <b>7</b> | <b>8</b> |

|   |  |   |   |   |  |
|---|--|---|---|---|--|
| <b>1 - Shank Type</b><br>B - Anti Vibration System<br>C - Carbide Shank<br>S - Mini Holders | <b>2 - Anvil</b><br>A - Anvil required<br>N - No Anvil required<br>O - Miniature holder<br><b>3 - Tool Type</b><br>VR - Internal Round shank | <b>4 - Cooling</b><br>C - With Coolant Channel<br><b>5 - Shank Front Dia</b><br>10, 10D, 12, 13, 16<br>16D, 20, 25, 25D, 32, 40, 50<br>6.2 (Mini Adjust)<br>8.0 (Mini Adjust) | <b>6 - Holder Length (Mini Holders)</b><br>U - Ultra Short<br>S - Short<br>M - Medium<br>L - Long<br>T - Adjustable | <b>7 - Insert Size</b><br>5L - IC5.0L mm<br>4.0K - IC4.0 mm<br>6.0 - IC6.0 mm<br>2 - IC1/4"<br>3 - IC3/8"<br>4 - IC1/2"<br>5 - IC5/8" | <b>8 - RH/LH Holder</b><br>None - Right Hand<br>LH - Left Hand |
|---|--|---|---|---|--|

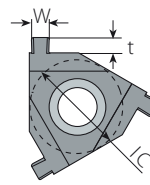
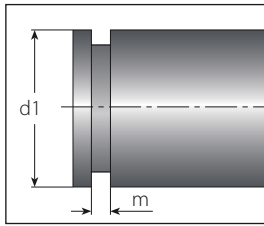
## Adjustable Toolholders (Sleeves)

|          |          |          |           |          |          |
|----------|----------|----------|-----------|----------|----------|
| <b>S</b> | <b>M</b> | <b>C</b> | <b>16</b> | <b>-</b> | <b>3</b> |
| <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b>  |          | <b>5</b> |

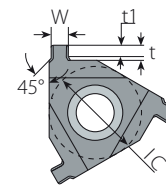
|  |  |   |  |   |
|--|--|---|--|---|
| <b>1 - Holder Shape</b><br>S - Sleeve (Double Ended) | <b>2 - Holder Type</b><br>V - Adjustable Holders | <b>3 - Cooling</b><br>C - Coolant Channel | <b>4 - Holder Dia.</b><br>10, 12, 16, 20 | <b>5 - Holder Bore Size</b><br>Adjustable Holders<br>6.2<br>8 |
|--|--|---|--|---|

# DIN 471 Retaining Ring Grooves for Shafts

## External



Standard  
(Partial Profile)



Standard  
(Full Profile)

## Standard (Partial Profile)



| Insert Size | Ordering Code        | Groove Std. | Dimensions mm |     |  | Anvil     | Holder |
|-------------|----------------------|-------------|---------------|-----|--|-----------|--------|
| IC          | RH                   | m (H13)     | W             | t   |  |           |        |
| 3/8"        | 3ER1.10-D471-1.30... | 1.10        | 1.19          | 1.3 |  | YE3M-1.5N | AL..-3 |
|             | 3ER1.30-D471-1.50... | 1.30        | 1.39          | 1.5 |  |           |        |
|             | 3ER1.60-D471-1.85... | 1.60        | 1.69          | 1.8 |  |           |        |
|             | 3ER1.85-D471-2.00... | 1.85        | 1.94          | 2.0 |  |           |        |

Range of profiles also available on IC 1/4", 1/2" and 5/8", inserts on request.

## Standard (Full Profile)

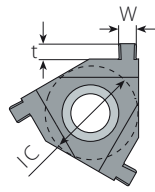
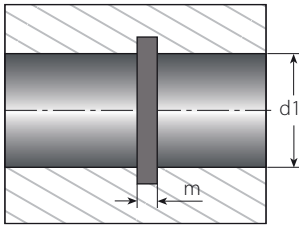


| Insert Size | Ordering Code         | Groove Std. | Dimensions mm |      |      |      | Anvil     | Holder |
|-------------|-----------------------|-------------|---------------|------|------|------|-----------|--------|
| IC          | RH                    | m(H13)      | d1            | W    | t1   | t    |           |        |
| 3/8"        | 3ER1.10C-D471-0.35... | 1.10        | 15            | 1.19 | 0.33 | 0.35 | YE3M-1.5N | AL..-3 |
|             | 3ER1.10C-D471-0.40... | 1.10        | 16-17         | 1.19 | 0.36 | 0.40 |           |        |
|             | 3ER1.30C-D471-0.50... | 1.30        | 18-22         | 1.39 | 0.44 | 0.50 |           |        |
|             | 3ER1.30C-D471-0.55... | 1.30        | 24-26         | 1.39 | 0.45 | 0.55 |           |        |
|             | 3ER1.60C-D471-0.70... | 1.60        | 28-30         | 1.69 | 0.60 | 0.70 |           |        |
|             | 3ER1.60C-D471-0.85... | 1.60        | 32-34         | 1.69 | 0.75 | 0.85 |           |        |
|             | 3ER1.60C-D471-1.00... | 1.60        | 35            | 1.69 | 0.85 | 1.00 |           |        |
|             | 3ER1.85C-D471-1.00... | 1.85        | 36-38         | 1.94 | 0.85 | 1.00 |           |        |
|             | 3ER1.85C-D471-1.25... | 1.85        | 40-48         | 1.94 | 1.10 | 1.25 |           |        |
|             | 3ER2.15C-D471-1.50... | 2.15        | 50-63         | 2.24 | 1.35 | 1.50 |           |        |

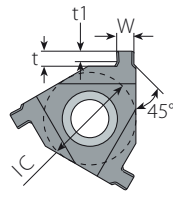
Range of profiles also available on IC 1/4", 1/2" and 5/8", inserts on request.

