



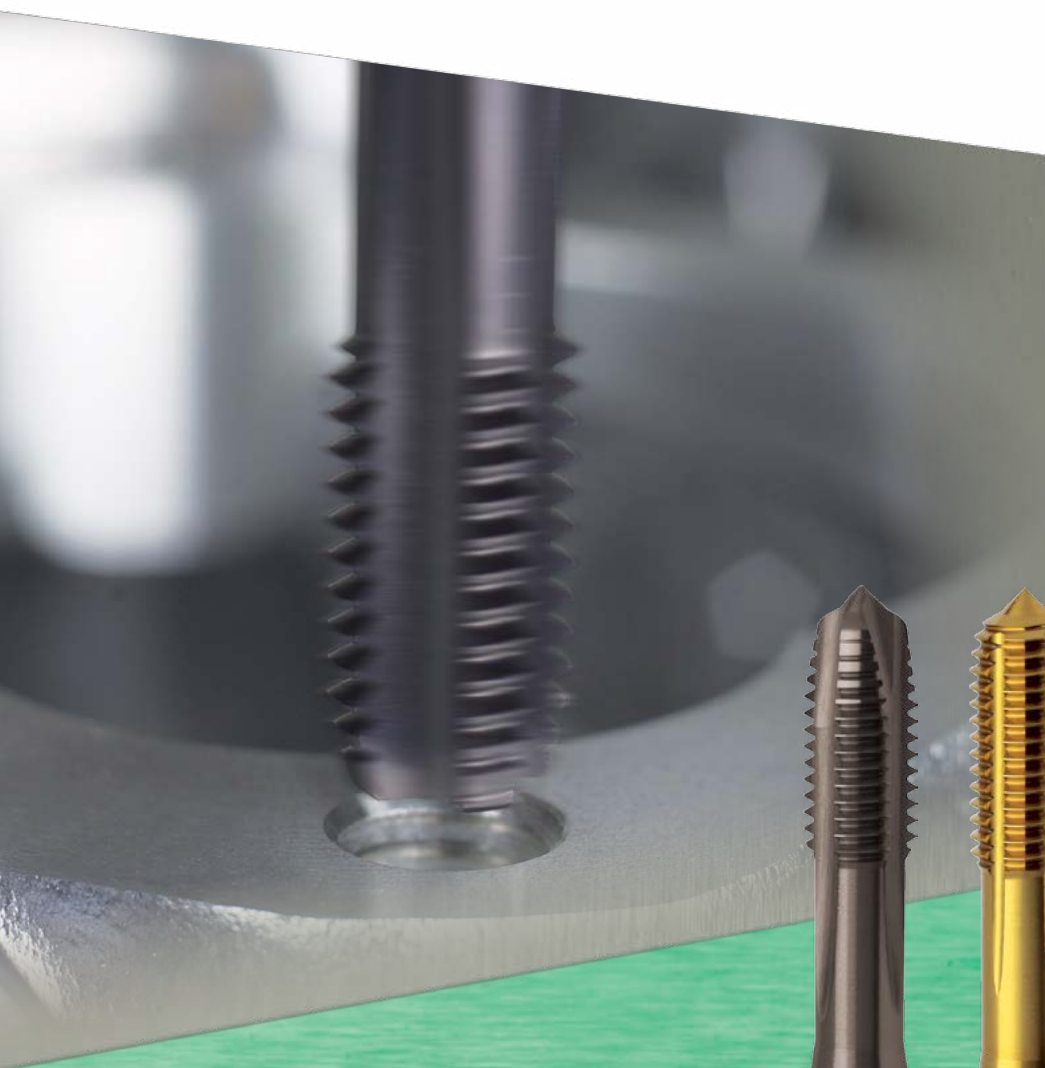
Precision Cutting Tools

# NEW

## Threading Tools

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New complete programme for  
universal thread production  
-----

2014





# HARTNER

Precision Cutting Tools

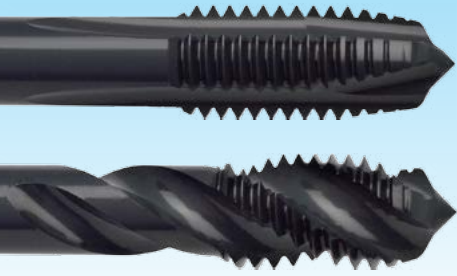
## HARTNER THREADING TOOLS



For the production of internal threads tapping is still the most efficient process.

The comprehensive complete programme for the production of threads offers a suitable precision tool for every material and for every machining task.

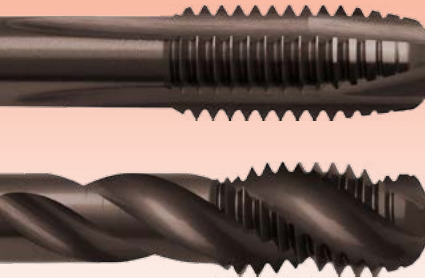
Reduce tooling costs and increase productivity: With Hartner taps users achieve a consistent productivity increase for metal machining thanks to an optimal coordination of tool material, geometry and coating.



## **TG 100 U**

BASICLine machine taps

BASICLine



## **TG 100 T**

TOPLine machine taps

TOPLine



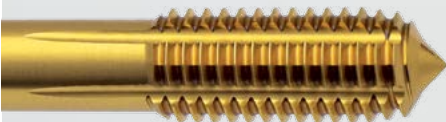
## **TG 100 GG**

Taps for the machining of cast material



## **TG 300 T**

High-Performance taps  
for the machining of cast material



## **Fluteless taps**

# BASICLine



## **TG 100 U**

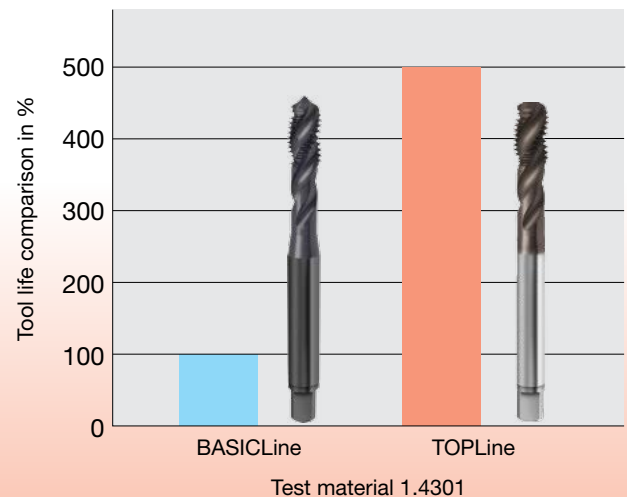
- universal tap for machining general, high-tensile and stainless steels
- outstanding economic efficiency thanks to a remarkable price-performance-ratio for small batch sizes



# TOPLine

## TG 100 T

- high-performance tap for demanding machining tasks in general, high-tensile and stainless steels
- optimised cutting edge geometry for optimal chip evacuation
- ultra-smooth TiAlN-coating and improved chip flow geometry for effective wear protection and maximum tool life as well as exceptional thread quality



# THE POWER PERFORMERS

## TG 100 GG

- tap for the machining of cast materials and short-chipping non-ferrous metals
- cast iron geometry with nitrided surface finish for economical machining
- a remarkable price-performance-ratio for small batch sizes



## TG 300 T

- high-performance tap with a wide application range for demanding machining tasks in all cast materials, general and high-tensile steels and aluminium cast alloys
- straight-fluted cutting edge geometry for increased rigidity and to produce short chips
- the combination of the HSS-E-PM tool material, TiCN-coating and internal cooling ensures a high wear resistance and provides a process reliable maximum tool life

# FORMING



## FLUTELESS TAPS

- fluteless taps for chip-free threading of through and blind holes
- oil grooves ensure optimal coolant supply
- high wear resistance in most materials thanks to TiN-coating and special geometry
- the forming process increases the tensile strength in the thread area of the component



# HARTNER

## Cutting Taps and Fluteless Taps according to DIN-standard

|                          |          |           |  |  |  |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
|--------------------------|----------|-----------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Hole type                |          |           |                                                                                   |                                                                                   |                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Tool material            |          |           | HSS-E                                                                             |                                                                                   |                                                                                     | HSS-E-PM                                                                          | HSS-E                                                                               |                                                                                     |                                                                                     |
| Type/form                |          |           | TG 100 U/B                                                                        | TG 100 T/B                                                                        | TG 100 U/C                                                                          | TG 100 T/C                                                                        | TG 100 GG/C                                                                         | TG 300 T/C                                                                          | N/C                                                                                 |
| Surface finish           |          |           |  |  |    |  |  |  |  |
|                          |          |           | BASICLine                                                                         | TOPLine                                                                           | BASICLine                                                                           | TOPLine                                                                           |                                                                                     |                                                                                     |                                                                                     |
|                          |          |           |  |  |    |  |  |  |  |
| Thread type              |          |           | Order no.                                                                         |                                                                                   |                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Tolerance zone           |          |           | Ø-range                                                                           |                                                                                   |                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Dimensions to DIN 2184-1 |          |           | Programme on page                                                                 |                                                                                   |                                                                                     |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| M                        | ISO 2 6H | DIN 371   | 80700<br>M2<br>—<br>M10<br>page 14                                                | 80800<br>M2<br>—<br>M10<br>page 16                                                | 80730<br>M2<br>—<br>M10<br>page 15                                                  | 80830<br>M2<br>—<br>M10<br>page 17                                                |                                                                                     |                                                                                     |                                                                                     |
|                          | 6HX      |           |                                                                                   |                                                                                   |                                                                                     |                                                                                   | 80750<br>M3<br>—<br>M10<br>page 18                                                  | 80850<br>M5<br>—<br>M10<br>page 19                                                  | 80900<br>M3<br>—<br>M10<br>page 45                                                  |
|                          | ISO 2 6H | DIN 376   | 80700<br>M12<br>—<br>M36<br>page 14                                               | 80800<br>M12<br>—<br>M30<br>page 16                                               | 80730<br>M12<br>—<br>M36<br>page 15                                                 | 80830<br>M12<br>—<br>M30<br>page 17                                               |                                                                                     |                                                                                     |                                                                                     |
|                          | 6HX      |           |                                                                                   |                                                                                   |                                                                                     |                                                                                   | 80750<br>M12<br>—<br>M30<br>page 18                                                 | 80850<br>M12<br>—<br>M39<br>page 19                                                 | 80900<br>M12<br>—<br>M39<br>page 45                                                 |
| MF                       | ISO 2 6H | DIN 374   | 80701<br>M4x0,5<br>—<br>M42x1,5<br>page 22                                        | 80801<br>M3x0,35<br>—<br>M36x2<br>page 24                                         | 80731<br>M4x0,5<br>—<br>M30x2<br>page 23                                            | 80831<br>M6x0,75<br>—<br>M24x1,5<br>page 25                                       |                                                                                     |                                                                                     |                                                                                     |
|                          | 6HX      |           |                                                                                   |                                                                                   |                                                                                     |                                                                                   | 80751<br>M4x0,5<br>—<br>M30x1,5<br>page 26                                          | 80851<br>M6x0,75<br>—<br>M16x1,5<br>page 27                                         | 80901<br>M6x0,75<br>—<br>M24x1,5<br>page 47                                         |
| UNC                      | 2B       | ~ DIN 371 | 80702<br>Nr.4-40<br>—<br>3/8-16<br>page 30                                        | 80802<br>Nr.4-40<br>—<br>3/8-16<br>page 32                                        | 80732<br>Nr.2-56<br>—<br>3/8-16<br>page 31                                          | 80832<br>Nr.4-40<br>—<br>3/8-16<br>page 33                                        | 80752<br>Nr.4-40<br>—<br>3/8-16<br>page 34                                          |                                                                                     | 80902*<br>Nr.4-40<br>—<br>3/8-16<br>page 49                                         |
|                          | 2B       | ~ DIN 376 | 80702<br>7/16-14<br>—<br>1-8<br>page 30                                           | 80802<br>7/16-14<br>—<br>1-8<br>page 32                                           | 80732<br>7/16-14<br>—<br>7/8-9<br>page 31                                           | 80832<br>7/16-14<br>—<br>7/8-9<br>page 33                                         | 80752<br>7/16-14<br>—<br>1-8<br>page 34                                             |                                                                                     | 80902*<br>7/16-14<br>—<br>1-8<br>page 49                                            |
| UNF                      | 2B       | ~ DIN 374 | 80703<br>Nr.4-48<br>—<br>1-12<br>page 35                                          | 80803<br>Nr.4-48<br>—<br>1-12<br>page 37                                          | 80733<br>Nr.3-56<br>—<br>1-12<br>page 36                                            | 80833<br>Nr.10-32<br>—<br>1-12<br>page 38                                         | 80753<br>Nr.4-48<br>—<br>1-12<br>page 39                                            |                                                                                     | 80903*<br>Nr.4-48<br>—<br>3/4-16<br>page 50                                         |
| G                        | -        | DIN 5156  | 80704<br>G 1/8<br>—<br>G 2<br>page 40                                             | 80804<br>G 1/8<br>—<br>G 1<br>page 42                                             | 80734<br>G 1/16<br>—<br>G 2<br>page 41                                              | 80834<br>G 1/16<br>—<br>G 1<br>page 43                                            | 80754<br>G 1/16<br>—<br>G 2<br>page 44                                              |                                                                                     | 80904<br>G 1/16<br>—<br>G 3/4<br>page 51                                            |

\*Tolerance zone 2BX

bright

steam tempered

nitrided

TiN

TiAlN

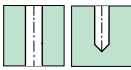
TiCN





# HARTNER

## Cutting Taps and Fluteless Taps according to JIS-standard

|             |                |               | Hole type                                   |  |  |  |
|-------------|----------------|---------------|---------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|             |                |               | Tool material                               | HSS-E                                                                             |                                                                                   |                                                                                   |
|             |                |               | Type/form                                   | TG 100 U/B                                                                        | TG 100 U/C                                                                        | N/C                                                                               |
|             |                |               | Surface finish                              |  |  |  |
|             |                |               |                                             |  |                                                                                   |                                                                                   |
|             |                |               |                                             |  |  |  |
| Thread type | Tolerance zone | Dimensions to | Order no.<br>Ø-range<br>Programme on page   |                                                                                   |                                                                                   |                                                                                   |
| M           | Class 1<br>OH  | JIS B<br>4430 | 80780<br>M2<br>–<br>M20<br>page 20          | 80790<br>M2<br>–<br>M20<br>page 21                                                |                                                                                   |                                                                                   |
|             | Class 2<br>RH  |               |                                             |                                                                                   | 80980<br>M4<br>–<br>M20<br>page 46                                                |                                                                                   |
| MF          | Class 1<br>OH  | JIS B<br>4430 | 80781<br>M6x0,75<br>–<br>M20x1,5<br>page 28 | 80791<br>M6x0,75<br>–<br>M20x1,5<br>page 29                                       |                                                                                   |                                                                                   |
|             | Class 2<br>RH  |               |                                             |                                                                                   | 80981<br>M6x0,75<br>–<br>M20x1,5<br>page 48                                       |                                                                                   |



for through holes



for blind holes

## Machine taps

| Standard | Type | Form | Tolerance | Tool material | Surface | Hole type | d1 | Order no. | Discount group | Standard range, page |
|----------|------|------|-----------|---------------|---------|-----------|----|-----------|----------------|----------------------|
|----------|------|------|-----------|---------------|---------|-----------|----|-----------|----------------|----------------------|

### Machine taps for ISO metric threads

|                                                                                     |                   |           |   |            |                  |                                                                                     |                                                                                     |           |       |     |    |
|-------------------------------------------------------------------------------------|-------------------|-----------|---|------------|------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------|-------|-----|----|
|    | DIN 371 / DIN 376 | TG 100 U  | B | ISO2/6H    | HSS-E            |    |    | M 2 - M36 | 80700 | 156 | 14 |
|    | DIN 371 / DIN 376 | TG 100 U  | C | ISO2/6H    | HSS-E            |    |    | M 2 - M36 | 80730 | 156 | 15 |
|    | DIN 371 / DIN 376 | TG 100 T  | B | ISO2/6H    | HSS-E            |    |    | M 2 - M30 | 80800 | 103 | 16 |
|    | DIN 371 / DIN 376 | TG 100 T  | C | 6HX        | HSS-E            |    |    | M 2 - M30 | 80830 | 103 | 17 |
|    | DIN 371 / DIN 376 | TG 100 GG | C | 6HX        | HSS-E            |   |   | M 3 - M30 | 80750 | 103 | 18 |
|  | DIN 371 / DIN 376 | TG 300 T  | C | 6HX        | HSS-E / HSS-E-PM |  |  | M 5 - M39 | 80850 | 103 | 19 |
|  | JIS B 4430        | TG 100 U  | B | Class 1/OH | HSS-E            |  |  | M 2 - M20 | 80780 | 103 | 20 |
|  | JIS B 4430        | TG 100 U  | C | Class 1/OH | HSS-E            |  |  | M 2 - M20 | 80790 | 103 | 21 |