# DIN 472 Retaining Ring Grooves for Bores

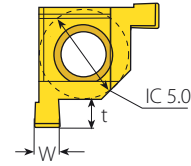
## Internal



Standard  
(Partial Profile)



Standard  
(Full Profile)



Mini-L  
(Partial Profile)

## Standard (Partial Profile)



| Insert Size | Ordering Code        | Groove Std. | Dimensions mm |      |           | Anvil  | Holder |
|-------------|----------------------|-------------|---------------|------|-----------|--------|--------|
| IC          |                      | m (H13)     | W             | t    |           |        |        |
| 3/8"        | 3IR1.10-D472-1.30... | 1.10        | 1.19          | 1.30 | Y13M-1.5N | AVR.-3 |        |
|             | 3IR1.30-D472-1.50... | 1.30        | 1.39          | 1.50 |           |        |        |
|             | 3IR1.60-D472-1.80... | 1.60        | 1.69          | 1.80 |           |        |        |
|             | 3IR1.85-D472-2.00... | 1.85        | 1.94          | 2.00 |           |        |        |

Range of profiles also available on IC 1/4", 1/2" and 5/8", inserts on request.  
For minimum bore diameters, refer to page 9.

## Standard (Full Profile)



| Insert Size | Ordering Code         | Groove Std. | Dimensions mm |      |      |      | Anvil     | Holder |
|-------------|-----------------------|-------------|---------------|------|------|------|-----------|--------|
| IC          |                       | m (H13)     | d1            | W    | t1   | t    |           |        |
| 3/8"        | 3IR1.10C-D472-0.50... | 1.10        | 18-22         | 1.19 | 0.36 | 0.50 | Y13M-1.5N | AVR.-3 |
|             | 3IR1.30C-D472-0.60... | 1.30        | 24-26         | 1.39 | 0.44 | 0.60 |           |        |
|             | 3IR1.30C-D472-0.70... | 1.30        | 28-30         | 1.39 | 0.60 | 0.70 |           |        |
|             | 3IR1.30C-D472-0.85... | 1.30        | 31-34         | 1.39 | 0.75 | 0.85 |           |        |
|             | 3IR1.60C-D472-0.85... | 1.60        | 34            | 1.69 | 0.75 | 0.85 |           |        |
|             | 3IR1.60C-D472-1.00... | 1.60        | 35-38         | 1.69 | 0.85 | 1.00 |           |        |
|             | 3IR1.85C-D472-1.25... | 1.85        | 40-48         | 1.94 | 1.10 | 1.25 |           |        |
|             | 3IR2.15C-D472-1.50... | 2.15        | 50-63         | 2.24 | 1.35 | 1.50 |           |        |

Range of profiles also available on IC 1/4", 1/2" and 5/8", inserts on request.  
For minimum bore diameters, refer to page 9.

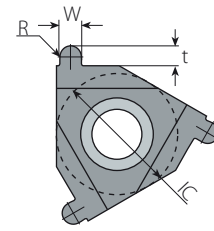
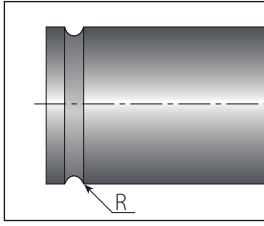
## Mini-L (Partial Profile)



| Insert Size | Ordering Code       | Groove Std. | Dimensions mm |     | Min. Bore dia (mm) | Holder     |
|-------------|---------------------|-------------|---------------|-----|--------------------|------------|
| IC          |                     | m (H13)     | W             | t   |                    |            |
| 5.0L        | 5LIR0.9-D472-0.7... | 0.9         | 0.99          | 0.7 | 8.0                | .NVR10.-5L |
|             | 5LIR1.1-D472-1.0... | 1.1         | 1.19          | 1.0 |                    |            |
|             | 5LIR1.3-D472-1.5... | 1.3         | 1.39          | 1.5 |                    |            |

# DIN 7993 Snap Ring Grooves

## External



Standard  
(Partial Profile)

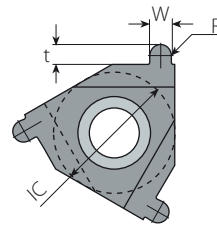
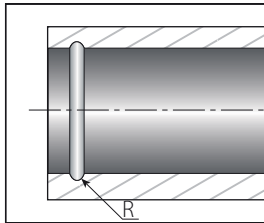
## Standard (Partial Profile for Shafts)



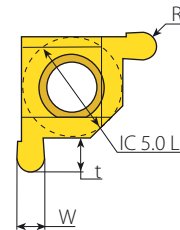
| Insert Size | Ordering Code         | Dimensions mm |      |      | Anvil     | Holder |
|-------------|-----------------------|---------------|------|------|-----------|--------|
| IC          | RH                    | R             | W    | t    |           |        |
| 3/8"        | 3ER0.40-D7993-0.60... | 0.40          | 0.80 | 0.60 | YE3M-1.5N | AL...3 |
|             | 3ER0.60-D7993-0.80... | 0.60          | 1.20 | 0.80 |           |        |
|             | 3ER0.90-D7993-1.10... | 0.90          | 1.80 | 1.10 |           |        |
|             | 3ER1.00-D7993-1.20... | 1.00          | 2.00 | 1.20 |           |        |

Range of profiles also available on IC 1/4", 1/2" and 5/8", inserts on request.

## Internal



Standard  
(Partial Profile)



Mini-L  
(Partial Profile)

## Standard (Partial Profile for Bores)



| Insert Size | Ordering Code         | Dimensions mm |      |      | Anvil     | Holder  |
|-------------|-----------------------|---------------|------|------|-----------|---------|
| IC          | RH                    | R             | W    | t    |           |         |
| 3/8"        | 3IR0.60-D7993-0.80... | 0.60          | 1.20 | 0.80 | YI3M-1.5N | AVR...3 |
|             | 3IR0.90-D7993-1.10... | 0.90          | 1.80 | 1.10 |           |         |
|             | 3IR1.00-D7993-1.20... | 1.00          | 2.00 | 1.20 |           |         |

Range of profiles also available on IC 1/4", 1/2" and 5/8" inserts on request.  
For minimum bore diameters, refer to page 9.

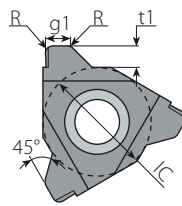
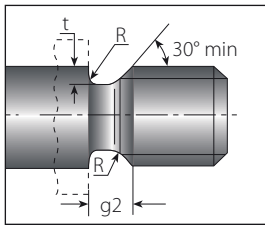
## Mini-L (Partial Profile for Bores)



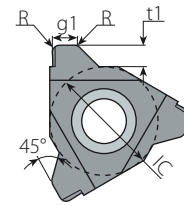
| Insert Size | Ordering Code        | Dimensions mm |     |     | Min Bore dia. | Holder    |
|-------------|----------------------|---------------|-----|-----|---------------|-----------|
| IC          | RH                   | R             | W   | t   | mm            |           |
| 5.0L        | 5LIR0.4-D7993-0.8... | 0.4           | 0.8 | 0.8 | 8.0           | .NVR10-5L |
|             | 5LIR0.6-D7993-1.0... | 0.6           | 1.2 | 1.0 |               |           |

# DIN 76 Thread Undercuts (For ISO Metric Threads in Accordance with DIN 13)

## External



Normal - Type A



Short - Type B

## Standard (Normal - Type A)



| Insert Size | Ordering Code         | Pitch | Dimensions mm |      |      |      |      | Anvil     | Holder |
|-------------|-----------------------|-------|---------------|------|------|------|------|-----------|--------|
| IC          | RH                    | mm    | R             | g1   | g2   | t    | t1   |           |        |
| 3/8"        | 3ER0.50-D76ST-0.40... | 0.50  | 0.2           | 1.10 | 1.50 | 0.40 | 2.50 | YE3M-1.5N | AL..-3 |
|             | 3ER0.60-D76ST-0.50... | 0.60  | 0.4           | 1.30 | 1.80 | 0.50 | 2.40 |           |        |
|             | 3ER0.70-D76ST-0.55... | 0.70  | 0.4           | 1.55 | 2.10 | 0.55 | 2.20 |           |        |
|             | 3ER0.80-D76ST-0.65... | 0.80  | 0.4           | 1.75 | 2.40 | 0.65 | 2.10 |           |        |
|             | 3ER1.00-D76ST-0.80... | 1.00  | 0.6           | 2.20 | 3.00 | 0.80 | 1.90 |           |        |
| 5/8"        | 5ER1.25-D76ST-1.00... | 1.25  | 0.6           | 2.80 | 3.80 | 1.00 | 3.60 | YE5M-1.5N | AL..-5 |
|             | 5ER1.50-D76ST-1.15... | 1.50  | 0.8           | 3.35 | 4.50 | 1.15 | 3.30 |           |        |
|             | 5ER1.75-D76ST-1.30... | 1.75  | 1.0           | 4.00 | 5.30 | 1.30 | 3.00 |           |        |
|             | 5ER2.00-D76ST-1.50... | 2.00  | 1.0           | 4.50 | 6.00 | 1.50 | 2.70 |           |        |

## Standard (Short - Type B)

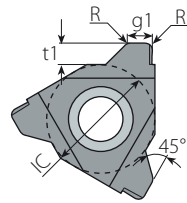
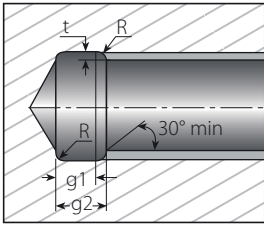


| Insert Size | Ordering Code         | Pitch | Dimensions mm |      |      |      |      | Anvil     | Holder |
|-------------|-----------------------|-------|---------------|------|------|------|------|-----------|--------|
| IC          | RH                    | mm    | R             | g1   | g2   | t    | t1   |           |        |
| 3/8"        | 3ER1.00-D76SH-0.80... | 1.00  | 0.6           | 1.20 | 2.00 | 0.80 | 2.50 | YE3M-1.5N | AL..-3 |
|             | 3ER1.25-D76SH-1.00... | 1.25  | 0.6           | 1.50 | 2.50 | 1.00 | 2.30 |           |        |
|             | 3ER1.50-D76SH-1.15... | 1.50  | 0.8           | 1.85 | 3.00 | 1.15 | 2.10 |           |        |
|             | 3ER1.75-D76SH-1.30... | 1.75  | 1.0           | 2.20 | 3.50 | 1.30 | 1.90 |           |        |
| 5/8"        | 5ER2.00-D76SH-1.50... | 2.00  | 1.0           | 2.50 | 4.00 | 1.50 | 3.80 | YE5M-1.5N | AL..-5 |
|             | 5ER2.50-D76SH-1.80... | 2.50  | 1.2           | 3.20 | 5.00 | 1.80 | 3.50 |           |        |
|             | 5ER3.00-D76SH-2.20... | 3.00  | 1.6           | 3.80 | 6.00 | 2.20 | 3.10 |           |        |

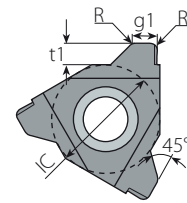
Range of profiles also available on IC 1/4" and 1/2" inserts on request.