### Machine taps for ISO metric fine threads

|                                                                                     |         |          |   |         |       |                                                                                     |                                                                                     |                      |       |     |    |
|-------------------------------------------------------------------------------------|---------|----------|---|---------|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------|-------|-----|----|
|  | DIN 374 | TG 100 U | B | ISO2/6H | HSS-E |  |  | M 4 X0,5 - M42 X1,5  | 80701 | 156 | 22 |
|  | DIN 374 | TG 100 U | C | ISO2/6H | HSS-E |  |  | M 4 X0,5 - M30 X2    | 80731 | 156 | 23 |
|  | DIN 374 | TG 100 T | B | ISO2/6H | HSS-E |  |  | M 3 X0,35 - M36 X2   | 80801 | 103 | 24 |
|  | DIN 374 | TG 100 T | C | 6HX     | HSS-E |  |  | M 6 X0,75 - M24 X1,5 | 80831 | 103 | 25 |

 bright
  steam tempered
  nitrided
  TiN
  TiAlN
  TiCN

## Machine taps

| Standard | Type | Form | Tolerance | Tool material | Surface | Hole type | d1 | Order no. | Discount group | Standard range, page |
|----------|------|------|-----------|---------------|---------|-----------|----|-----------|----------------|----------------------|
|----------|------|------|-----------|---------------|---------|-----------|----|-----------|----------------|----------------------|

### Machine taps for ISO metric fine threads

|                                                                                   |            |           |   |            |          |                                                                                   |                                                                                   |                      |              |     |    |
|-----------------------------------------------------------------------------------|------------|-----------|---|------------|----------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------|--------------|-----|----|
|  | DIN 374    | TG 100 GG | C | 6HX        | HSS-E    |  |  | M 4 X0,5 - M30 X1,5  | <b>80751</b> | 103 | 26 |
|  | DIN 374    | TG 300 T  | C | 6HX        | HSS-E-PM |  |  | M 6 X0,75 - M16 X1,5 | <b>80851</b> | 103 | 27 |
|  | JIS B 4430 | TG 100 U  | B | Class 1/OH | HSS-E    |  |  | M 6 X0,75 - M20 X1,5 | <b>80781</b> | 103 | 28 |
|  | JIS B 4430 | TG 100 U  | C | Class 1/OH | HSS-E    |  |  | M 6 X0,75 - M20 X1,5 | <b>80791</b> | 103 | 29 |

### Machine taps for UNC-threads

|                                                                                     |                        |           |   |    |       |                                                                                     |                                                                                     |                     |              |     |    |
|-------------------------------------------------------------------------------------|------------------------|-----------|---|----|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------|--------------|-----|----|
|  | ~DIN 371 /<br>~DIN 376 | TG 100 U  | B | 2B | HSS-E |  |  | NR. 4 -40 - 1 - 8   | <b>80702</b> | 156 | 30 |
|  | ~DIN 371 /<br>~DIN 376 | TG 100 U  | C | 2B | HSS-E |  |  | NR. 2 -56 - 7/8 - 9 | <b>80732</b> | 156 | 31 |
|  | ~DIN 371 /<br>~DIN 376 | TG 100 T  | B | 2B | HSS-E |  |  | NR. 4 -40 - 1 - 8   | <b>80802</b> | 103 | 32 |
|  | ~DIN 371 /<br>~DIN 376 | TG 100 T  | C | 2B | HSS-E |  |  | NR. 4 -40 - 7/8 - 9 | <b>80832</b> | 103 | 33 |
|  | ~DIN 371 /<br>~DIN 376 | TG 100 GG | C | 2B | HSS-E |  |  | NR. 4 -40 - 1 - 8   | <b>80752</b> | 103 | 34 |

### Machine taps for UNF-threads

|                                                                                     |          |          |   |    |       |                                                                                     |                                                                                     |                   |              |     |    |
|-------------------------------------------------------------------------------------|----------|----------|---|----|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------|--------------|-----|----|
|  | ~DIN 374 | TG 100 U | B | 2B | HSS-E |  |  | NR. 4 -48 - 1 -12 | <b>80703</b> | 156 | 35 |
|  | ~DIN 374 | TG 100 U | C | 2B | HSS-E |  |  | NR. 3 -56 - 1 -12 | <b>80733</b> | 156 | 36 |

 bright
  steam tempered
  nitrided
  TiN
  TiAlN
  TiCN

## Machine taps

| Standard | Type | Form | Tolerance | Tool material | Surface | Hole type | d1 | Order no. | Discount group | Standard range, page |
|----------|------|------|-----------|---------------|---------|-----------|----|-----------|----------------|----------------------|
|----------|------|------|-----------|---------------|---------|-----------|----|-----------|----------------|----------------------|

### Machine taps for UNF-threads

|                                                                                   |          |           |   |    |       |                                                                                   |                                                                                   |                   |              |     |    |
|-----------------------------------------------------------------------------------|----------|-----------|---|----|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------|--------------|-----|----|
|  | ~DIN 374 | TG 100 T  | B | 2B | HSS-E |  |  | NR. 4 -48 - 1 -12 | <b>80803</b> | 103 | 37 |
|  | ~DIN 374 | TG 100 T  | C | 2B | HSS-E |  |  | NR.10 -32 - 1 -12 | <b>80833</b> | 103 | 38 |
|  | ~DIN 374 | TG 100 GG | C | 2B | HSS-E |  |  | NR. 4 -48 - 1 -12 | <b>80753</b> | 103 | 39 |

### Machine taps for BSP-threads

|                                                                                     |          |           |   |  |       |                                                                                     |                                                                                     |             |              |     |    |
|-------------------------------------------------------------------------------------|----------|-----------|---|--|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------|--------------|-----|----|
|    | DIN 5156 | TG 100 U  | B |  | HSS-E |  |  | G 1/8 - G2  | <b>80704</b> | 156 | 40 |
|  | DIN 5156 | TG 100 U  | C |  | HSS-E |  |  | G 1/16 - G2 | <b>80734</b> | 156 | 41 |
|  | DIN 5156 | TG 100 T  | B |  | HSS-E |  |  | G 1/8 - G1  | <b>80804</b> | 103 | 42 |
|  | DIN 5156 | TG 100 T  | C |  | HSS-E |  |  | G 1/16 - G1 | <b>80834</b> | 103 | 43 |
|  | DIN 5156 | TG 100 GG | C |  | HSS-E |  |  | G 1/16 - G2 | <b>80754</b> | 103 | 44 |





# HARTNER

## Fluteless taps with oil grooves

| Standard | Type | Form | Tolerance | Tool material | Surface | Hole type | d1 | Order no. | Discount group | Standard range, page |
|----------|------|------|-----------|---------------|---------|-----------|----|-----------|----------------|----------------------|
|----------|------|------|-----------|---------------|---------|-----------|----|-----------|----------------|----------------------|

### Fluteless machine taps for ISO metric threads

|                                                                                   |                        |   |   |            |       |                                                                                   |                                                                                   |           |              |     |    |
|-----------------------------------------------------------------------------------|------------------------|---|---|------------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------|--------------|-----|----|
|  | ~DIN 371 /<br>~DIN 376 | N | C | 6HX        | HSS-E |  |  | M 3 - M39 | <b>80900</b> | 103 | 45 |
|  | JIS B 4430             | N | C | Class 2/RH | HSS-E |  |  | M 4 - M20 | <b>80980</b> | 103 | 46 |

### Fluteless machine taps for ISO metric fine threads

|                                                                                   |            |   |   |            |       |                                                                                     |                                                                                     |                      |              |     |    |
|-----------------------------------------------------------------------------------|------------|---|---|------------|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------|--------------|-----|----|
|  | ~DIN 374   | N | C | 6HX        | HSS-E |    |    | M 6 X0,75 - M24 X1,5 | <b>80901</b> | 103 | 47 |
|  | JIS B 4430 | N | C | Class 2/RH | HSS-E |  |  | M 6 X0,75 - M20 X1,5 | <b>80981</b> | 103 | 48 |

### Fluteless machine taps for UNC-threads

|                                                                                     |                        |   |   |     |       |                                                                                     |                                                                                     |                     |              |     |    |
|-------------------------------------------------------------------------------------|------------------------|---|---|-----|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------|--------------|-----|----|
|  | ~DIN 371 /<br>~DIN 376 | N | C | 2BX | HSS-E |  |  | NR. 4 -40 - 3/4 -10 | <b>80902</b> | 103 | 49 |
|-------------------------------------------------------------------------------------|------------------------|---|---|-----|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------|--------------|-----|----|

### Fluteless machine taps for UNF-threads

|                                                                                     |                        |   |   |     |       |                                                                                     |                                                                                     |                     |              |     |    |
|-------------------------------------------------------------------------------------|------------------------|---|---|-----|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------|--------------|-----|----|
|  | ~DIN 371 /<br>~DIN 374 | N | C | 2BX | HSS-E |  |  | NR. 4 -48 - 3/4 -16 | <b>80903</b> | 103 | 50 |
|-------------------------------------------------------------------------------------|------------------------|---|---|-----|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------|--------------|-----|----|

### Fluteless machine taps for BSP-threads

|                                                                                     |          |   |   |  |       |                                                                                     |                                                                                     |                |              |     |    |
|-------------------------------------------------------------------------------------|----------|---|---|--|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------|--------------|-----|----|
|  | DIN 2189 | N | C |  | HSS-E |  |  | G 1/16 - G 3/4 | <b>80904</b> | 103 | 51 |
|-------------------------------------------------------------------------------------|----------|---|---|--|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------|--------------|-----|----|

 bright

 steam tempered

 nitrided

 TiN

 TiAlN

 TiCN



# HARTNER

## Machine taps for ISO metric threads

Order no. 80700



Through hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard DIN 371 / DIN 376

DIN 2184-1

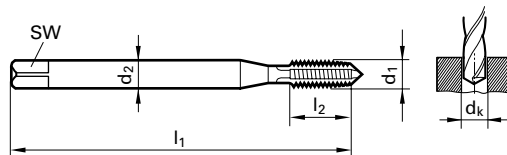
Tool material **HSS-E**

Surface

Form B

Tolerance ISO2/6H

Discount group 156



| d1  | P    | d2     | SW    | dk     | l1     | l2    | Availability |
|-----|------|--------|-------|--------|--------|-------|--------------|
| mm  | mm   | mm     |       | mm     | mm     | mm    |              |
| M 2 | 0.40 | 2.800  | 2.10  | 1.600  | 45.00  | 8.00  | ●            |
| M 3 | 0.50 | 3.500  | 2.70  | 2.500  | 56.00  | 10.00 | ●            |
| M 4 | 0.70 | 4.500  | 3.40  | 3.300  | 63.00  | 12.00 | ●            |
| M 5 | 0.80 | 6.000  | 4.90  | 4.200  | 70.00  | 14.00 | ●            |
| M 6 | 1.00 | 6.000  | 4.90  | 5.000  | 80.00  | 16.00 | ●            |
| M 8 | 1.25 | 8.000  | 6.20  | 6.800  | 90.00  | 17.00 | ●            |
| M10 | 1.50 | 10.000 | 8.00  | 8.500  | 100.00 | 20.00 | ●            |
| M12 | 1.75 | 9.000  | 7.00  | 10.200 | 110.00 | 24.00 | ●            |
| M14 | 2.00 | 11.000 | 9.00  | 12.000 | 110.00 | 26.00 | ●            |
| M16 | 2.00 | 12.000 | 9.00  | 14.000 | 110.00 | 26.00 | ●            |
| M18 | 2.50 | 14.000 | 11.00 | 15.500 | 125.00 | 30.00 | ●            |
| M20 | 2.50 | 16.000 | 12.00 | 17.500 | 140.00 | 32.00 | ●            |
| M22 | 2.50 | 18.000 | 14.50 | 19.500 | 140.00 | 32.00 | ●            |
| M24 | 3.00 | 18.000 | 14.50 | 21.000 | 160.00 | 36.00 | ●            |
| M27 | 3.00 | 20.000 | 16.00 | 24.000 | 160.00 | 36.00 | ●            |
| M30 | 3.50 | 22.000 | 18.00 | 26.500 | 180.00 | 40.00 | ●            |
| M36 | 4.00 | 28.000 | 22.00 | 32.000 | 200.00 | 50.00 | ●            |

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



# HARTNER

## Machine taps for ISO metric threads

Order no. 80730



Blind hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard DIN 371 / DIN 376

DIN 2184-1

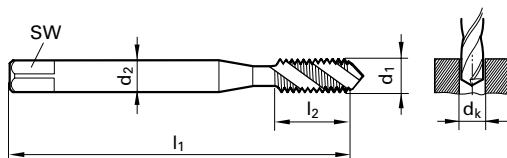
Tool material **HSS-E**

Surface

Form C

Tolerance ISO2/6H

Discount group 156



| d1  | P    | d2     | SW    | dk     | l1     | l2    | Availability |
|-----|------|--------|-------|--------|--------|-------|--------------|
| mm  | mm   | mm     |       | mm     | mm     | mm    |              |
| M 2 | 0.40 | 2.800  | 2.10  | 1.600  | 45.00  | 4.50  | ●            |
| M 3 | 0.50 | 3.500  | 2.70  | 2.500  | 56.00  | 6.00  | ●            |
| M 4 | 0.70 | 4.500  | 3.40  | 3.300  | 63.00  | 7.50  | ●            |
| M 5 | 0.80 | 6.000  | 4.90  | 4.200  | 70.00  | 8.50  | ●            |
| M 6 | 1.00 | 6.000  | 4.90  | 5.000  | 80.00  | 11.00 | ●            |
| M 8 | 1.25 | 8.000  | 6.20  | 6.800  | 90.00  | 14.00 | ●            |
| M10 | 1.50 | 10.000 | 8.00  | 8.500  | 100.00 | 16.00 | ●            |
| M12 | 1.75 | 9.000  | 7.00  | 10.200 | 110.00 | 18.50 | ●            |
| M14 | 2.00 | 11.000 | 9.00  | 12.000 | 110.00 | 20.00 | ●            |
| M16 | 2.00 | 12.000 | 9.00  | 14.000 | 110.00 | 20.00 | ●            |
| M20 | 2.50 | 16.000 | 12.00 | 17.500 | 140.00 | 25.00 | ●            |
| M22 | 2.50 | 18.000 | 14.50 | 19.500 | 140.00 | 27.00 | ●            |
| M24 | 3.00 | 18.000 | 14.50 | 21.000 | 160.00 | 30.00 | ●            |
| M27 | 3.00 | 20.000 | 16.00 | 24.000 | 160.00 | 30.00 | ●            |
| M30 | 3.50 | 22.000 | 18.00 | 26.500 | 180.00 | 35.00 | ●            |
| M36 | 4.00 | 28.000 | 22.00 | 32.000 | 200.00 | 40.00 | ●            |

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



# HARTNER

## Machine taps for ISO metric threads

Order no. 80800



Through hole

High Performance Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# TOPLine

Type **TG 100 T**

Standard DIN 371 / DIN 376

DIN 2184-1

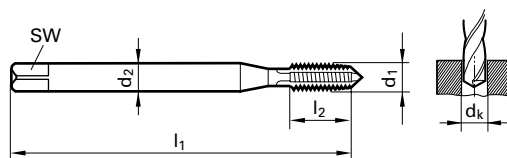
Tool material **HSS-E**

Surface **A**

Form B

Tolerance ISO2/6H

Discount group 103



| d1    | P    | d2     | SW    | dk     | l1     | l2    | Availability |
|-------|------|--------|-------|--------|--------|-------|--------------|
| mm    | mm   | mm     |       | mm     | mm     | mm    |              |
| M 2   | 0.40 | 2.800  | 2.10  | 1.600  | 45.00  | 8.00  | ●            |
| M 2,5 | 0.45 | 2.800  | 2.10  | 2.050  | 50.00  | 9.00  | ●            |
| M 3   | 0.50 | 3.500  | 2.70  | 2.500  | 56.00  | 10.00 | ●            |
| M 3,5 | 0.60 | 4.000  | 3.00  | 2.900  | 56.00  | 12.00 | ●            |
| M 4   | 0.70 | 4.500  | 3.40  | 3.300  | 63.00  | 12.00 | ●            |
| M 5   | 0.80 | 6.000  | 4.90  | 4.200  | 70.00  | 14.00 | ●            |
| M 6   | 1.00 | 6.000  | 4.90  | 5.000  | 80.00  | 16.00 | ●            |
| M 8   | 1.25 | 8.000  | 6.20  | 6.800  | 90.00  | 17.00 | ●            |
| M10   | 1.50 | 10.000 | 8.00  | 8.500  | 100.00 | 20.00 | ●            |
| M12   | 1.75 | 9.000  | 7.00  | 10.200 | 110.00 | 24.00 | ●            |
| M14   | 2.00 | 11.000 | 9.00  | 12.000 | 110.00 | 26.00 | ●            |
| M16   | 2.00 | 12.000 | 9.00  | 14.000 | 110.00 | 26.00 | ●            |
| M18   | 2.50 | 14.000 | 11.00 | 15.500 | 125.00 | 30.00 | ●            |
| M20   | 2.50 | 16.000 | 12.00 | 17.500 | 140.00 | 32.00 | ●            |
| M24   | 3.00 | 18.000 | 14.50 | 21.000 | 160.00 | 36.00 | ●            |
| M27   | 3.00 | 20.000 | 16.00 | 24.000 | 160.00 | 36.00 | ●            |
| M30   | 3.50 | 22.000 | 18.00 | 26.500 | 180.00 | 40.00 | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for ISO metric threads

Order no. 80830



Blind hole

High Performance Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# TOPLine

Type TG 100 T

Standard DIN 371 / DIN 376

DIN 2184-1

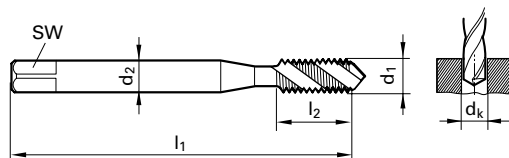
Tool material HSS-E

Surface A

Form C

Tolerance 6HX

Discount group 103



| d1  | P    | d2     | SW    | dk     | l1     | l2    | Availability |
|-----|------|--------|-------|--------|--------|-------|--------------|
| mm  | mm   | mm     |       | mm     | mm     | mm    |              |
| M 2 | 0.40 | 2.800  | 2.10  | 1.600  | 45.00  | 4.50  | ●            |
| M 3 | 0.50 | 3.500  | 2.70  | 2.500  | 56.00  | 6.00  | ●            |
| M 4 | 0.70 | 4.500  | 3.40  | 3.300  | 63.00  | 7.50  | ●            |
| M 5 | 0.80 | 6.000  | 4.90  | 4.200  | 70.00  | 8.50  | ●            |
| M 6 | 1.00 | 6.000  | 4.90  | 5.000  | 80.00  | 11.00 | ●            |
| M 8 | 1.25 | 8.000  | 6.20  | 6.800  | 90.00  | 14.00 | ●            |
| M10 | 1.50 | 10.000 | 8.00  | 8.500  | 100.00 | 16.00 | ●            |
| M12 | 1.75 | 9.000  | 7.00  | 10.200 | 110.00 | 18.50 | ●            |
| M14 | 2.00 | 11.000 | 9.00  | 12.000 | 110.00 | 20.00 | ●            |
| M16 | 2.00 | 12.000 | 9.00  | 14.000 | 110.00 | 20.00 | ●            |
| M18 | 2.50 | 14.000 | 11.00 | 15.500 | 125.00 | 25.00 | ●            |
| M20 | 2.50 | 16.000 | 12.00 | 17.500 | 140.00 | 25.00 | ●            |
| M24 | 3.00 | 18.000 | 14.50 | 21.000 | 160.00 | 30.00 | ●            |
| M30 | 3.50 | 22.000 | 18.00 | 26.500 | 180.00 | 35.00 | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN





# HARTNER

## Machine taps for ISO metric threads

**Order no. 80750**



**Through hole/  
blind hole**

Taps for cast materials such as cast iron, spheroidal graphite and malleable cast iron with vermicular graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals.

**Type TG 100 GG**

Standard DIN 371 / DIN 376

DIN 2184-1

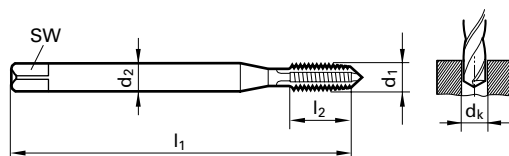
Tool material **HSS-E**

Surface ●

Form C

Tolerance 6HX

Discount group 103



| d1    | P    | d2     | SW    | dk     | l1     | l2    | Availability |
|-------|------|--------|-------|--------|--------|-------|--------------|
| mm    | mm   | mm     |       | mm     | mm     | mm    |              |
| M 3   | 0.50 | 3.500  | 2.70  | 2.500  | 56.00  | 10.00 | ●            |
| M 3,5 | 0.60 | 4.000  | 3.00  | 2.900  | 56.00  | 12.00 | ●            |
| M 4   | 0.70 | 4.500  | 3.40  | 3.300  | 63.00  | 12.00 | ●            |
| M 5   | 0.80 | 6.000  | 4.90  | 4.200  | 70.00  | 14.00 | ●            |
| M 6   | 1.00 | 6.000  | 4.90  | 5.000  | 80.00  | 16.00 | ●            |
| M 8   | 1.25 | 8.000  | 6.20  | 6.800  | 90.00  | 17.00 | ●            |
| M10   | 1.50 | 10.000 | 8.00  | 8.500  | 100.00 | 20.00 | ●            |
| M12   | 1.75 | 9.000  | 7.00  | 10.200 | 110.00 | 24.00 | ●            |
| M14   | 2.00 | 11.000 | 9.00  | 12.000 | 110.00 | 26.00 | ●            |
| M16   | 2.00 | 12.000 | 9.00  | 14.000 | 110.00 | 26.00 | ●            |
| M18   | 2.50 | 14.000 | 11.00 | 15.500 | 125.00 | 30.00 | ●            |
| M20   | 2.50 | 16.000 | 12.00 | 17.500 | 140.00 | 32.00 | ●            |
| M22   | 2.50 | 18.000 | 14.50 | 19.500 | 140.00 | 32.00 | ●            |
| M24   | 3.00 | 18.000 | 14.50 | 21.000 | 160.00 | 36.00 | ●            |
| M27   | 3.00 | 20.000 | 16.00 | 24.000 | 160.00 | 36.00 | ●            |
| M30   | 3.50 | 22.000 | 18.00 | 26.500 | 180.00 | 40.00 | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for ISO metric threads

Order no. 80850



Through hole/  
blind hole

Taps with internal cooling for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with spheroidal graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals for maximum tool life. In addition, excellent suitability for creating short chips in common and high tensile steels.

From thread size  $\geq$  M16 taps type TG 300 T are no longer manufactured in HSS-E-PM but HSS-E.

Type **TG 300 T**

Standard DIN 371 / DIN 376

DIN 2184-1

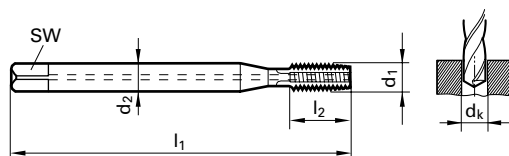
Tool material **HSS-E / HSS-E-PM**

Surface **C**

Form C

Tolerance 6HX

Discount group 103



| d1  | P    | d2     | SW    | dk     | l1     | l2    | Availability |
|-----|------|--------|-------|--------|--------|-------|--------------|
| mm  | mm   | mm     |       | mm     | mm     | mm    |              |
| M 5 | 0.80 | 6.000  | 4.90  | 4.200  | 70.00  | 14.00 | ●            |
| M 6 | 1.00 | 6.000  | 4.90  | 5.000  | 80.00  | 16.00 | ●            |
| M 8 | 1.25 | 8.000  | 6.20  | 6.800  | 90.00  | 17.00 | ●            |
| M10 | 1.50 | 10.000 | 8.00  | 8.500  | 100.00 | 20.00 | ●            |
| M12 | 1.75 | 9.000  | 7.00  | 10.200 | 110.00 | 24.00 | ●            |
| M14 | 2.00 | 11.000 | 9.00  | 12.000 | 110.00 | 26.00 | ●            |
| M16 | 2.00 | 12.000 | 9.00  | 14.000 | 110.00 | 20.00 | ●            |
| M20 | 2.50 | 16.000 | 12.00 | 17.500 | 140.00 | 25.00 | ●            |
| M24 | 3.00 | 18.000 | 14.50 | 21.000 | 160.00 | 30.00 | ●            |
| M27 | 3.00 | 20.000 | 16.00 | 24.000 | 160.00 | 30.00 | ●            |
| M30 | 3.50 | 22.000 | 18.00 | 26.500 | 180.00 | 35.00 | ●            |
| M33 | 3.50 | 25.000 | 20.00 | 29.500 | 180.00 | 35.00 | ●            |
| M36 | 4.00 | 28.000 | 22.00 | 32.000 | 200.00 | 40.00 | ●            |
| M39 | 4.00 | 32.000 | 24.00 | 35.000 | 200.00 | 40.00 | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for ISO metric threads

Order no. 80780



Through hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard JIS B 4430

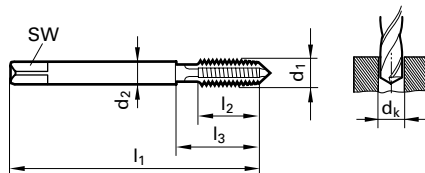
Tool material **HSS-E**

Surface ○

Form B

Tolerance Class 1/OH

Discount group 103



| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    | Availability |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|--------------|
| mm    | mm   |           | mm     | mm    | mm     | mm     | mm    | mm    |              |
| M 2   | 0.40 | OH2       | 3.000  | 2.50  | 1.600  | 40.00  | 8.00  | 15.00 | ●            |
| M 2,5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 9.00  | 16.00 | ●            |
| M 3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 10.00 | 19.00 | ●            |
| M 4   | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 52.00  | 12.00 | 20.00 | ●            |
| M 5   | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 60.00  | 14.00 | 24.00 | ●            |
| M 6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 62.00  | 16.00 | 29.00 | ●            |
| M 8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 70.00  | 17.00 | 37.00 | ●            |
| M10   | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 75.00  | 20.00 | 41.00 | ●            |
| M12   | 1.75 | OH3       | 8.500  | 6.50  | 10.200 | 82.00  | 24.00 | 48.00 | ●            |
| M14   | 2.00 | OH3       | 10.500 | 8.00  | 12.000 | 88.00  | 26.00 | 48.00 | ●            |
| M16   | 2.00 | OH3       | 12.500 | 10.00 | 14.000 | 95.00  | 26.00 | 52.00 | ●            |
| M18   | 2.50 | OH4       | 14.000 | 11.00 | 15.500 | 100.00 | 30.00 | 55.00 | ●            |
| M20   | 2.50 | OH4       | 15.000 | 12.00 | 17.500 | 105.00 | 32.00 | 58.00 | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for ISO metric threads

Order no. 80790



Blind hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard JIS B 4430

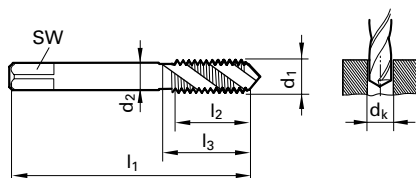
Tool material **HSS-E**

Surface ○

Form C

Tolerance Class 1/OH

Discount group 103



| d1    | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    | Availability |
|-------|------|-----------|--------|-------|--------|--------|-------|-------|--------------|
| mm    | mm   |           | mm     | mm    | mm     | mm     | mm    | mm    |              |
| M 2   | 0.40 | OH2       | 3.000  | 2.50  | 1.600  | 40.00  | 4.50  | 15.00 | ●            |
| M 2,5 | 0.45 | OH2       | 3.000  | 2.50  | 2.050  | 44.00  | 5.00  | 16.00 | ●            |
| M 3   | 0.50 | OH2       | 4.000  | 3.20  | 2.500  | 46.00  | 6.00  | 19.00 | ●            |
| M 4   | 0.70 | OH2       | 5.000  | 4.00  | 3.300  | 52.00  | 7.50  | 20.00 | ●            |
| M 5   | 0.80 | OH2       | 5.500  | 4.50  | 4.200  | 60.00  | 8.50  | 24.00 | ●            |
| M 6   | 1.00 | OH2       | 6.000  | 4.50  | 5.000  | 62.00  | 11.00 | 29.00 | ●            |
| M 8   | 1.25 | OH2       | 6.200  | 5.00  | 6.800  | 70.00  | 14.00 | 37.00 | ●            |
| M10   | 1.50 | OH2       | 7.000  | 5.50  | 8.500  | 75.00  | 16.00 | 41.00 | ●            |
| M12   | 1.75 | OH3       | 8.500  | 6.50  | 10.200 | 82.00  | 18.50 | 48.00 | ●            |
| M14   | 2.00 | OH3       | 10.500 | 8.00  | 12.000 | 88.00  | 20.00 | 48.00 | ●            |
| M16   | 2.00 | OH3       | 12.500 | 10.00 | 14.000 | 95.00  | 20.00 | 52.00 | ●            |
| M18   | 2.50 | OH4       | 14.000 | 11.00 | 15.500 | 100.00 | 25.00 | 55.00 | ●            |
| M20   | 2.50 | OH4       | 15.000 | 12.00 | 17.500 | 105.00 | 25.00 | 58.00 | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for ISO metric fine threads

Order no. 80701



Through hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICline

Type **TG 100 U**

Standard DIN 374

DIN 2184-1

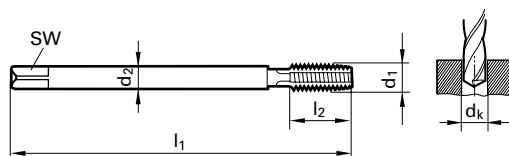
Tool material **HSS-E**

Surface

Form B

Tolerance ISO2/6H

Discount group 156



| d1 XP     | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| M 4 X0,5  | 2.800    | 2.10  | 3.500    | 63.00    | 8.00     | 4.003    | ●            |
| M 5 X0,5  | 3.500    | 2.70  | 4.500    | 70.00    | 10.00    | 5.003    | ●            |
| M 6 X0,75 | 4.500    | 3.40  | 5.200    | 80.00    | 13.00    | 6.004    | ●            |
| M 8 X0,75 | 6.000    | 4.90  | 7.200    | 80.00    | 14.00    | 8.004    | ●            |
| M 8 X1    | 6.000    | 4.90  | 7.000    | 90.00    | 17.00    | 8.005    | ●            |
| M10 X1    | 7.000    | 5.50  | 9.000    | 90.00    | 17.00    | 10.005   | ●            |
| M12 X1    | 9.000    | 7.00  | 11.000   | 100.00   | 20.00    | 12.005   | ●            |
| M12 X1,5  | 9.000    | 7.00  | 10.500   | 100.00   | 20.00    | 12.007   | ●            |
| M14 X1,5  | 11.000   | 9.00  | 12.500   | 100.00   | 20.00    | 14.007   | ●            |
| M16 X1,5  | 12.000   | 9.00  | 14.500   | 100.00   | 22.00    | 16.007   | ●            |
| M18 X1,5  | 14.000   | 11.00 | 16.500   | 110.00   | 25.00    | 18.007   | ●            |
| M20 X1,5  | 16.000   | 12.00 | 18.500   | 125.00   | 25.00    | 20.007   | ●            |
| M22 X1,5  | 18.000   | 14.50 | 20.500   | 125.00   | 25.00    | 22.007   | ●            |
| M24 X1,5  | 18.000   | 14.50 | 22.500   | 140.00   | 28.00    | 24.007   | ●            |
| M24 X2    | 18.000   | 14.50 | 22.000   | 140.00   | 28.00    | 24.008   | ●            |
| M26 X1,5  | 18.000   | 14.50 | 24.500   | 140.00   | 28.00    | 26.007   | ●            |
| M27 X1,5  | 20.000   | 16.00 | 25.500   | 140.00   | 28.00    | 27.007   | ●            |
| M27 X2    | 20.000   | 16.00 | 25.000   | 140.00   | 28.00    | 27.008   | ●            |
| M28 X1,5  | 20.000   | 16.00 | 26.500   | 140.00   | 28.00    | 28.007   | ●            |
| M30 X1,5  | 22.000   | 18.00 | 28.500   | 150.00   | 28.00    | 30.007   | ●            |
| M30 X2    | 22.000   | 18.00 | 28.000   | 150.00   | 28.00    | 30.008   | ●            |
| M32 X1,5  | 22.000   | 18.00 | 30.500   | 150.00   | 28.00    | 32.007   | ●            |
| M36 X1,5  | 28.000   | 22.00 | 34.500   | 170.00   | 30.00    | 36.007   | ●            |
| M42 X1,5  | 32.000   | 24.00 | 40.500   | 170.00   | 30.00    | 42.007   | ●            |