# DIN 76 Thread Undercuts (For ISO Metric Threads in Accordance with DIN 13)

## Internal



Normal - Type C



Short - Type D

## Standard (Normal - Type C)



| Insert Size | Ordering Code         | Pitch | Dimensions mm |      |      |      |      | Anvil     | Holder   |
|-------------|-----------------------|-------|---------------|------|------|------|------|-----------|----------|
| IC          | RH                    | mm    | R             | g1   | g2   | t    | t1   |           |          |
| 3/8"        | 3IR0.50-D76ST-0.40... | 0.50  | 0.2           | 1.10 | 1.50 | 0.40 | 2.50 | Y13M-1.5N | AVR...-3 |
|             | 3IR0.60-D76ST-0.50... | 0.60  | 0.4           | 1.30 | 1.80 | 0.50 | 2.40 |           |          |
|             | 3IR0.70-D76ST-0.55... | 0.70  | 0.4           | 1.55 | 2.10 | 0.55 | 2.20 |           |          |
|             | 3IR0.80-D76ST-0.65... | 0.80  | 0.4           | 1.75 | 2.40 | 0.65 | 2.10 |           |          |
|             | 3IR1.00-D76ST-0.80... | 1.00  | 0.6           | 2.20 | 3.00 | 0.80 | 1.90 |           |          |

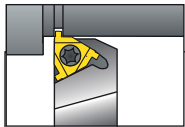
Range of profiles also available on IC 1/4", 1/2" and 5/8" inserts on request.  
For minimum bore diameters, refer to page 9.

## Standard (Short - Type D)

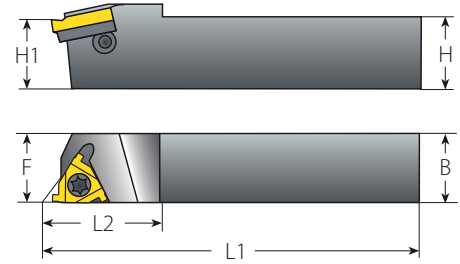


| Insert Size | Ordering Code         | Pitch | Dimensions mm |      |      |      |      | Anvil     | Holder   |
|-------------|-----------------------|-------|---------------|------|------|------|------|-----------|----------|
| IC          | RH                    | mm    | R             | g1   | g2   | t    | t1   |           |          |
| 3/8"        | 3IR1.00-D76SH-0.80... | 1.00  | 0.6           | 1.20 | 2.00 | 0.80 | 2.50 | Y13M-1.5N | AVR...-3 |
|             | 3IR1.25-D76SH-1.00... | 1.25  | 0.6           | 1.50 | 2.50 | 1.00 | 2.30 |           |          |
|             | 3IR1.50-D76SH-1.15... | 1.50  | 0.8           | 1.85 | 3.00 | 1.15 | 2.10 |           |          |
|             | 3IR1.75-D76SH-1.30... | 1.75  | 1.0           | 2.20 | 3.50 | 1.30 | 1.90 |           |          |

Range of profiles also available on IC 1/4", 1/2" and 5/8" inserts on request.  
For minimum bore diameters, refer to page 9.







## External Toolholders



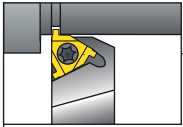
### Standard

### Spare Parts

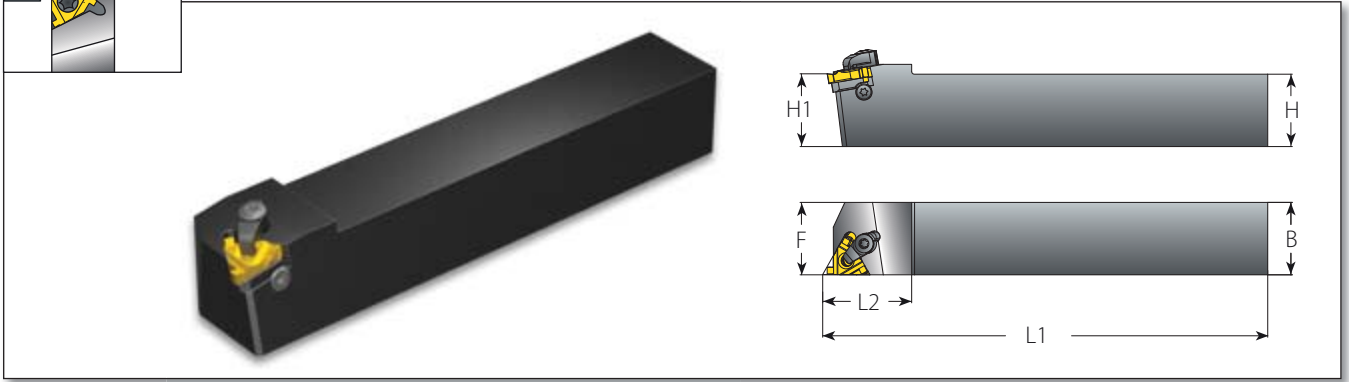
| Insert Size | Ordering Code | Dimensions mm |    |       |      |  |  |  |  * |
|-------------|---------------|---------------|----|-------|------|---|---|---|---|
| IC          | RH            | H=H1=B        | F  | L1    | L2   | Insert Screw  | Anvil Screw   | Torx Key  | Anvil RH  |
| 1/4"        | NL8-2         | 8             | 11 | 136.4 | 17.5 | SN2T  | -   | K2T   | -   |
|             | NL10-2        | 10            | 11 | 70.0  | 17.5 |   |   |   |   |
|             | NL12-2        | 12            | 12 | 80.0  | 17.5 |   |   |   |   |
| 3/8"        | AL3/8-3       | 9.52          | 16 | 63.6  | 20.5 | SA3T  | SY3T  | K3T   | YE3M-1.5N   |
|             | AL12-3        | 12            | 16 | 100.0 | 22.0 |   |   |   |   |
|             | AL16-3        | 16            | 16 | 82.3  | 20.5 |   |   |   |   |
|             | AL20-3        | 20            | 20 | 128.6 | 30.0 |   |   |   |   |
|             | AL25-3        | 25            | 25 | 153.6 | 30.0 |   |   |   |   |
| 1/2"        | AL32-3        | 32            | 32 | 173.6 | 30.0 | SA4T  | SY4T  | K4T   | YE4M-1.5N   |
|             | AL25-4        | 25            | 25 | 155.7 | 36.0 |   |   |   |   |
|             | AL32-4        | 32            | 32 | 175.7 | 36.0 |   |   |   |   |
| 5/8"        | AL40-4        | 40            | 40 | 205.7 | 36.0 | SA5T  | SY5T  | K5T   | YE5M-1.5N   |
|             | AL25-5        | 25            | 32 | 151.6 | 35.0 |   |   |   |   |
|             | AL32-5        | 32            | 32 | 176.6 | 40.0 |   |   |   |   |
|             | AL40-5        | 40            | 40 | 206.6 | 40.0 |   |   |   |   |
|             | AL50-5        | 50            | 50 | 256.6 | 40.0 |   |   |   |   |

\* The toolholders are supplied with standard anvils. For Grooving, please use the anvils indicated in the table above. For ordering code see page 2.