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



# HARTNER

## Machine taps for ISO metric fine threads

Order no. 80731



Blind hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICline

Type **TG 100 U**

Standard DIN 374

DIN 2184-1

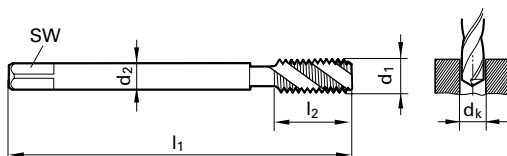
Tool material **HSS-E**

Surface

Form C

Tolerance ISO2/6H

Discount group 156



| d1 XP     | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| M 4 X0,5  | 2.800    | 2.10  | 3.500    | 63.00    | 5.00     | 4.003    | ●            |
| M 5 X0,5  | 3.500    | 2.70  | 4.500    | 70.00    | 5.00     | 5.003    | ●            |
| M 6 X0,75 | 4.500    | 3.40  | 5.200    | 80.00    | 8.00     | 6.004    | ●            |
| M 8 X1    | 6.000    | 4.90  | 7.000    | 90.00    | 11.00    | 8.005    | ●            |
| M10 X1    | 7.000    | 5.50  | 9.000    | 90.00    | 11.00    | 10.005   | ●            |
| M10 X1,25 | 7.000    | 5.50  | 8.800    | 100.00   | 14.00    | 10.006   | ●            |
| M12 X1    | 9.000    | 7.00  | 11.000   | 100.00   | 11.00    | 12.005   | ●            |
| M12 X1,25 | 9.000    | 7.00  | 10.800   | 100.00   | 16.00    | 12.006   | ●            |
| M12 X1,5  | 9.000    | 7.00  | 10.500   | 100.00   | 16.00    | 12.007   | ●            |
| M14 X1    | 11.000   | 9.00  | 13.000   | 100.00   | 11.00    | 14.005   | ●            |
| M14 X1,25 | 11.000   | 9.00  | 12.800   | 100.00   | 15.00    | 14.006   | ●            |
| M14 X1,5  | 11.000   | 9.00  | 12.500   | 100.00   | 15.00    | 14.007   | ●            |
| M16 X1    | 12.000   | 9.00  | 15.000   | 100.00   | 11.00    | 16.005   | ●            |
| M16 X1,5  | 12.000   | 9.00  | 14.500   | 100.00   | 15.00    | 16.007   | ●            |
| M18 X1    | 14.000   | 11.00 | 17.000   | 110.00   | 12.00    | 18.005   | ●            |
| M18 X1,5  | 14.000   | 11.00 | 16.500   | 110.00   | 16.00    | 18.007   | ●            |
| M20 X1,5  | 16.000   | 12.00 | 18.500   | 125.00   | 16.00    | 20.007   | ●            |
| M22 X1,5  | 18.000   | 14.50 | 20.500   | 125.00   | 16.00    | 22.007   | ●            |
| M24 X2    | 18.000   | 14.50 | 22.000   | 140.00   | 22.00    | 24.008   | ●            |
| M26 X1,5  | 18.000   | 14.50 | 24.500   | 140.00   | 20.00    | 26.007   | ●            |
| M27 X1,5  | 20.000   | 16.00 | 25.500   | 140.00   | 20.00    | 27.007   | ●            |
| M27 X2    | 20.000   | 16.00 | 25.000   | 140.00   | 28.00    | 27.008   | ●            |
| M28 X1,5  | 20.000   | 16.00 | 26.500   | 140.00   | 20.00    | 28.007   | ●            |
| M30 X1,5  | 22.000   | 18.00 | 28.500   | 150.00   | 20.00    | 30.007   | ●            |
| M30 X2    | 22.000   | 18.00 | 28.000   | 150.00   | 20.00    | 30.008   | ●            |

bright

steam tempered

nitrided

TiN

TiAlN

TiCN





# HARTNER

## Machine taps for ISO metric fine threads

Order no. 80801



Through hole

High Performance Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# TOPLine

Type **TG 100 T**

Standard DIN 374

DIN 2184-1

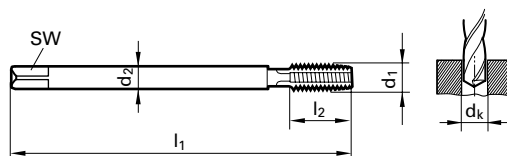
Tool material **HSS-E**

Surface **A**

Form B

Tolerance ISO2/6H

Discount group 103



| d1 XP     | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| M 3 X0,35 | 2.200    |       | 2.650    | 56.00    | 7.00     | 3.002    | ●            |
| M 4 X0,5  | 2.800    | 2.10  | 3.500    | 63.00    | 8.00     | 4.003    | ●            |
| M 5 X0,5  | 3.500    | 2.70  | 4.500    | 70.00    | 10.00    | 5.003    | ●            |
| M 6 X0,5  | 4.500    | 3.40  | 5.500    | 80.00    | 13.00    | 6.003    | ●            |
| M 6 X0,75 | 4.500    | 3.40  | 5.200    | 80.00    | 13.00    | 6.004    | ●            |
| M 8 X0,75 | 6.000    | 4.90  | 7.200    | 80.00    | 14.00    | 8.004    | ●            |
| M 8 X1    | 6.000    | 4.90  | 7.000    | 90.00    | 17.00    | 8.005    | ●            |
| M10 X1    | 7.000    | 5.50  | 9.000    | 90.00    | 17.00    | 10.005   | ●            |
| M10 X1,25 | 7.000    | 5.50  | 8.800    | 100.00   | 20.00    | 10.006   | ●            |
| M12 X1    | 9.000    | 7.00  | 11.000   | 100.00   | 20.00    | 12.005   | ●            |
| M12 X1,25 | 9.000    | 7.00  | 10.800   | 100.00   | 20.00    | 12.006   | ●            |
| M12 X1,5  | 9.000    | 7.00  | 10.500   | 100.00   | 20.00    | 12.007   | ●            |
| M14 X1,5  | 11.000   | 9.00  | 12.500   | 100.00   | 20.00    | 14.007   | ●            |
| M16 X1,5  | 12.000   | 9.00  | 14.500   | 100.00   | 22.00    | 16.007   | ●            |
| M18 X1,5  | 14.000   | 11.00 | 16.500   | 110.00   | 25.00    | 18.007   | ●            |
| M20 X1,5  | 16.000   | 12.00 | 18.500   | 125.00   | 25.00    | 20.007   | ●            |
| M24 X1,5  | 18.000   | 14.50 | 22.500   | 140.00   | 28.00    | 24.007   | ●            |
| M24 X2    | 18.000   | 14.50 | 22.000   | 140.00   | 28.00    | 24.008   | ●            |
| M36 X2    | 28.000   | 22.00 | 34.000   | 170.00   | 30.00    | 36.008   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for ISO metric fine threads

Order no. 80831



Blind hole

High Performance Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# TOPLine

Type TG 100 T

Standard DIN 374

DIN 2184-1

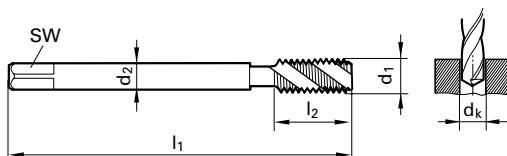
Tool material HSS-E

Surface **A**

Form C

Tolerance 6HX

Discount group 103



| d1 XP     | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| M 6 X0,75 | 4.500    | 3.40  | 5.200    | 80.00    | 8.00     | 6.004    | ●            |
| M 8 X0,75 | 6.000    | 4.90  | 7.200    | 80.00    | 8.00     | 8.004    | ●            |
| M 8 X1    | 6.000    | 4.90  | 7.000    | 90.00    | 11.00    | 8.005    | ●            |
| M10 X1    | 7.000    | 5.50  | 9.000    | 90.00    | 11.00    | 10.005   | ●            |
| M10 X1,25 | 7.000    | 5.50  | 8.800    | 100.00   | 14.00    | 10.006   | ●            |
| M12 X1    | 9.000    | 7.00  | 11.000   | 100.00   | 11.00    | 12.005   | ●            |
| M12 X1,25 | 9.000    | 7.00  | 10.800   | 100.00   | 16.00    | 12.006   | ●            |
| M12 X1,5  | 9.000    | 7.00  | 10.500   | 100.00   | 16.00    | 12.007   | ●            |
| M14 X1,5  | 11.000   | 9.00  | 12.500   | 100.00   | 15.00    | 14.007   | ●            |
| M16 X1,5  | 12.000   | 9.00  | 14.500   | 100.00   | 15.00    | 16.007   | ●            |
| M18 X1,5  | 14.000   | 11.00 | 16.500   | 110.00   | 16.00    | 18.007   | ●            |
| M20 X1,5  | 16.000   | 12.00 | 18.500   | 125.00   | 16.00    | 20.007   | ●            |
| M24 X1,5  | 18.000   | 14.50 | 22.500   | 140.00   | 16.00    | 24.007   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for ISO metric fine threads

Order no. 80751



Through hole/  
blind hole

Taps for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with vermicular graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals.

Type **TG 100 GG**

Standard DIN 374

DIN 2184-1

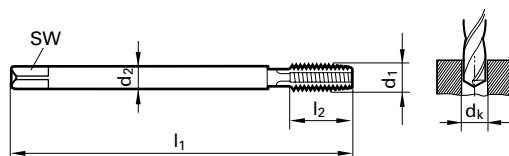
Tool material **HSS-E**

Surface ●

Form C

Tolerance 6HX

Discount group 103



| d1 XP     | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| M 4 X0,5  | 2.800    | 2.10  | 3.500    | 63.00    | 8.00     | 4.003    | ●            |
| M 5 X0,5  | 3.500    | 2.70  | 4.500    | 70.00    | 10.00    | 5.003    | ●            |
| M 6 X0,75 | 4.500    | 3.40  | 5.200    | 80.00    | 13.00    | 6.004    | ●            |
| M 8 X0,75 | 6.000    | 4.90  | 7.200    | 80.00    | 14.00    | 8.004    | ●            |
| M 8 X1    | 6.000    | 4.90  | 7.000    | 90.00    | 17.00    | 8.005    | ●            |
| M10 X1    | 7.000    | 5.50  | 9.000    | 90.00    | 17.00    | 10.005   | ●            |
| M12 X1    | 9.000    | 7.00  | 11.000   | 100.00   | 20.00    | 12.005   | ●            |
| M12 X1,5  | 9.000    | 7.00  | 10.500   | 100.00   | 20.00    | 12.007   | ●            |
| M14 X1,5  | 11.000   | 9.00  | 12.500   | 100.00   | 20.00    | 14.007   | ●            |
| M16 X1,5  | 12.000   | 9.00  | 14.500   | 100.00   | 22.00    | 16.007   | ●            |
| M18 X1,5  | 14.000   | 11.00 | 16.500   | 110.00   | 25.00    | 18.007   | ●            |
| M20 X1,5  | 16.000   | 12.00 | 18.500   | 125.00   | 25.00    | 20.007   | ●            |
| M22 X1,5  | 18.000   | 14.50 | 20.500   | 125.00   | 25.00    | 22.007   | ●            |
| M24 X1,5  | 18.000   | 14.50 | 22.500   | 140.00   | 28.00    | 24.007   | ●            |
| M27 X1,5  | 20.000   | 16.00 | 25.500   | 140.00   | 28.00    | 27.007   | ●            |
| M30 X1,5  | 22.000   | 18.00 | 28.500   | 150.00   | 28.00    | 30.007   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for ISO metric fine threads

Order no. 80851



Through hole/  
blind hole

Taps with internal cooling for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with spheroidal graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals for maximum tool life. In addition, excellent suitability for creating short chips in common and high tensile steels.

Type **TG 300 T**

Standard DIN 374

DIN 2184-1

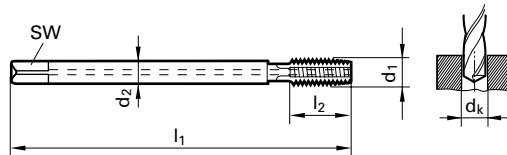
Tool material **HSS-E-PM**

Surface **C**

Form C

Tolerance 6HX

Discount group 103



| d1 XP     | d2<br>mm | SW   | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|------|----------|----------|----------|----------|--------------|
| M 6 X0,75 | 4.500    | 3.40 | 5.200    | 80.00    | 13.00    | 6.004    | ●            |
| M 8 X0,75 | 6.000    | 4.90 | 7.200    | 80.00    | 14.00    | 8.004    | ●            |
| M 8 X1    | 6.000    | 4.90 | 7.000    | 90.00    | 17.00    | 8.005    | ●            |
| M10 X1    | 7.000    | 5.50 | 9.000    | 90.00    | 17.00    | 10.005   | ●            |
| M10 X1,25 | 7.000    | 5.50 | 8.800    | 100.00   | 20.00    | 10.006   | ●            |
| M12 X1    | 9.000    | 7.00 | 11.000   | 100.00   | 20.00    | 12.005   | ●            |
| M12 X1,25 | 9.000    | 7.00 | 10.800   | 100.00   | 20.00    | 12.006   | ●            |
| M12 X1,5  | 9.000    | 7.00 | 10.500   | 100.00   | 20.00    | 12.007   | ●            |
| M14 X1,5  | 11.000   | 9.00 | 12.500   | 100.00   | 20.00    | 14.007   | ●            |
| M16 X1,5  | 12.000   | 9.00 | 14.500   | 100.00   | 22.00    | 16.007   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for ISO metric fine threads

Order no. 80781



Through hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard JIS B 4430

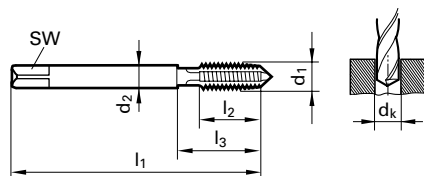
Tool material **HSS-E**

Surface ○

Form B

Tolerance Class 1/OH

Discount group 103



| d1 XP     | Tolerance | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | Code no.<br>mm |
|-----------|-----------|----------|----------|----------|----------|----------|----------|----------------|
| M 6 X0,75 | OH2       | 6.000    | 4.50     | 5.200    | 62.00    | 13.00    | 30.00    | 6.004          |
| M 8 X1    | OH2       | 6.200    | 5.00     | 7.000    | 70.00    | 16.00    | 35.00    | 8.005          |
| M10 X1    | OH2       | 7.000    | 5.50     | 9.000    | 70.00    | 16.00    | 35.00    | 10.005         |
| M10 X1,25 | OH2       | 7.000    | 5.50     | 8.800    | 75.00    | 20.00    | 39.00    | 10.006         |
| M12 X1    | OH2       | 8.500    | 6.50     | 11.000   | 70.00    | 20.00    | 40.00    | 12.005         |
| M12 X1,25 | OH2       | 8.500    | 6.50     | 10.800   | 80.00    | 20.00    | 40.00    | 12.006         |
| M12 X1,5  | OH2       | 8.500    | 6.50     | 10.500   | 82.00    | 20.00    | 40.00    | 12.007         |
| M14 X1,5  | OH2       | 10.500   | 8.00     | 12.500   | 88.00    | 20.00    | 40.00    | 14.007         |
| M16 X1,5  | OH2       | 12.500   | 10.00    | 14.500   | 95.00    | 22.00    | 44.00    | 16.007         |
| M20 X1,5  | OH2       | 15.000   | 12.00    | 18.500   | 95.00    | 25.00    | 44.00    | 20.007         |

Availability



○ bright

● steam tempered

● nitrided

● T TiN

● A TiAlN

● C TiCN



# HARTNER

## Machine taps for ISO metric fine threads

Order no. 80791



Blind hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard JIS B 4430

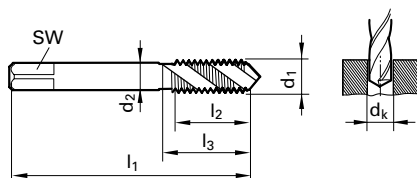
Tool material **HSS-E**

Surface ○

Form C

Tolerance Class 1/OH

Discount group 103



| d1 XP     | Tolerance | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | Code no.<br>mm |
|-----------|-----------|----------|----------|----------|----------|----------|----------|----------------|
| M 6 X0,75 | OH2       | 6.000    | 4.50     | 5.200    | 62.00    | 8.00     | 30.00    | 6.004          |
| M 8 X1    | OH2       | 6.200    | 5.00     | 7.000    | 70.00    | 11.00    | 35.00    | 8.005          |
| M10 X1    | OH2       | 7.000    | 5.50     | 9.000    | 70.00    | 11.00    | 35.00    | 10.005         |
| M10 X1,25 | OH2       | 7.000    | 5.50     | 8.800    | 75.00    | 14.00    | 39.00    | 10.006         |
| M12 X1    | OH2       | 8.500    | 6.50     | 11.000   | 70.00    | 11.00    | 40.00    | 12.005         |
| M12 X1,25 | OH2       | 8.500    | 6.50     | 10.800   | 80.00    | 16.00    | 40.00    | 12.006         |
| M12 X1,5  | OH2       | 8.500    | 6.50     | 10.500   | 82.00    | 16.00    | 40.00    | 12.007         |
| M14 X1,5  | OH2       | 10.500   | 8.00     | 12.500   | 88.00    | 15.00    | 40.00    | 14.007         |
| M16 X1,5  | OH2       | 12.500   | 10.00    | 14.500   | 95.00    | 15.00    | 44.00    | 16.007         |
| M20 X1,5  | OH2       | 15.000   | 12.00    | 18.500   | 95.00    | 16.00    | 44.00    | 20.007         |

Availability

●  
●  
●  
●  
●  
●  
●  
●  
●  
●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for UNC-threads

Order no. 80702



Through hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

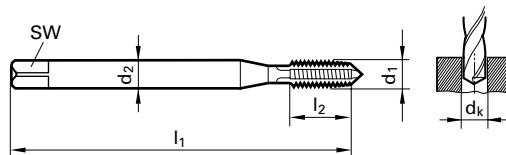
Tool material **HSS-E**

Surface

Form B

Tolerance 2B

Discount group 156



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR. 4 -40 | 3.500    | 2.70  | 2.350    | 56.00    | 11.00    | 2.845    | ●            |
| NR. 6 -32 | 4.000    | 3.00  | 2.850    | 56.00    | 12.00    | 3.505    | ●            |
| NR. 8 -32 | 4.500    | 3.40  | 3.500    | 63.00    | 13.00    | 4.166    | ●            |
| NR.10 -24 | 6.000    | 4.90  | 3.900    | 70.00    | 14.00    | 4.826    | ●            |
| 1/4" -20  | 7.000    | 5.50  | 5.100    | 80.00    | 16.00    | 6.350    | ●            |
| 5/16" -18 | 8.000    | 6.20  | 6.600    | 90.00    | 18.00    | 7.938    | ●            |
| 3/8" -16  | 10.000   | 8.00  | 8.000    | 100.00   | 20.00    | 9.525    | ●            |
| 7/16" -14 | 8.000    | 6.20  | 9.400    | 100.00   | 22.00    | 11.113   | ●            |
| 1/2" -13  | 9.000    | 7.00  | 10.800   | 110.00   | 25.00    | 12.700   | ●            |
| 5/8" -11  | 12.000   | 9.00  | 13.500   | 110.00   | 30.00    | 15.875   | ●            |
| 3/4" -10  | 14.000   | 11.00 | 16.500   | 125.00   | 33.00    | 19.050   | ●            |
| 7/8" - 9  | 18.000   | 14.50 | 19.500   | 140.00   | 35.00    | 22.225   | ●            |
| 1" - 8    | 18.000   | 14.50 | 22.250   | 160.00   | 38.00    | 25.400   | ●            |

bright

steam tempered

nitrided

TiN

TiAlN

TiCN





# HARTNER

## Machine taps for UNC-threads

Order no. 80732



Blind hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

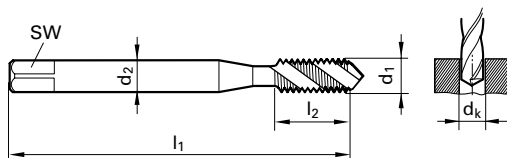
Tool material **HSS-E**

Surface

Form C

Tolerance 2B

Discount group 156



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR. 2 -56 | 2.800    | 2.10  | 1.850    | 45.00    | 5.00     | 2.184    | ●            |
| NR. 4 -40 | 3.500    | 2.70  | 2.350    | 56.00    | 7.00     | 2.845    | ●            |
| NR. 6 -32 | 4.000    | 3.00  | 2.850    | 56.00    | 8.00     | 3.505    | ●            |
| NR. 8 -32 | 4.500    | 3.40  | 3.500    | 63.00    | 8.00     | 4.166    | ●            |
| NR.10 -24 | 6.000    | 4.90  | 3.900    | 70.00    | 11.00    | 4.826    | ●            |
| 1/4" -20  | 7.000    | 5.50  | 5.100    | 80.00    | 13.00    | 6.350    | ●            |
| 5/16" -18 | 8.000    | 6.20  | 6.600    | 90.00    | 14.00    | 7.938    | ●            |
| 3/8" -16  | 10.000   | 8.00  | 8.000    | 100.00   | 16.00    | 9.525    | ●            |
| 7/16" -14 | 8.000    | 6.20  | 9.400    | 100.00   | 18.00    | 11.113   | ●            |
| 1/2" -13  | 9.000    | 7.00  | 10.800   | 110.00   | 20.00    | 12.700   | ●            |
| 9/16" -12 | 11.000   | 9.00  | 12.200   | 110.00   | 21.00    | 14.288   | ●            |
| 5/8" -11  | 12.000   | 9.00  | 13.500   | 110.00   | 24.00    | 15.875   | ●            |
| 3/4" -10  | 14.000   | 11.00 | 16.500   | 125.00   | 25.00    | 19.050   | ●            |
| 7/8" - 9  | 18.000   | 14.50 | 19.500   | 140.00   | 28.00    | 22.225   | ●            |

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



# HARTNER

## Machine taps for UNC-threads

Order no. 80802



Through hole

High Performance Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# TOPLine

Type **TG 100 T**

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

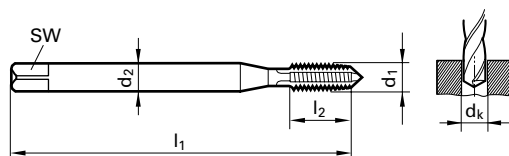
Tool material **HSS-E**

Surface **A**

Form B

Tolerance 2B

Discount group 103



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR. 4 -40 | 3.500    | 2.70  | 2.350    | 56.00    | 11.00    | 2.845    | ●            |
| NR. 6 -32 | 4.000    | 3.00  | 2.850    | 56.00    | 12.00    | 3.505    | ●            |
| NR. 8 -32 | 4.500    | 3.40  | 3.500    | 63.00    | 13.00    | 4.166    | ●            |
| NR.10 -24 | 6.000    | 4.90  | 3.900    | 70.00    | 14.00    | 4.826    | ●            |
| 1/4" -20  | 7.000    | 5.50  | 5.100    | 80.00    | 16.00    | 6.350    | ●            |
| 5/16" -18 | 8.000    | 6.20  | 6.600    | 90.00    | 18.00    | 7.938    | ●            |
| 3/8" -16  | 10.000   | 8.00  | 8.000    | 100.00   | 20.00    | 9.525    | ●            |
| 7/16" -14 | 8.000    | 6.20  | 9.400    | 100.00   | 22.00    | 11.113   | ●            |
| 1/2" -13  | 9.000    | 7.00  | 10.800   | 110.00   | 25.00    | 12.700   | ●            |
| 9/16" -12 | 11.000   | 9.00  | 12.200   | 110.00   | 30.00    | 14.288   | ●            |
| 5/8" -11  | 12.000   | 9.00  | 13.500   | 110.00   | 30.00    | 15.875   | ●            |
| 3/4" -10  | 14.000   | 11.00 | 16.500   | 125.00   | 33.00    | 19.050   | ●            |
| 7/8" - 9  | 18.000   | 14.50 | 19.500   | 140.00   | 35.00    | 22.225   | ●            |
| 1" - 8    | 18.000   | 14.50 | 22.250   | 160.00   | 38.00    | 25.400   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for UNC-threads

Order no. 80832



Blind hole

High Performance Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# TOPLine

Type **TG 100 T**

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

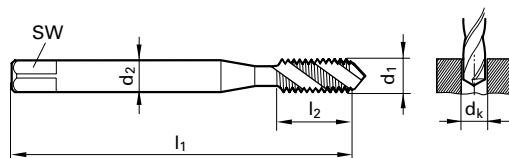
Tool material **HSS-E**

Surface **A**

Form C

Tolerance 2B

Discount group 103



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR. 4 -40 | 3.500    | 2.70  | 2.350    | 56.00    | 7.00     | 2.845    | ●            |
| NR. 6 -32 | 4.000    | 3.00  | 2.850    | 56.00    | 8.00     | 3.505    | ●            |
| NR. 8 -32 | 4.500    | 3.40  | 3.500    | 63.00    | 8.00     | 4.166    | ●            |
| NR.10 -24 | 6.000    | 4.90  | 3.900    | 70.00    | 11.00    | 4.826    | ●            |
| 1/4" -20  | 7.000    | 5.50  | 5.100    | 80.00    | 13.00    | 6.350    | ●            |
| 5/16" -18 | 8.000    | 6.20  | 6.600    | 90.00    | 14.00    | 7.938    | ●            |
| 3/8" -16  | 10.000   | 8.00  | 8.000    | 100.00   | 16.00    | 9.525    | ●            |
| 7/16" -14 | 8.000    | 6.20  | 9.400    | 100.00   | 18.00    | 11.113   | ●            |
| 1/2" -13  | 9.000    | 7.00  | 10.800   | 110.00   | 20.00    | 12.700   | ●            |
| 9/16" -12 | 11.000   | 9.00  | 12.200   | 110.00   | 21.00    | 14.288   | ●            |
| 5/8" -11  | 12.000   | 9.00  | 13.500   | 110.00   | 24.00    | 15.875   | ●            |
| 3/4" -10  | 14.000   | 11.00 | 16.500   | 125.00   | 25.00    | 19.050   | ●            |
| 7/8" -9   | 18.000   | 14.50 | 19.500   | 140.00   | 28.00    | 22.225   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for UNC-threads

Order no. 80752



Durchgangs-/  
Sacklochgewinde

Taps for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with vermicular graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals.

Type **TG 100 GG**

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

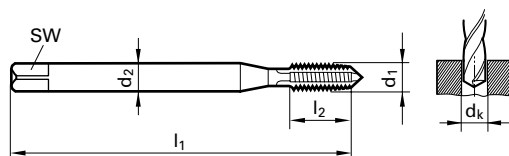
Tool material **HSS-E**

Surface ●

Form C

Tolerance 2B

Discount group 103



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR. 4 -40 | 3.500    | 2.70  | 2.350    | 56.00    | 11.00    | 2.845    | ●            |
| NR. 6 -32 | 4.000    | 3.00  | 2.850    | 56.00    | 12.00    | 3.505    | ●            |
| NR. 8 -32 | 4.500    | 3.40  | 3.500    | 63.00    | 13.00    | 4.166    | ●            |
| NR.10 -24 | 6.000    | 4.90  | 3.900    | 70.00    | 14.00    | 4.826    | ●            |
| 1/4" -20  | 7.000    | 5.50  | 5.100    | 80.00    | 16.00    | 6.350    | ●            |
| 5/16" -18 | 8.000    | 6.20  | 6.600    | 90.00    | 18.00    | 7.938    | ●            |
| 3/8" -16  | 10.000   | 8.00  | 8.000    | 100.00   | 20.00    | 9.525    | ●            |
| 7/16" -14 | 8.000    | 6.20  | 9.400    | 100.00   | 22.00    | 11.113   | ●            |
| 1/2" -13  | 9.000    | 7.00  | 10.800   | 110.00   | 25.00    | 12.700   | ●            |
| 9/16" -12 | 11.000   | 9.00  | 12.200   | 110.00   | 30.00    | 14.288   | ●            |
| 5/8" -11  | 12.000   | 9.00  | 13.500   | 110.00   | 30.00    | 15.875   | ●            |
| 3/4" -10  | 14.000   | 11.00 | 16.500   | 125.00   | 33.00    | 19.050   | ●            |
| 7/8" - 9  | 18.000   | 14.50 | 19.500   | 140.00   | 35.00    | 22.225   | ●            |
| 1" - 8    | 18.000   | 14.50 | 22.250   | 160.00   | 38.00    | 25.400   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for UNF-threads

Order no. 80703



Through hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard ~DIN 374

DIN 2184-1

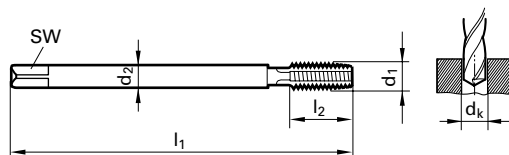
Tool material **HSS-E**

Surface

Form B

Tolerance 2B

Discount group 156



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR. 4 -48 | 2.200    |       | 2.400    | 56.00    | 10.00    | 2.845    | ●            |
| NR. 6 -40 | 2.500    | 2.10  | 2.950    | 56.00    | 11.00    | 3.505    | ●            |
| NR.10 -32 | 3.500    | 2.70  | 4.100    | 70.00    | 14.00    | 4.826    | ●            |
| 1/4" -28  | 4.500    | 3.40  | 5.500    | 80.00    | 16.00    | 6.350    | ●            |
| 3/8" -24  | 7.000    | 5.50  | 8.500    | 90.00    | 18.00    | 9.525    | ●            |
| 5/8" -18  | 12.000   | 9.00  | 14.500   | 100.00   | 22.00    | 15.875   | ●            |
| 7/8" -14  | 18.000   | 14.50 | 20.400   | 125.00   | 25.00    | 22.225   | ●            |
| 1" -12    | 18.000   | 14.50 | 23.250   | 140.00   | 28.00    | 25.400   | ●            |

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



# HARTNER

## Machine taps for UNF-threads

Order no. 80733



Blind hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard ~DIN 374

DIN 2184-1

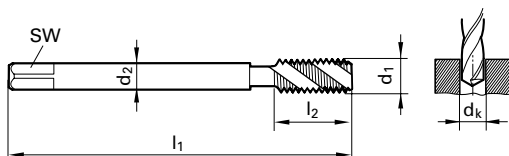
Tool material **HSS-E**

Surface

Form C

Tolerance 2B

Discount group 156



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR. 3 -56 | 1.800    |       | 2.150    | 50.00    | 5.00     | 2.515    | ●            |
| NR. 4 -48 | 2.200    |       | 2.400    | 56.00    | 6.00     | 2.845    | ●            |
| NR. 6 -40 | 2.500    | 2.10  | 2.950    | 56.00    | 6.50     | 3.505    | ●            |
| NR. 8 -36 | 2.800    | 2.10  | 3.500    | 63.00    | 7.00     | 4.166    | ●            |
| NR.10 -32 | 3.500    | 2.70  | 4.100    | 70.00    | 8.50     | 4.826    | ●            |
| 1/4" -28  | 4.500    | 3.40  | 5.500    | 80.00    | 9.00     | 6.350    | ●            |
| 3/8" -24  | 7.000    | 5.50  | 8.500    | 90.00    | 11.00    | 9.525    | ●            |
| 7/16" -20 | 8.000    | 6.20  | 9.900    | 100.00   | 13.00    | 11.113   | ●            |
| 1/2" -20  | 9.000    | 7.00  | 11.500   | 100.00   | 13.00    | 12.700   | ●            |
| 5/8" -18  | 12.000   | 9.00  | 14.500   | 100.00   | 15.00    | 15.875   | ●            |
| 7/8" -14  | 18.000   | 14.50 | 20.400   | 125.00   | 19.00    | 22.225   | ●            |
| 1" -12    | 18.000   | 14.50 | 23.250   | 140.00   | 22.00    | 25.400   | ●            |

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



# HARTNER

## Machine taps for UNF-threads

Order no. 80803



Through hole

High Performance Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# TOPLine

Type **TG 100 T**

Standard ~DIN 374

DIN 2184-1

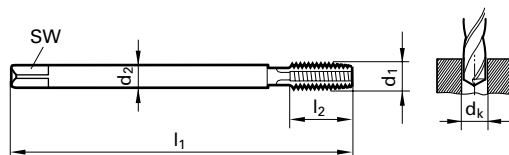
Tool material **HSS-E**

Surface **A**

Form B

Tolerance 2B

Discount group 103



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR. 4 -48 | 2.200    |       | 2.400    | 56.00    | 10.00    | 2.845    | ●            |
| NR. 6 -40 | 2.500    | 2.10  | 2.950    | 56.00    | 11.00    | 3.505    | ●            |
| NR. 8 -36 | 2.800    | 2.10  | 3.500    | 63.00    | 12.00    | 4.166    | ●            |
| NR.10 -32 | 3.500    | 2.70  | 4.100    | 70.00    | 14.00    | 4.826    | ●            |
| 1/4" -28  | 4.500    | 3.40  | 5.500    | 80.00    | 16.00    | 6.350    | ●            |
| 5/16" -24 | 6.000    | 4.90  | 6.900    | 90.00    | 18.00    | 7.938    | ●            |
| 3/8" -24  | 7.000    | 5.50  | 8.500    | 90.00    | 18.00    | 9.525    | ●            |
| 7/16" -20 | 8.000    | 6.20  | 9.900    | 90.00    | 18.00    | 11.113   | ●            |
| 5/8" -18  | 12.000   | 9.00  | 14.500   | 100.00   | 22.00    | 15.875   | ●            |
| 7/8" -14  | 18.000   | 14.50 | 20.400   | 125.00   | 25.00    | 22.225   | ●            |
| 1" -12    | 18.000   | 14.50 | 23.250   | 140.00   | 28.00    | 25.400   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for UNF-threads

Order no. 80833



Blind hole

High Performance Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# TOPLine

Type TG 100 T

Standard ~DIN 374

DIN 2184-1

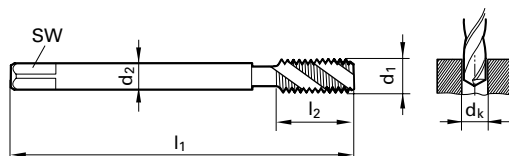
Tool material HSS-E

Surface **A**

Form C

Tolerance 2B

Discount group 103



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR.10 -32 | 3.500    | 2.70  | 4.100    | 70.00    | 8.50     | 4.826    | ●            |
| NR.12 -28 | 4.000    | 3.00  | 4.600    | 80.00    | 9.00     | 5.486    | ●            |
| 1/4" -28  | 4.500    | 3.40  | 5.500    | 80.00    | 9.00     | 6.350    | ●            |
| 5/16" -24 | 6.000    | 4.90  | 6.900    | 90.00    | 11.00    | 7.938    | ●            |
| 3/8" -24  | 7.000    | 5.50  | 8.500    | 90.00    | 11.00    | 9.525    | ●            |
| 7/16" -20 | 8.000    | 6.20  | 9.900    | 100.00   | 13.00    | 11.113   | ●            |
| 1/2" -20  | 9.000    | 7.00  | 11.500   | 100.00   | 13.00    | 12.700   | ●            |
| 5/8" -18  | 12.000   | 9.00  | 14.500   | 100.00   | 15.00    | 15.875   | ●            |
| 7/8" -14  | 18.000   | 14.50 | 20.400   | 125.00   | 19.00    | 22.225   | ●            |
| 1" -12    | 18.000   | 14.50 | 23.250   | 140.00   | 22.00    | 25.400   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN





# HARTNER

## Machine taps for UNF-threads

Order no. 80753



Through hole/  
blind hole

Taps for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with vermicular graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals.