## External Toolholders

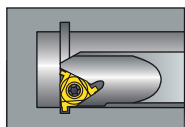


### Standard with Clamp (Dual System, Screw or Clamp)

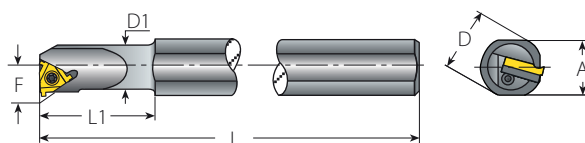
### Spare Parts

| Insert Size | Ordering Code | Dimensions mm |    |       |      |  |             |       |          |           |
|-------------|---------------|---------------|----|-------|------|--|-------------|-------|----------|-----------|
| IC          | RH/LH         | H=H1=B        | F  | L1    | L2   | Insert Screw   | Anvil Screw | Clamp | Torx Key | Anvil LH  |
| 3/8"        | AL16-3C       | 16            | 16 | 100.0 | 20.5 | SA3T   | SY3T        | C3    | K3CT     | YE3M-1.5N |
|             | AL20-3C       | 20            | 20 | 128.6 | 30   |  |             |       |          |           |
|             | AL25-3C       | 25            | 25 | 153.6 | 30   |  |             |       |          |           |
|             | AL32-3C       | 32            | 32 | 173.6 | 30   |  |             |       |          |           |
| 1/2"        | AL25-4C       | 25            | 25 | 155.7 | 36   | SA4T   | SY4T        | C4    | K4T      | YE4M-1.5N |
|             | AL32-4C       | 32            | 32 | 175.7 | 36   |  |             |       |          |           |
|             | AL40-4C       | 40            | 40 | 205.7 | 36   |  |             |       |          |           |
| 5/8"        | AL25-5C       | 25            | 32 | 151.6 | 35   | SA5T   | SY5T        | C5    | K5T      | YE5M-1.5N |
|             | AL32-5C       | 32            | 32 | 176.6 | 40   |  |             |       |          |           |
|             | AL40-5C       | 40            | 40 | 206.6 | 40   |  |             |       |          |           |
|             | AL50-5C       | 50            | 50 | 256.6 | 40   |  |             |       |          |           |

\* The toolholders are supplied with standard anvils. For Grooving, please use the anvils indicated in the table above.  
For ordering code see page 2.