Type **TG 100 GG**

Standard ~DIN 374

DIN 2184-1

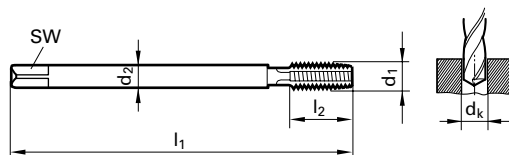
Tool material **HSS-E**

Surface ●

Form C

Tolerance 2B

Discount group 103



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR. 4 -48 | 2.200    |       | 2.400    | 56.00    | 10.00    | 2.845    | ●            |
| NR. 6 -40 | 2.500    | 2.10  | 2.950    | 56.00    | 11.00    | 3.505    | ●            |
| NR. 8 -36 | 2.800    | 2.10  | 3.500    | 63.00    | 12.00    | 4.166    | ●            |
| NR.10 -32 | 3.500    | 2.70  | 4.100    | 70.00    | 14.00    | 4.826    | ●            |
| 1/4" -28  | 4.500    | 3.40  | 5.500    | 80.00    | 16.00    | 6.350    | ●            |
| 5/16" -24 | 6.000    | 4.90  | 6.900    | 90.00    | 18.00    | 7.938    | ●            |
| 3/8" -24  | 7.000    | 5.50  | 8.500    | 90.00    | 18.00    | 9.525    | ●            |
| 7/16" -20 | 8.000    | 6.20  | 9.900    | 100.00   | 22.00    | 11.113   | ●            |
| 1/2" -20  | 9.000    | 7.00  | 11.500   | 100.00   | 20.00    | 12.700   | ●            |
| 9/16" -18 | 11.000   | 9.00  | 12.900   | 100.00   | 22.00    | 14.288   | ●            |
| 3/4" -16  | 14.000   | 11.00 | 17.500   | 110.00   | 25.00    | 19.050   | ●            |
| 7/8" -14  | 18.000   | 14.50 | 20.400   | 125.00   | 25.00    | 22.225   | ●            |
| 1" -12    | 18.000   | 14.50 | 23.250   | 140.00   | 28.00    | 25.400   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for BSP-threads

Order no. 80704



Through hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard DIN 5156

DIN 2184-1

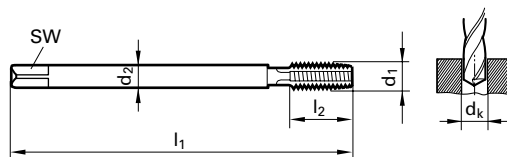
Tool material **HSS-E**

Surface

Form B

Tolerance

Discount group 156



| d1     | P     | d2     | SW    | dk     | l1     | l2    | Code no. | Availability |
|--------|-------|--------|-------|--------|--------|-------|----------|--------------|
| G/inch | mm    | mm     | mm    | mm     | mm     | mm    |          |              |
| G 1/8  | 28.00 | 7.000  | 5.50  | 8.800  | 90.00  | 18.00 | 9.728    | ●            |
| G 1/4  | 19.00 | 11.000 | 9.00  | 11.800 | 100.00 | 20.00 | 13.157   | ●            |
| G 3/8  | 19.00 | 12.000 | 9.00  | 15.250 | 100.00 | 22.00 | 16.662   | ●            |
| G 1/2  | 14.00 | 16.000 | 12.00 | 19.000 | 125.00 | 25.00 | 20.955   | ●            |
| G 3/4  | 14.00 | 20.000 | 16.00 | 24.500 | 140.00 | 28.00 | 26.441   | ●            |
| G1     | 11.00 | 25.000 | 20.00 | 30.750 | 160.00 | 30.00 | 33.249   | ●            |
| G1 1/4 | 11.00 | 32.000 | 24.00 | 39.500 | 170.00 | 30.00 | 41.910   | ●            |
| G1 1/2 | 11.00 | 36.000 | 29.00 | 45.250 | 190.00 | 32.00 | 47.803   | ●            |
| G2     | 11.00 | 45.000 | 35.00 | 57.000 | 220.00 | 40.00 | 59.614   | ●            |

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



# HARTNER

## Machine taps for BSP-threads

Order no. 80734



Blind hole

Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# BASICLine

Type **TG 100 U**

Standard DIN 5156

DIN 2184-1

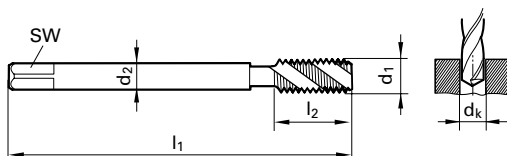
Tool material **HSS-E**

Surface

Form C

Tolerance

Discount group 156



| d1     | P     | d2     | SW    | dk     | l1     | l2    | Code no. | Availability |
|--------|-------|--------|-------|--------|--------|-------|----------|--------------|
| G/inch | mm    | mm     | mm    | mm     | mm     | mm    |          |              |
| G 1/16 | 28.00 | 6.000  | 4.90  | 6.800  | 90.00  | 11.00 | 7.723    | ●            |
| G 1/8  | 28.00 | 7.000  | 5.50  | 8.800  | 90.00  | 11.00 | 9.728    | ●            |
| G 1/4  | 19.00 | 11.000 | 9.00  | 11.800 | 100.00 | 14.00 | 13.157   | ●            |
| G 3/8  | 19.00 | 12.000 | 9.00  | 15.250 | 100.00 | 14.00 | 16.662   | ●            |
| G 1/2  | 14.00 | 16.000 | 12.00 | 19.000 | 125.00 | 18.00 | 20.955   | ●            |
| G 3/4  | 14.00 | 20.000 | 16.00 | 24.500 | 140.00 | 20.00 | 26.441   | ●            |
| G1     | 11.00 | 25.000 | 20.00 | 30.750 | 160.00 | 24.00 | 33.249   | ●            |
| G1 1/4 | 11.00 | 32.000 | 24.00 | 39.500 | 170.00 | 25.00 | 41.910   | ●            |
| G1 1/2 | 11.00 | 36.000 | 29.00 | 45.250 | 190.00 | 27.00 | 47.803   | ●            |
| G2     | 11.00 | 45.000 | 35.00 | 57.000 | 220.00 | 32.00 | 59.614   | ●            |

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



# HARTNER

## Machine taps for BSP-threads

Order no. 80804



Through hole

High Performance Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# TOPLine

Type **TG 100 T**

Standard DIN 5156

DIN 2184-1

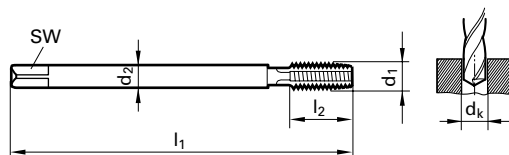
Tool material **HSS-E**

Surface **A**

Form B

Tolerance

Discount group 103



| d1     | P     | d2     | SW    | dk     | l1     | l2    | Code no. | Availability |
|--------|-------|--------|-------|--------|--------|-------|----------|--------------|
| G/inch | mm    | mm     | mm    | mm     | mm     | mm    |          |              |
| G 1/8  | 28.00 | 7.000  | 5.50  | 8.800  | 90.00  | 18.00 | 9.728    | ●            |
| G 1/4  | 19.00 | 11.000 | 9.00  | 11.800 | 100.00 | 20.00 | 13.157   | ●            |
| G 3/8  | 19.00 | 12.000 | 9.00  | 15.250 | 100.00 | 22.00 | 16.662   | ●            |
| G 1/2  | 14.00 | 16.000 | 12.00 | 19.000 | 125.00 | 25.00 | 20.955   | ●            |
| G 5/8  | 14.00 | 18.000 | 14.50 | 21.000 | 125.00 | 25.00 | 22.911   | ●            |
| G 3/4  | 14.00 | 20.000 | 16.00 | 24.500 | 140.00 | 28.00 | 26.441   | ●            |
| G 7/8  | 14.00 | 22.000 | 18.00 | 28.250 | 150.00 | 28.00 | 30.201   | ●            |
| G1     | 11.00 | 25.000 | 20.00 | 30.750 | 160.00 | 30.00 | 33.249   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Machine taps for BSP-threads

Order no. 80834



Blind hole

High Performance Taps for universal application in materials < 1000 N/mm<sup>2</sup> such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

# TOPLine

Type TG 100 T

Standard DIN 5156

DIN 2184-1

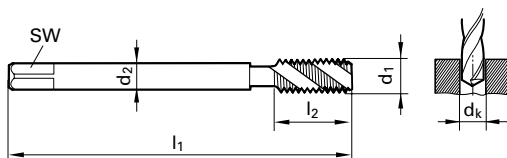
Tool material HSS-E

Surface **A**

Form C

Tolerance

Discount group 103



| d1     | P     | d2     | SW    | dk     | l1     | l2    | Code no. | Availability |
|--------|-------|--------|-------|--------|--------|-------|----------|--------------|
| G/inch | mm    | mm     | mm    | mm     | mm     | mm    |          |              |
| G 1/16 | 28.00 | 6.000  | 4.90  | 6.800  | 90.00  | 11.00 | 7.723    | ●            |
| G 1/8  | 28.00 | 7.000  | 5.50  | 8.800  | 90.00  | 11.00 | 9.728    | ●            |
| G 1/4  | 19.00 | 11.000 | 9.00  | 11.800 | 100.00 | 14.00 | 13.157   | ●            |
| G 3/8  | 19.00 | 12.000 | 9.00  | 15.250 | 100.00 | 14.00 | 16.662   | ●            |
| G 1/2  | 14.00 | 16.000 | 12.00 | 19.000 | 125.00 | 18.00 | 20.955   | ●            |
| G 5/8  | 14.00 | 18.000 | 14.50 | 21.000 | 125.00 | 18.00 | 22.911   | ●            |
| G 3/4  | 14.00 | 20.000 | 16.00 | 24.500 | 140.00 | 20.00 | 26.441   | ●            |
| G 7/8  | 14.00 | 22.000 | 18.00 | 28.250 | 150.00 | 22.00 | 30.201   | ●            |
| G 1    | 11.00 | 25.000 | 20.00 | 30.750 | 160.00 | 24.00 | 33.249   | ●            |

○ bright

● steam tempered

● nitrided

● T TiN

● A TiAlN

● C TiCN



# HARTNER

## Machine taps for BSP-threads

Order no. 80754



Through hole/  
blind hole

Taps for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with vermicular graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals.

Type **TG 100 GG**

Standard DIN 5156

DIN 2184-1

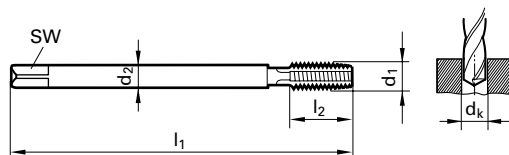
Tool material **HSS-E**

Surface ●

Form C

Tolerance

Discount group 103



| d1     | P     | d2     | SW    | dk     | l1     | l2    | Code no. | Availability |
|--------|-------|--------|-------|--------|--------|-------|----------|--------------|
| G/inch | mm    | mm     | mm    | mm     | mm     | mm    |          |              |
| G 1/16 | 28.00 | 6.000  | 4.90  | 6.800  | 90.00  | 18.00 | 7.723    | ●            |
| G 1/8  | 28.00 | 7.000  | 5.50  | 8.800  | 90.00  | 18.00 | 9.728    | ●            |
| G 1/4  | 19.00 | 11.000 | 9.00  | 11.800 | 100.00 | 20.00 | 13.157   | ●            |
| G 3/8  | 19.00 | 12.000 | 9.00  | 15.250 | 100.00 | 22.00 | 16.662   | ●            |
| G 1/2  | 14.00 | 16.000 | 12.00 | 19.000 | 125.00 | 25.00 | 20.955   | ●            |
| G 5/8  | 14.00 | 18.000 | 14.50 | 21.000 | 125.00 | 25.00 | 22.911   | ●            |
| G 3/4  | 14.00 | 20.000 | 16.00 | 24.500 | 140.00 | 28.00 | 26.441   | ●            |
| G 7/8  | 14.00 | 22.000 | 18.00 | 28.250 | 150.00 | 28.00 | 30.201   | ●            |
| G1     | 11.00 | 25.000 | 20.00 | 30.750 | 160.00 | 30.00 | 33.249   | ●            |
| G1 1/8 | 11.00 | 28.000 | 22.00 | 35.500 | 170.00 | 30.00 | 37.897   | ●            |
| G1 1/4 | 11.00 | 32.000 | 24.00 | 39.500 | 170.00 | 30.00 | 41.910   | ●            |
| G1 3/8 | 11.00 | 36.000 | 29.00 | 41.750 | 180.00 | 32.00 | 44.323   | ●            |
| G1 1/2 | 11.00 | 36.000 | 29.00 | 45.250 | 190.00 | 32.00 | 47.803   | ●            |
| G1 3/4 | 11.00 | 40.000 | 32.00 | 51.000 | 190.00 | 40.00 | 53.746   | ●            |
| G2     | 11.00 | 45.000 | 35.00 | 57.000 | 220.00 | 40.00 | 59.614   | ●            |

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



# HARTNER

## Fluteless machine taps for ISO metric threads

Order no. 80900



Through hole/  
blind hole

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm<sup>2</sup>, stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Type **N**

Standard ~DIN 371 / ~DIN 376

DIN 2174

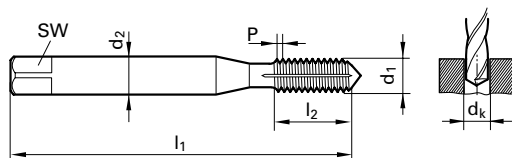
Tool material **HSS-E**

Surface **T**

Form C

Tolerance 6HX

Discount group 103



| d1    | P    | d2     | SW    | dk     | l1     | l2    | Availability |
|-------|------|--------|-------|--------|--------|-------|--------------|
| M 3   | 0.50 | 3.500  | 2.70  | 2.800  | 56.00  | 10.00 | ●            |
| M 3,5 | 0.60 | 4.000  | 3.00  | 3.250  | 56.00  | 12.00 | ●            |
| M 4   | 0.70 | 4.500  | 3.40  | 3.700  | 63.00  | 12.00 | ●            |
| M 5   | 0.80 | 6.000  | 4.90  | 4.650  | 70.00  | 14.00 | ●            |
| M 6   | 1.00 | 4.500  | 3.40  | 5.550  | 80.00  | 16.00 | ●            |
| M 8   | 1.25 | 6.000  | 4.90  | 7.400  | 90.00  | 17.00 | ●            |
| M10   | 1.50 | 7.000  | 5.50  | 9.300  | 100.00 | 20.00 | ●            |
| M12   | 1.75 | 9.000  | 7.00  | 11.200 | 110.00 | 24.00 | ●            |
| M14   | 2.00 | 11.000 | 9.00  | 13.100 | 110.00 | 26.00 | ●            |
| M16   | 2.00 | 12.000 | 9.00  | 15.100 | 110.00 | 26.00 | ●            |
| M18   | 2.50 | 14.000 | 11.00 | 16.900 | 125.00 | 30.00 | ●            |
| M20   | 2.50 | 16.000 | 12.00 | 18.900 | 140.00 | 32.00 | ●            |
| M22   | 2.50 | 18.000 | 14.50 | 20.900 | 140.00 | 27.00 | ●            |
| M24   | 3.00 | 18.000 | 14.50 | 22.700 | 160.00 | 30.00 | ●            |
| M27   | 3.00 | 20.000 | 16.00 | 25.700 | 160.00 | 30.00 | ●            |
| M30   | 3.50 | 22.000 | 18.00 | 28.500 | 180.00 | 35.00 | ●            |
| M33   | 3.50 | 25.000 | 20.00 | 31.500 | 180.00 | 35.00 | ●            |
| M36   | 4.00 | 28.000 | 22.00 | 34.300 | 200.00 | 40.00 | ●            |
| M39   | 4.00 | 32.000 | 24.00 | 37.300 | 200.00 | 40.00 | ●            |

○ bright

● steam tempered

● nitrided

**T** TiN

**A** TiAlN

**C** TiCN



# HARTNER

## Fluteless machine taps for ISO metric threads

**Order no. 80980**



**Through hole/  
blind hole**

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm<sup>2</sup>, stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

**Type N**

Standard JIS B 4430

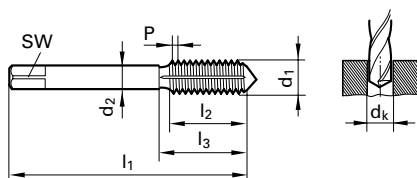
Tool material **HSS-E**

Surface **T**

Form C

Tolerance Class 2/RH

Discount group 103



| d1  | P    | Tolerance | d2     | SW    | dk     | l1     | l2    | l3    | Availability |
|-----|------|-----------|--------|-------|--------|--------|-------|-------|--------------|
| M 4 | 0.70 | RH6       | 5.000  | 4.00  | 3.700  | 52.00  | 12.00 | 20.00 | ●            |
| M 5 | 0.80 | RH6       | 5.500  | 4.50  | 4.650  | 60.00  | 14.00 | 24.00 | ●            |
| M 6 | 1.00 | RH7       | 6.000  | 4.50  | 5.550  | 62.00  | 16.00 | 29.00 | ●            |
| M 8 | 1.25 | RH7       | 6.200  | 5.00  | 7.400  | 70.00  | 17.00 | 37.00 | ●            |
| M10 | 1.50 | RH7       | 7.000  | 5.50  | 9.300  | 75.00  | 20.00 | 41.00 | ●            |
| M12 | 1.75 | RH8       | 8.500  | 6.50  | 11.200 | 82.00  | 24.00 | 48.00 | ●            |
| M16 | 2.00 | RH10      | 12.500 | 10.00 | 15.100 | 95.00  | 26.00 | 52.00 | ●            |
| M20 | 2.50 | RH11      | 15.000 | 12.00 | 18.900 | 105.00 | 32.00 | 58.00 | ●            |

○ bright

● steam tempered

● nitrided

**T** TiN

**A** TiAlN

**C** TiCN





# HARTNER

## Fluteless machine taps for ISO metric fine threads

Order no. 80901



Through hole/  
blind hole

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm<sup>2</sup>, stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Type **N**

Standard ~DIN 374

DIN 2174

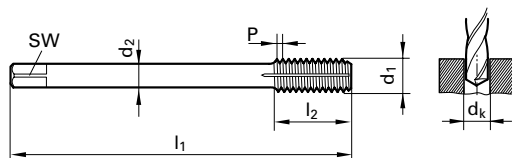
Tool material **HSS-E**

Surface **T**

Form C

Tolerance 6HX

Discount group 103



| d1 XP     | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| M 6 X0,75 | 4.500    | 3.40  | 5.650    | 80.00    | 13.00    | 6.004    | ●            |
| M 8 X0,75 | 6.000    | 4.90  | 7.650    | 80.00    | 14.00    | 8.004    | ●            |
| M 8 X1    | 6.000    | 4.90  | 7.550    | 90.00    | 17.00    | 8.005    | ●            |
| M10 X1    | 7.000    | 5.50  | 9.550    | 90.00    | 17.00    | 10.005   | ●            |
| M10 X1,25 | 7.000    | 5.50  | 9.400    | 100.00   | 20.00    | 10.006   | ●            |
| M12 X1    | 9.000    | 7.00  | 11.550   | 100.00   | 20.00    | 12.005   | ●            |
| M12 X1,25 | 9.000    | 7.00  | 11.400   | 100.00   | 20.00    | 12.006   | ●            |
| M12 X1,5  | 9.000    | 7.00  | 11.300   | 100.00   | 20.00    | 12.007   | ●            |
| M14 X1    | 11.000   | 9.00  | 13.550   | 100.00   | 20.00    | 14.005   | ●            |
| M14 X1,5  | 11.000   | 9.00  | 13.300   | 100.00   | 20.00    | 14.007   | ●            |
| M16 X1    | 12.000   | 9.00  | 15.550   | 100.00   | 22.00    | 16.005   | ●            |
| M16 X1,5  | 12.000   | 9.00  | 15.300   | 100.00   | 22.00    | 16.007   | ●            |
| M18 X1    | 14.000   | 11.00 | 17.550   | 110.00   | 25.00    | 18.005   | ●            |
| M18 X1,5  | 14.000   | 11.00 | 17.300   | 110.00   | 25.00    | 18.007   | ●            |
| M20 X1    | 16.000   | 12.00 | 19.550   | 125.00   | 25.00    | 20.005   | ●            |
| M20 X1,5  | 16.000   | 12.00 | 19.300   | 125.00   | 25.00    | 20.007   | ●            |
| M22 X1,5  | 18.000   | 14.50 | 21.300   | 125.00   | 25.00    | 22.007   | ●            |
| M24 X1,5  | 18.000   | 14.50 | 23.300   | 140.00   | 28.00    | 24.007   | ●            |

○ bright

● steam tempered

● nitrided

**T** TiN

**A** TiAlN

**C** TiCN



# HARTNER

## Fluteless machine taps for ISO metric fine threads

**Order no. 80981**



**Through hole/  
blind hole**

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm<sup>2</sup>, stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

**Type N**

Standard JIS B 4430

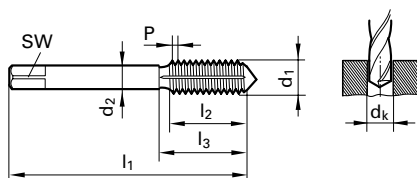
Tool material **HSS-E**

Surface **T**

Form C

Tolerance Class 2/RH

Discount group 103



| d1 XP     | Tolerance | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | Code no.<br>mm |
|-----------|-----------|----------|----------|----------|----------|----------|----------|----------------|
| M 6 X0,75 | RH6       | 6.000    | 4.50     | 5.650    | 62.00    | 13.00    | 30.00    | 6.004          |
| M 8 X1    | RH7       | 6.200    | 5.00     | 7.550    | 70.00    | 16.00    | 35.00    | 8.005          |
| M10 X1    | RH7       | 7.000    | 5.50     | 9.550    | 70.00    | 16.00    | 35.00    | 10.005         |
| M10 X1,25 | RH7       | 7.000    | 5.50     | 9.400    | 75.00    | 20.00    | 39.00    | 10.006         |
| M12 X1    | RH7       | 8.500    | 6.50     | 11.550   | 70.00    | 20.00    | 40.00    | 12.005         |
| M12 X1,25 | RH7       | 8.500    | 6.50     | 11.400   | 80.00    | 20.00    | 40.00    | 12.006         |
| M12 X1,5  | RH7       | 8.500    | 6.50     | 11.300   | 82.00    | 20.00    | 40.00    | 12.007         |
| M14 X1,5  | RH9       | 10.500   | 8.00     | 13.300   | 88.00    | 20.00    | 40.00    | 14.007         |
| M16 X1,5  | RH9       | 12.500   | 10.00    | 15.300   | 95.00    | 22.00    | 44.00    | 16.007         |
| M20 X1,5  | RH10      | 15.000   | 12.00    | 19.300   | 95.00    | 25.00    | 44.00    | 20.007         |

Availability



○ bright

● steam tempered

● nitrided

**T** TiN

**A** TiAlN

**C** TiCN



# HARTNER

## Fluteless machine taps for UNC-threads

Order no. 80902



Through hole/  
blind hole

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm<sup>2</sup>, stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Type **N**

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

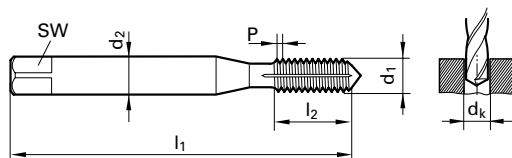
Tool material **HSS-E**

Surface **T**

Form C

Tolerance 2BX

Discount group 103



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR. 4 -40 | 3.500    | 2.70  | 2.550    | 56.00    | 11.00    | 2.845    | ●            |
| NR. 5 -40 | 3.500    | 2.70  | 2.900    | 56.00    | 11.00    | 3.175    | ●            |
| NR. 6 -32 | 4.000    | 3.00  | 3.150    | 56.00    | 12.00    | 3.505    | ●            |
| NR. 8 -32 | 4.500    | 3.40  | 3.800    | 63.00    | 13.00    | 4.166    | ●            |
| NR.10 -24 | 6.000    | 4.90  | 4.350    | 70.00    | 14.00    | 4.826    | ●            |
| NR.12 -24 | 6.000    | 4.90  | 5.000    | 80.00    | 16.00    | 5.486    | ●            |
| 1/4" -20  | 7.000    | 5.50  | 5.750    | 80.00    | 16.00    | 6.350    | ●            |
| 5/16" -18 | 8.000    | 6.20  | 7.300    | 90.00    | 18.00    | 7.938    | ●            |
| 3/8" -16  | 10.000   | 8.00  | 8.800    | 100.00   | 20.00    | 9.525    | ●            |
| 7/16" -14 | 8.000    | 6.20  | 10.300   | 100.00   | 22.00    | 11.113   | ●            |
| 1/2" -13  | 9.000    | 7.00  | 11.800   | 110.00   | 25.00    | 12.700   | ●            |
| 9/16" -12 | 11.000   | 9.00  | 13.300   | 110.00   | 30.00    | 14.288   | ●            |
| 5/8" -11  | 12.000   | 9.00  | 14.800   | 110.00   | 30.00    | 15.875   | ●            |
| 3/4" -10  | 14.000   | 11.00 | 17.900   | 125.00   | 33.00    | 19.050   | ●            |

○ bright

● steam tempered

● nitrided

**T** TiN

**A** TiAlN

**C** TiCN



# HARTNER

## Fluteless machine taps for UNF-threads

Order no. 80903



Through hole/  
blind hole

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm<sup>2</sup>, stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Type **N**

Standard ~DIN 371 / ~DIN 374

DIN 2184-1

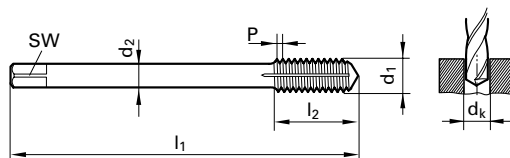
Tool material **HSS-E**

Surface **T**

Form C

Tolerance 2BX

Discount group 103



| d1 - P    | d2<br>mm | SW    | dk<br>mm | l1<br>mm | l2<br>mm | Code no. | Availability |
|-----------|----------|-------|----------|----------|----------|----------|--------------|
| NR. 4 -48 | 3.500    | 2.70  | 2.600    | 56.00    | 10.00    | 2.845    | ●            |
| NR. 5 -44 | 3.500    | 2.70  | 2.900    | 56.00    | 10.00    | 3.175    | ●            |
| NR. 6 -40 | 4.000    | 3.00  | 3.200    | 56.00    | 11.00    | 3.505    | ●            |
| NR. 8 -36 | 4.500    | 3.40  | 3.850    | 63.00    | 12.00    | 4.166    | ●            |
| NR.10 -32 | 6.000    | 4.90  | 4.450    | 70.00    | 14.00    | 4.826    | ●            |
| NR.12 -28 | 6.000    | 4.90  | 5.100    | 80.00    | 16.00    | 5.486    | ●            |
| 1/4" -28  | 7.000    | 5.50  | 5.950    | 80.00    | 16.00    | 6.350    | ●            |
| 5/16" -24 | 8.000    | 6.20  | 7.450    | 90.00    | 18.00    | 7.938    | ●            |
| 3/8" -24  | 10.000   | 8.00  | 9.050    | 90.00    | 18.00    | 9.525    | ●            |
| 7/16" -20 | 8.000    | 6.20  | 10.550   | 100.00   | 22.00    | 11.113   | ●            |
| 1/2" -20  | 9.000    | 7.00  | 12.100   | 100.00   | 20.00    | 12.700   | ●            |
| 9/16" -18 | 11.000   | 9.00  | 13.650   | 100.00   | 22.00    | 14.288   | ●            |
| 5/8" -18  | 12.000   | 9.00  | 15.250   | 100.00   | 22.00    | 15.875   | ●            |
| 3/4" -16  | 14.000   | 11.00 | 18.350   | 110.00   | 25.00    | 19.050   | ●            |

○ bright

● steam tempered

● nitrided

**T** TiN

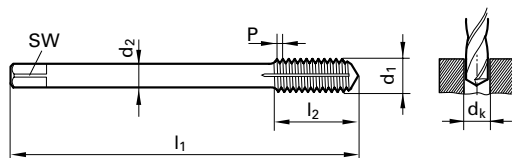
**A** TiAlN

**C** TiCN

**Order no. 80904**

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm<sup>2</sup>, stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Discount group 103

[illegible]

© TiCN



## DIN characteristic features

### Master standards for dimensions to DIN 2184

The standard DIN 2184 stipulates the major dimensions for taps and fluteless taps required for the thread production with nominal diameter  $d_1 > 0.9 \dots 113 \text{ mm}$ . Part 1 is the master standard for dimensions for a long tool design, part 2 the master standard for dimensions for the short tool design. According to the nominal diameter range and dependent on

the pitch, the number of teeth and the ratio total length these master standards include: the max. thread length, the shank designs “reinforced shank” and “reduced shank“. A detailed illustration of shank designs and characteristic features can be found on the following page.

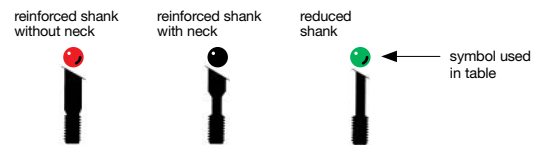
#### Taps

| DIN 2184-1         |                        |          | DIN 2184-2                 |                        |          |            |
|--------------------|------------------------|----------|----------------------------|------------------------|----------|------------|
| Machine taps, long |                        |          | Hand taps and machine taps |                        |          |            |
| ISO metric thread  | ISO metric fine thread |          | ISO metric thread          | ISO metric fine thread |          |            |
| DIN 371            | DIN 371                |          | DIN 352                    | DIN 2181               |          |            |
| DIN 376            | DIN 374                |          |                            |                        |          |            |
| UNC-/BSW* thread   | UNF thread             | G thread | UNC/BSW thread             | UNF thread             | G thread | Pg thread  |
| ~DIN 371           | ~DIN 371               | DIN 5156 | ~DIN 352                   | ~DIN 2181              | DIN 5157 | DIN 40 432 |
| ~DIN 376           | ~DIN 374               |          |                            |                        |          |            |

#### Fluteless taps

| DIN 2184-1                    |                               |                                 |                                 |                     |
|-------------------------------|-------------------------------|---------------------------------|---------------------------------|---------------------|
| DIN 2174                      |                               | DIN 2184-1                      |                                 |                     |
| ISO metric thread             | ISO metric fine thread        | UNC thread                      | UNF thread                      | G thread            |
| previously DIN 371<br>DIN 376 | previously DIN 371<br>DIN 374 | previously ~DIN 371<br>~DIN 376 | previously ~DIN 371<br>~DIN 374 | previously DIN 5156 |

#### Shank designs for thread cutting tools



| Thread type                           | DIN        |                | contained in the master standards | Nominal diameter ranges mm |               |                |       |
|---------------------------------------|------------|----------------|-----------------------------------|----------------------------|---------------|----------------|-------|
|                                       | Taps       | Fluteless taps |                                   | 0.9 ... 2.6                | >2.6 ... 6.35 | >6.35 ... 10.0 | >10.0 |
| <b>M/MJ ISO metric threads</b>        | DIN 371    |                | 2184-1                            | ●                          | ●             | ●              | —     |
|                                       | DIN 376    |                | 2184-1                            | ●                          | ●             | ●              | ●     |
|                                       | DIN 352    |                | 2184-2                            | ●                          | ●             | ●              | ●     |
|                                       | DIN 2174   |                | 2184-1                            | ●                          | ●             | ●              | ●     |
| <b>MF/MJF ISO metric fine threads</b> | DIN 371    |                | 2184-1                            | ●                          | ●             | ●              | —     |
|                                       | DIN 374    |                | 2184-1                            | —                          | ●             | ●              | ●     |
|                                       | DIN 2181   |                | 2184-2                            | ●                          | ●             | ●              | ●     |
|                                       | DIN 2174   |                | 2184-1                            | ●                          | ●             | ●              | ●     |
| <b>UNC/UNJC/BSW threads</b>           | ~DIN 371   |                | 2184-1                            | ●                          | ●             | ●              | —     |
|                                       | ~DIN 376   |                | 2184-1                            | ●                          | ●             | ●              | ●     |
|                                       | ~DIN 352   |                | 2184-2                            | ●                          | ●             | ●              | ●     |
| <b>UNF/UNJF threads</b>               | ~DIN 371   |                | 2184-1                            | ●                          | ●             | ●              | —     |
|                                       | ~DIN 374   |                | 2184-1                            | —                          | ●             | ●              | ●     |
|                                       | ~DIN 2181  |                | 2184-2                            | ●                          | ●             | ●              | ●     |
| <b>G threads</b>                      | DIN 5156   |                | 2184-1                            | —                          | ●             | ●              | ●     |
|                                       | DIN 5157   |                | 2184-2                            | —                          | ●             | ●              | ●     |
| <b>Pg threads</b>                     | DIN 40 432 |                | 2184-2                            | —                          | —             | —              | ●     |