## Internal Toolholders

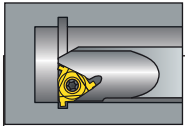


### Standard

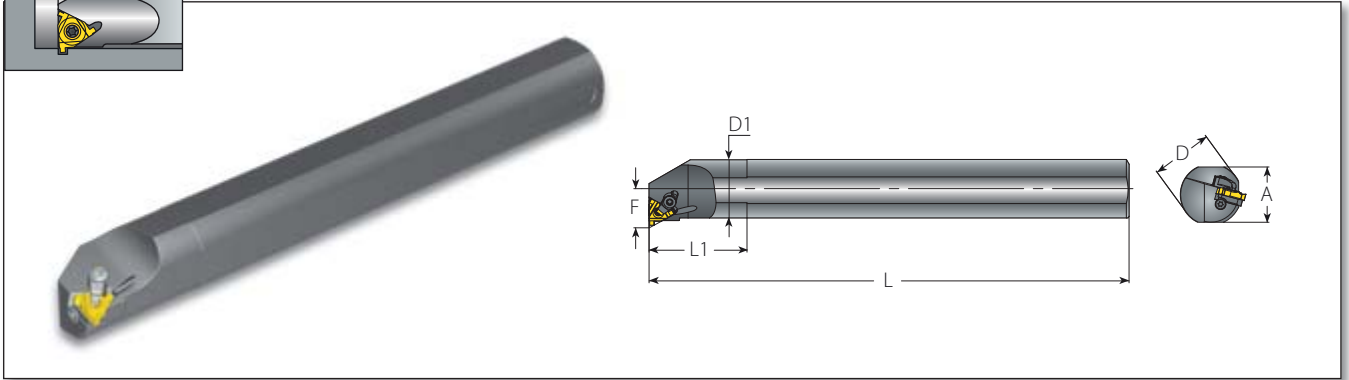
### Spare Parts

| Insert Size | Ordering Code | Dimensions mm |     |    |    |      |      |    | Min Bore Dia. |  |          |           |  |
|-------------|---------------|---------------|-----|----|----|------|------|----|---------------|--|----------|-----------|--|
| IC          | RH            | A             | L   | L1 | D  | D1   | F    | mm | Insert Screw  | Anvil Screw  | Torx Key | Anvil RH  |  |
| 1/4"        | NVR10D-2      |               | 100 |    | 10 | 10.0 | 7.3  | 13 |               |  |          |           |  |
|             | NVR10-2       | 18.0          | 180 | 25 | 20 | 10.0 | 7.3  | 13 | SN2T          | -  | K2T      | -         |  |
|             | NVR13-2       | 18.0          | 180 | 32 | 20 | 13.0 | 8.9  | 16 |               |  |          |           |  |
| 3/8"        | NVR13-3       | 18.0          | 180 | 32 | 20 | 12.7 | 10.3 | 17 |               |  |          |           |  |
|             | NVR16-3       | 18.0          | 180 | 40 | 20 | 16.0 | 11.5 | 20 | SN3T          | -  | K3T      | -         |  |
|             | NVR16D-3      | 15.2          | 150 | 32 | 16 | 16.0 | 11.3 | 20 |               |  |          |           |  |
|             | AVR20-3       | 18.0          | 180 | 40 | 20 | 20.0 | 13.4 | 24 |               |  |          |           |  |
|             | AVR25-3       | 29.0          | 250 | 60 | 32 | 25.0 | 16.3 | 29 |               |  |          |           |  |
| 1/2"        | AVR25D-3      | 22.6          | 200 | 45 | 25 | 24.6 | 16.1 | 29 | SA3T          | SY3T   | K3T      | YI3M-1.5N |  |
|             | AVR32-3       | 29.0          | 250 | 60 | 32 | 32.0 | 19.6 | 36 |               |  |          |           |  |
|             | AVR40-3       | 36.0          | 300 | 60 | 40 | 40.0 | 23.8 | 44 |               |  |          |           |  |
|             | NVR20-4       | 18.0          | 180 | 50 | 20 | 20.0 | 15.6 | 27 | SN4T          | -  | K4T      | -         |  |
| 5/8"        | AVR25-4       | 29.0          | 250 | 60 | 32 | 25.0 | 17.4 | 32 |               |  |          |           |  |
|             | AVR25D-4      | 22.6          | 200 | 45 | 25 | 24.6 | 17.2 | 32 | SA4T          | SY4T   | K4T      | YI4M-1.5N |  |
|             | AVR32-4       | 29.0          | 250 | 60 | 32 | 32.0 | 21.5 | 39 |               |  |          |           |  |
|             | AVR40-4       | 36.0          | 300 | 60 | 40 | 40.0 | 25.8 | 47 |               |  |          |           |  |
| 1"          | AVR32-5       | 29.0          | 250 | 60 | 32 | 32.0 | 22.4 | 40 | SN5T          | SY5T   | K5T      | YI5M-1.5N |  |
|             | AVR40-5       | 36.0          | 300 | 60 | 40 | 40.0 | 26.4 | 48 |               |  |          |           |  |
|             | AVR50-5       | 45.0          | 350 | 75 | 50 | 50.0 | 31.4 | 58 | SA5T          | SY5T   | K5T      | YI5M-1.5N |  |
|             | AVR60-5       | 54.0          | 400 | 75 | 60 | 60.0 | 36.4 | 69 |               |  |          |           |  |

\* The toolholders are supplied with standard anvils. For Grooving, please use the anvils indicated in the table above. Holders with coolant channel available as standard. For ordering code see page 2.



## Internal Toolholders



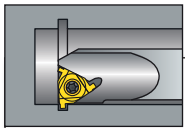
### Standard with Clamp

(Dual System, Screw or Clamp)

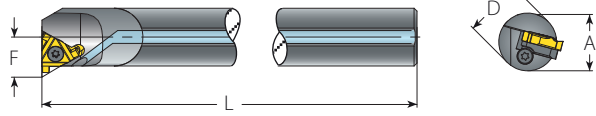
### Spare Parts

| Insert Size | Ordering Code | Dimensions mm |       |    |    |      |      |    | Min Bore Dia. | Spare Parts |    |              |             |       |
|-------------|---------------|---------------|-------|----|----|------|------|----|---------------|-------------|----|--------------|-------------|-------|
|             |               | IC            | RH/LH | A  | L  | L1   | D    | D1 |               | F           | mm | Insert Screw | Anvil Screw | Clamp |
| 3/8"        | AVR20-3C      | 18.0          | 180   | 50 | 20 | 20.0 | 13.4 | 24 | SA3T          | SY3T        | C3 | K3CT         | YI3M-1.5N   |       |
|             | AVR25-3C      | 28.0          | 250   | 60 | 32 | 25.0 | 16.3 | 29 |               |             |    |              |             |       |
|             | AVR25D-3C     | 22.6          | 200   | 45 | 25 | 24.6 | 16.1 | 29 |               |             |    |              |             |       |
|             | AVR32-3C      | 29.0          | 250   | 60 | 32 | 32.0 | 19.6 | 36 |               |             |    |              |             |       |
| 1/2"        | AVR40-3C      | 36.0          | 300   | 60 | 40 | 40.0 | 23.8 | 44 | SA4T          | SY4T        | C4 | K4T          | YI4M-1.5N   |       |
|             | AVR25-4C      | 29.0          | 250   | 60 | 32 | 25.0 | 17.4 | 32 |               |             |    |              |             |       |
|             | AVR25D-4C     | 22.6          | 200   | 45 | 25 | 24.6 | 17.2 | 32 |               |             |    |              |             |       |
|             | AVR32-4C      | 29.0          | 250   | 60 | 32 | 32.0 | 21.5 | 39 |               |             |    |              |             |       |
| 5/8"        | AVR40-4C      | 36.0          | 300   | 60 | 40 | 40.0 | 25.8 | 47 | SN5T          | SY5T        | C5 | K5T          | YI5M-1.5N   |       |
|             | AVR32-5C      | 29.0          | 250   | 60 | 32 | 32.0 | 22.4 | 40 |               |             |    |              |             |       |
|             | AVR40-5C      | 36.0          | 300   | 60 | 40 | 40.0 | 26.4 | 48 |               |             |    |              |             |       |
|             | AVR50-5C      | 45.0          | 350   | 75 | 50 | 50.0 | 31.4 | 58 |               |             |    |              |             |       |
|             | AVR60-5C      | 54.0          | 400   | 75 | 60 | 60.0 | 36.4 | 69 | SA5T          | SY5T        | C5 | K5T          | YI5M-1.5N   |       |

\* The toolholders are supplied with standard anvils. For Grooving, please use the anvils indicated in the table above.  
 Holders with coolant channel available as standard. For ordering code see page 2.



## Internal Toolholders



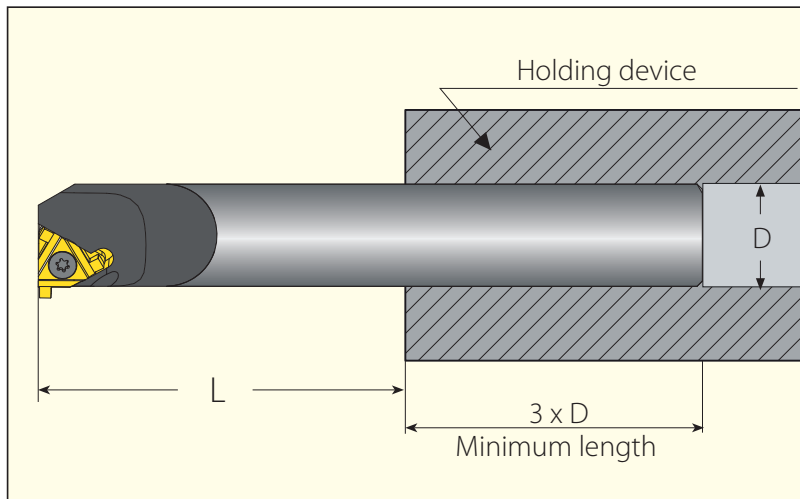
### Standard with Carbide Shank

### Spare Parts

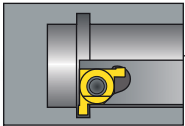
| Insert Size |           | Ordering Code |      |      |     |    | Min Bore Dia. | Spare Parts |          |           |  |
|-------------|-----------|---------------|------|------|-----|----|---------------|-------------|----------|-----------|--|
| IC          | RH/LH     | D             | A    | F    | L   | mm | Insert Screw  | Anvil Screw | Torx Key | Anvil RH  |  |
| 1/4"        | CNVRC10-2 | 10            | 9.5  | 7.3  | 150 | 13 | SN2T          | -           | K2T      | -         |  |
|             | CNVRC12-2 | 12            | 11.7 | 8.3  | 180 | 15 | -             | -           | -        | -         |  |
| 3/8"        | CNVRC16-3 | 16            | 15.6 | 11.5 | 200 | 20 | SN3T          | -           | K3T      | -         |  |
|             | CAVRC20-3 | 20            | 19.5 | 13.4 | 250 | 24 | SA3T          | SY3T        | K3T      | YI3M-1.5N |  |
| 1/2"        | CNVRC20-4 | 20            | 19.5 | 13.8 | 250 | 25 | SN4T          | -           | K4T      | -         |  |

\* The toolholders are supplied with standard anvils. For Grooving, please use the anvils indicated in the table above. The above Toolholders have coolant channel as standard.

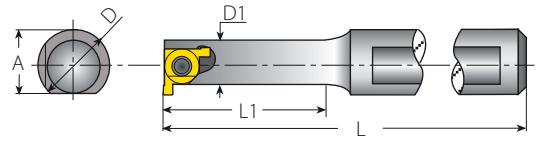
Carbide Shank toolholders should be used when extra accuracy is required or when the bar length to bar diameter ratio exceeds 3:1.





The overhang to bar diameter ratio should be as small as possible to eliminate the chance of chatter (vibration). The minimum length inside a holding device should be 3 times the diameter of the bar shank.

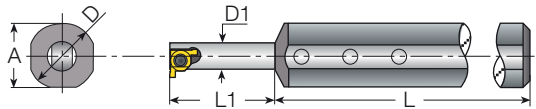
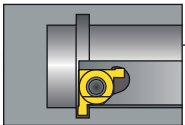


## Internal Toolholders






### Mini-L

| Insert Size | Ordering Code     | Dimensions mm |     |    |    |     | Anti-Vibration System | Spare Parts   |   |
|-------------|-------------------|---------------|-----|----|----|-----|-----------------------|---|---|
|             |                   | A             | L   | L1 | D  | D1  |                       |  |  |
| 5.0L        | IC RH SNVR 10U-5L | 9.4           | 81  | 16 | 10 | 6.2 | No                    | Insert Screw<br>SN5LT   | Torx Key<br>K5LT  |
|             | BNVR 10S-5L       | 9.4           | 87  | 22 | 10 | 6.2 | Carbide Implanted     |   |   |
|             | BNVR 10M-5L       | 9.4           | 97  | 31 | 10 | 6.2 | Carbide Implanted     |   |   |
|             | BNVR 10L-5L       | 9.4           | 109 | 43 | 10 | 6.2 | Carbide Implanted     |   |   |



### Mini-L - Adjustable





| Insert Size | Ordering Code        | Dimensions mm |           |      |    |     |       | Spare Parts |   |  |   |
|-------------|----------------------|---------------|-----------|------|----|-----|-------|-------------|---|--|---|
|             |                      | Sleeve        | Holder RH | A    | L  | L1  | D     | D1          |  |  |  |
| 5.0L        | SV16-6.2 BNVR6.2T-5L | 15.6          | 100       | 8-44 | 16 | 6.2 | SN5LT | K5LT        | S4.0  | K2.0   |   |

# GROOVING Technical Data

Recommended Grades, Cutting Speeds Vc [m/min] and Feed f [mm/rev]

| Material Group                                    | Vargus No.                   | Material                                 | Hardness Brinell HB                | Vc [m/min] |         |         | Feed [mm/rev] |      |
|---|------------------------------|--|------------------------------------|------------|---------|---------|---------------|------|
|   |                              |  |                                    | Coated     |         |         |               |      |
|   |                              |  |                                    | VTX        | VKP/VKX | VHX     |               |      |
| <b>P</b><br>Steel                                 | 1                            | Unalloyed steel                          | Low carbon (C=0.1-0.25%)           | 125        | 140-200 | 140-200 | 20-50         | 0.3  |
|   | 2                            |  | Medium carbon (C=0.25-0.55%)       | 150        | 120-180 | 120-180 | 15-40         | 0.15 |
|   | 3                            |  | High Carbon (C=0.55-0.85%)         | 170        | 110-180 | 110-180 | 15-30         | 0.05 |
|   | 4                            | Low alloy steel (alloying elements ≤ 5%) | Non hardened                       | 180        | 100-155 | 100-155 | 20-45         | 0.25 |
|   | 5                            |  | Hardened                           | 275        | 90-145  | 90-145  | 10-25         | 0.1  |
|   | 6                            |  | Hardened                           | 350        | 80-135  | 80-135  | 10-25         | 0.05 |
|   | 7                            | High alloy steel (alloying elements >5%) | Annealed                           | 200        | 70-115  | 65-115  |               | 0.2  |
|   | 8                            |  | Hardened                           | 325        | 50-100  | 50-100  |               | 0.05 |
|   | 9                            | Cast steel                               | Low alloy (alloying elements <5%)  | 200        | 30-50   | 30-50   | 25-50         | 0.2  |
|   | 10                           |  | High alloy (alloying elements >5%) | 225        | 20-40   | 25-40   | 20-40         | 0.05 |
| <b>M</b><br>Stainless Steel                       | 11                           | Stainless steel Ferritic                 | Non hardened                       | 200        | 70-120  | 80-120  |               | 0.2  |
|   | 12                           |  | Hardened                           | 330        | 60-95   | 55-95   |               | 0.05 |
|   | 13                           | Stainless steel Austenitic               | Austenitic                         | 180        | 70-100  | 60-100  |               | 0.2  |
|   | 14                           |  | Super Austenitic                   | 200        | 40-90   | 50-90   |               | 0.05 |
|   | 15                           | Stainless steel Cast Ferritic            | Non hardened                       | 200        | 80-110  | 60-80   |               | 0.2  |
|   | 16                           |  | Hardened                           | 330        | 65-110  | 45-65   |               | 0.05 |
|   | 17                           | Cast austenitic                          | Austenitic                         | 200        | 85-100  | 50-70   |               | 0.2  |
|   | 18                           |  | Hardened                           | 330        | 60-100  | 40-60   |               | 0.05 |
| <b>K</b><br>Cast Iron                             | 28                           | Malleable Cast iron                      | Ferritic (short chips)             | 130        | 70-120  | 60-80   |               | 0.2  |
|   | 29                           |  | Pearlitic (long chips)             | 230        | 70-120  | 60-80   |               | 0.15 |
|   | 30                           | Grey cast iron                           | Low tensile strength               | 180        | 70-120  | 60-80   |               | 0.2  |
|   | 31                           |  | High tensile strength              | 260        | 60-100  | 40-70   |               | 0.1  |
|   | 32                           | Nodular SG iron                          | Ferritic                           | 160        | 50-80   | 60-80   |               | 0.2  |
|   | 33                           |  | Pearlitic                          | 260        | 60-90   | 70-90   |               | 0.1  |
| <b>N<sub>(K)</sub></b><br>Non-Ferrous Metals      | 34                           | Aluminium alloys Wrought                 | Non aging                          | 60         | 100-240 | 80-240  | 30-60         | 0.4  |
|   | 35                           |  | Aged                               | 100        | 80-170  | 100-170 | 25-50         | 0.1  |
|   | 36                           | Aluminium alloys                         | Cast                               | 75         | 100-150 | 100-150 | 25-50         | 0.25 |
|   | 37                           |  | Cast & aged                        | 90         | 80-120  | 60-100  | 20-40         | 0.15 |
|   | 38                           | Aluminium alloys                         | Cast Si 13-22%                     | 130        | 100-150 | 100-150 | 15-30         | 0.15 |
|   | 39                           | Copper and copper alloys                 | Brass                              | 90         | 80-200  | 80-200  | 15-35         | 0.2  |
| 40  | Bronze and non leaded copper |  | 100                                | 80-200     | 80-200  | 15-35   | 0.15          |      |
| <b>S<sub>(M)</sub></b><br>Heat Resistant Material | 19                           | High temperature alloys                  | Annealed (Iron based)              | 200        | 45-60   | 25-45   |               | 0.2  |
|   | 20                           |  | Aged (Iron based)                  | 280        | 35-50   | 20-30   |               | 0.05 |
|   | 21                           |  | Annealed (Nickel or Cobalt based)  | 250        | 20-30   | 15-20   |               | 0.05 |
|   | 22                           |  | Aged (Nickel or Cobalt based)      | 350        | 15-25   | 10-15   |               | 0.05 |
|   | 23                           | Titanium alloys                          | Pure 99.5 Ti                       | 400Rm      | 140-170 | 60-100  |               | 0.1  |
|   | 24                           |  | α+β alloys                         | 1050Rm     | 50-70   | 40-50   |               | 0.05 |
| <b>H<sub>(K)</sub></b><br>Hardened Material       | 25                           | Extra hard steel                         | Hardened & tempered                | 45-50HRC   | 45-60   | 20-40   |               | 0.02 |
|   | 26                           |  |                                    | 51-55HRC   | 40-50   | 20-35   |               | 0.02 |

## Grades and Their Application

| Grade      | Application Type  | Sample  | Grade      | Application Type  | Sample  |
|------------|---|---|------------|---|---|
| <b>VTX</b> | General use carbide grade. A tough sub-micron substrate with TiAlN coating. Provides good fracture toughness and excellent wear resistance. |  | <b>VKP</b> | General use carbide grade. TiN coated                                 |  |
| <b>VKX</b> | Superior general purpose grade, excellent in steels and stainless steels, recommended for rigid cutting conditions. TiN coated.             |  | <b>VHX</b> | General use HSS grade. For machining at low cutting speed. TiN coated |  |





## Laydown Grooving

For Shallow Grooves

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