# HARTNER

## DIN characteristic features

### Master standards for dimensions to DIN 2184-1

| Ø nom.<br>mm  | Shank designs<br>mm |                  |               | Metric pitch<br>mm | Total length<br>mm | Max.<br>thread length<br>mm |
|---------------|---------------------|------------------|---------------|--------------------|--------------------|-----------------------------|
|               | Reinforced shank    |                  | Reduced shank |                    |                    |                             |
| from...to     | Ø                   | Effective length | Ø             |                    |                    |                             |
| 0.9...1.20    | 2.5                 | 5.5              | –             | ≤0.20              | 40                 | 5.5                         |
| 1.20...1.40   | 2.5                 | 7.0              | –             | ≤0.35              | 40                 | 7.0                         |
| 1.40...1.80   | 2.5                 | 8.0              | –             | ≤0.35              | 40                 | 8.0                         |
| 1.80...2.00   | 2.8                 | 8.0              | –             | ≤0.40              | 45                 | 8.0                         |
| 2.00...2.30   | 2.8                 | 9.0              | –             | ≤0.40              | 45                 | 9.0                         |
| 2.30...2.60   | 2.8                 | 9.0              | –             | ≤0.50              | 50                 | 9.0                         |
| 2.60...3.20   | 3.5                 | 18               | 2.2           | ≤0.45              | 56                 | 8.0                         |
| 2.60...3.20   | 3.5                 | 18               | 2.2           | 0.50...0.60        | 56                 | 11.0                        |
| 3.20...3.55   | 4.0                 | 20               | 2.5           | ≤0.50              | 56                 | 9.0                         |
| 3.20...3.55   | 4.0                 | 20               | 2.5           | 0.60...0.80        | 56                 | 12.0                        |
| 3.55...4.20   | 4.5                 | 21               | 2.8           | ≤0.50              | 63                 | 10.0                        |
| 3.55...4.20   | 4.5                 | 21               | 2.8           | 0.60...0.80        | 63                 | 13.0                        |
| 4.20...4.55   | 6.0                 | 25               | 3.5           | ≤0.60              | 70                 | 12.0                        |
| 4.20...4.55   | 6.0                 | 25               | 3.5           | 0.70...0.80        | 70                 | 16.0                        |
| 4.55...5.00   | 6.0                 | 25               | 3.5           | ≤0.75              | 70                 | 12.0                        |
| 4.55...5.00   | 6.0                 | 25               | 3.5           | 0.80...1.00        | 70                 | 16.0                        |
| 5.00...5.60   | 6.0                 | 30               | 4.0           | ≤0.75              | 80                 | 12.0                        |
| 5.00...5.60   | 6.0                 | 30               | 4.0           | 0.80...1.00        | 80                 | 17.0                        |
| 5.60...6.10   | 6.0                 | 30               | 4.5           | ≤0.80              | 80                 | 14.0                        |
| 5.60...6.10   | 6.0                 | 30               | 4.5           | 1.0                | 80                 | 19.0                        |
| 6.10...6.40   | 7.0                 | 30               | 4.5           | ≤0.80              | 80                 | 14.0                        |
| 6.10...6.40   | 7.0                 | 30               | 4.5           | 1.00...1.25        | 80                 | 19.0                        |
| 6.40...7.00   | 7.0                 | 30               | 5.5           | ≤0.80              | 80                 | 14.0                        |
| 6.40...7.00   | 7.0                 | 30               | 5.5           | 1.00...1.25        | 80                 | 19.0                        |
| 7.00...8.00   | 8.0                 | 30               | 6.0           | ≤0.80              | 80                 | 18.0                        |
| 7.00...8.00   | 8.0                 | 35               | 6.0           | 1.00...1.50        | 90                 | 22.0                        |
| 8.00...9.00   | 9.0                 | 30               | 7.0           | ≤0.80              | 90                 | 18.0                        |
| 8.00...9.00   | 9.0                 | 35               | 7.0           | 1.00...1.50        | 90                 | 22.0                        |
| 9.00...10.15  | 10.0                | 35               | 7.0           | ≤1.00              | 90                 | 20.0                        |
| 9.00...10.15  | 10.0                | 39               | 7.0           | 1.25...1.50        | 100                | 24.0                        |
| 10.15...11.15 | –                   | –                | 8.0           | 0.25...1.00        | 90                 | 20.0                        |
| 10.15...11.15 | –                   | –                | 8.0           | 1.25...1.75        | 100                | 24.0                        |
| 11.15...12.80 | –                   | –                | 9.0           | 0.25...1.50        | 100                | 22.0                        |
| 11.15...12.80 | –                   | –                | 9.0           | 1.75...2.00        | 110                | 28.0                        |
| 12.80...14.35 | –                   | –                | 11.0          | 0.25...1.50        | 100                | 22.0                        |
| 12.80...14.35 | –                   | –                | 11.0          | 1.75...2.00        | 110                | 30.0                        |
| 14.35...17.10 | –                   | –                | 12.0          | 0.25...1.50        | 100                | 22.0                        |
| 14.35...17.10 | –                   | –                | 12.0          | 1.75...2.00        | 110                | 32.0                        |
| 17.10...19.10 | –                   | –                | 14.0          | 0.25...1.50        | 110                | 25.0                        |
| 17.10...19.10 | –                   | –                | 14.0          | 1.75...2.50        | 125                | 34.0                        |
| 19.10...21.15 | –                   | –                | 16.0          | 0.25...1.75        | 125                | 25.0                        |
| 19.10...21.15 | –                   | –                | 16.0          | 2.00...2.50        | 140                | 34.0                        |
| 21.15...23.00 | –                   | –                | 18.0          | 0.25...1.75        | 125                | 25.0                        |
| 21.15...23.00 | –                   | –                | 18.0          | 2.00...2.50        | 140                | 34.0                        |
| 23.00...26.00 | –                   | –                | 18.0          | 0.25...2.00        | 140                | 28.0                        |
| 23.00...26.00 | –                   | –                | 18.0          | 2.50...3.00        | 160                | 38.0                        |
| 26.00...28.15 | –                   | –                | 20.0          | 0.25...2.00        | 140                | 28.0                        |
| 26.00...28.15 | –                   | –                | 20.0          | 2.50...3.00        | 160                | 38.0                        |
| 28.15...30.20 | –                   | –                | 22.0          | 0.25...2.00        | 150                | 28.0                        |
| 28.15...30.20 | –                   | –                | 22.0          | 2.50...3.50        | 180                | 45.0                        |
| 30.20...32.00 | –                   | –                | 22.0          | 0.25...2.00        | 150                | 28.0                        |
| 30.20...32.00 | –                   | –                | 22.0          | 2.50...3.50        | 180                | 50.0                        |
| 32.00...33.30 | –                   | –                | 25.0          | 0.25...2.00        | 160                | 30.0                        |
| 32.00...33.30 | –                   | –                | 25.0          | 2.50...3.50        | 180                | 50.0                        |
| 33.30...38.20 | –                   | –                | 28.0          | 0.25...2.00        | 170                | 30.0                        |
| 33.30...38.20 | –                   | –                | 28.0          | 2.50...4.50        | 200                | 56.0                        |
| 38.20...42.00 | –                   | –                | 32.0          | 0.25...2.00        | 170                | 30.0                        |
| 38.20...42.00 | –                   | –                | 32.0          | 2.50...4.50        | 200                | 60.0                        |
| 42.00...45.00 | –                   | –                | 36.0          | 0.25...2.00        | 180                | 32.0                        |
| 42.00...45.00 | –                   | –                | 36.0          | 2.50...3.00        | 200                | 50.0                        |
| 42.00...45.00 | –                   | –                | 36.0          | 3.50...5.00        | 220                | 69.0                        |
| 45.00...50.00 | –                   | –                | 36.0          | 0.25...2.00        | 190                | 82.0                        |
| 45.00...50.00 | –                   | –                | 36.0          | 2.50...3.00        | 225                | 50.0                        |
| 45.00...50.00 | –                   | –                | 36.0          | 3.50...5.00        | 250                | 70.0                        |



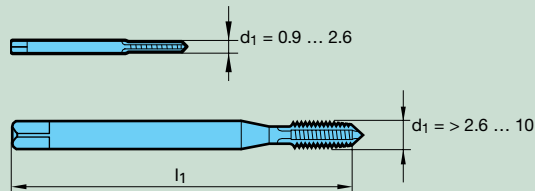
# HARTNER

## DIN characteristic features

### Characteristic features of the individual standards

#### DIN 371

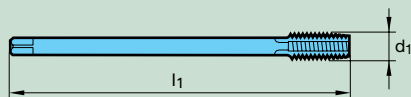
in the master standard  
DIN 2184-1



Standard for machine taps with reinforced shank for standard ISO metric threads and ISO metric fine threads. Long design. Shank design in accordance with diameter ranges shown opposite (mm).

#### DIN 376

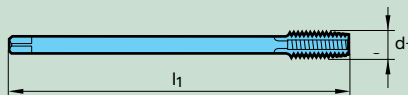
in the master standard  
DIN 2184-1



Standard for machine taps with reduced shank for standard ISO metric threads. Long design. Diameter range  $d_1 = 1.6 \dots 68 \text{ mm}$  ( $\leq \text{Ø M3}$ , shank without square)

#### DIN 374

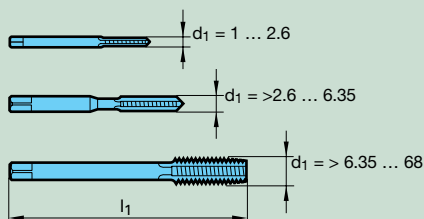
in the master standard  
DIN 2184-1



Standard for machine taps with reduced shank for ISO metric fine threads. Long design. Diameter range  $d_1 = 3 \dots 52 \text{ mm}$

#### DIN 352

in the master standard  
DIN 2184-2



Standard for hand and machine taps for standard ISO metric threads. Short design. Shank design in accordance with diameter ranges shown opposite (mm).





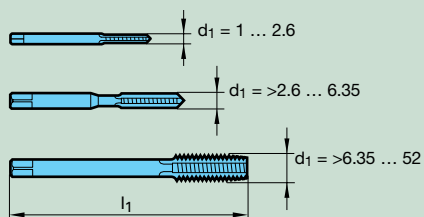
# HARTNER

## DIN characteristic features

### Characteristic features of the individual standards

#### DIN 2181

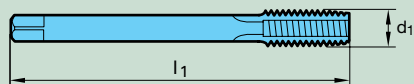
in the master standard  
DIN 2184-2



Standard for hand and machine taps for standard ISO metric threads. Short design. Shank design in accordance with diameter ranges shown opposite (mm).

#### DIN 5156

in the master standard  
DIN 2184-1



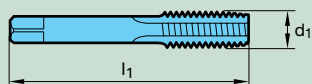
Standard for machine taps for BSP threads to DIN ISO 228 and for BSW threads to DIN 2999. Long design.

Diameter ranges:

BSP threads G 1/16" ... G 4"  
BSW threads W 1/16" ... W 4"

#### DIN 5157

in the master standard  
DIN 2184-2



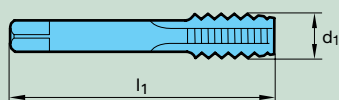
Standard for machine taps for BSP threads to DIN ISO 228 and for BSW threads to DIN EN 10 226-1. Short design.

Diameter ranges:

BSP threads G 1/16" ... G 4"  
BSW threads W 1/16" ... W 4"

#### DIN 40 432

in the master standard  
DIN 2184-2



Standard for machine taps for steel armoured conduit threads to DIN 40 430. Short design.

Diameter range:

Pg 7 (12.5 mm) ... Pg 48 (59.3 mm)

Will be replaced by DIN 374 ISO 3 6G.



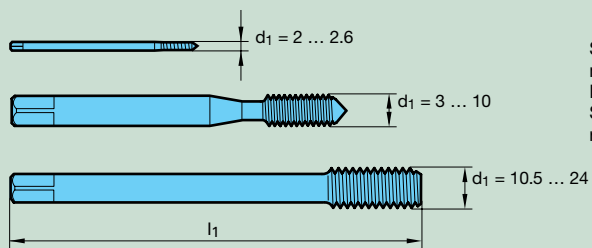
# HARTNER

## DIN characteristic features

### Characteristic features of the individual standards

#### DIN 2174

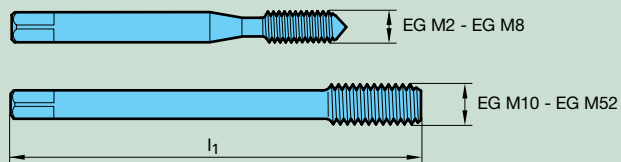
in the master standard  
DIN 2184-1



Standard for fluteless taps for standard ISO metric threads and ISO metric fine threads. Long design. Shank design in accordance with diameter ranges shown opposite (mm).

#### DIN 40 435

in the master standard  
DIN 2184-1



Standard for machine taps for tapped holes (EG) for wire thread inserts as in DIN 8140 for ISO metric threads. Standard thread tapped holes EG M2 to EG M52 and fine thread tapped holes EG M8 x1 to EG M48 x 3

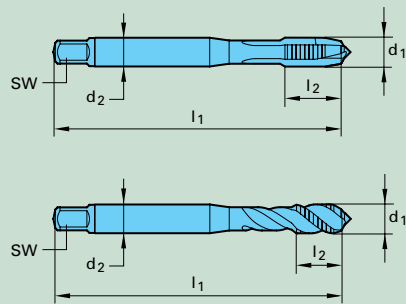


# HARTNER

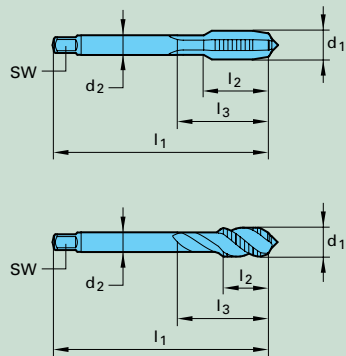
## Comparison of Standards

### DIN - International Standards

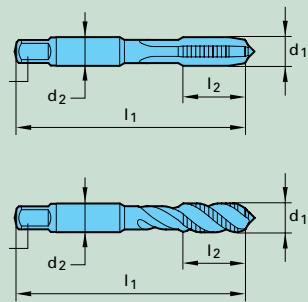
#### DIN 2184-1 DIN 2184-2



#### JIS B 4430 Japan Industrial Standard

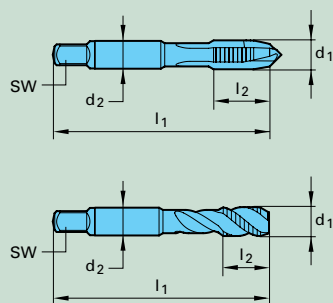


#### ISO 529



#### ASME B94.9

The American Society of  
Mechanical Engineers





## The characteristics of different thread types

| Geometry drawing                                                    | Standard          | Application                                          | Geometry drawing                                                  | Standard                                | Application                                            |
|---------------------------------------------------------------------|-------------------|------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------|
| <b>M ISO-metric thread</b>                                          |                   |                                                      | <b>MF ISO-metric fine thread</b>                                  |                                         |                                                        |
|                                                                     | DIN 13-1          | General standard thread                              |                                                                   | DIN 13-2 to DIN 13-11                   | General fine thread                                    |
| <b>UNC Unified National Coarse Thread</b>                           |                   |                                                      | <b>UNF Unified National Fine Thread</b>                           |                                         |                                                        |
|                                                                     | ASME B1.1         | General UN standard thread                           |                                                                   | ASME B1.1 ISO-metric trapezoidal thread | General UN Fine Thread                                 |
| <b>UNEF Unified National Extra Fine Thread</b>                      |                   |                                                      | <b>UNS Unified Special Thread</b>                                 |                                         |                                                        |
|                                                                     | ASME B1.1         | General UN Extra Fine Thread                         |                                                                   | ASME B1.1                               | General UN Special Thread                              |
| <b>G Cylindrical Pipe Thread without thread sealing connections</b> |                   |                                                      | <b>PG steel conduit thread</b>                                    |                                         |                                                        |
|                                                                     | DIN EN ISO 228-1  | Threads for pipes, pipe connections and fittings     |                                                                   | DIN 40430 cylindrical round thread      | electrical engineering                                 |
| <b>TR ISO-metric trapezoidal thread</b>                             |                   |                                                      | <b>S metric saw thread</b>                                        |                                         |                                                        |
|                                                                     | DIN 103           | General, draw collets, rolling stock                 |                                                                   | DIN 513                                 | when absorbing uni-directional forces                  |
| <b>W Cylindrical Whitworth Thread</b>                               |                   |                                                      | <b>W Whitworth Taper Thread</b>                                   |                                         |                                                        |
|                                                                     | DIN 477           | Side connector and accessories for gas bottle valves |                                                                   | DIN 477                                 | Threaded connection in gas cylinder bottles for valves |
| <b>NPT American Standard Pipe Threads tapered for sealing</b>       |                   |                                                      | <b>NPTF American Standard Pipe Thread tapered for dry sealing</b> |                                         |                                                        |
|                                                                     | ANSI/ASME B1.20.1 | pipe threads and fittings                            |                                                                   | ANSI B1.20.3                            | pipe threads and fittings                              |



## The characteristics of different thread types

| Geometry drawing                                 | Standard                                                                                               | Application                                                                                          | Geometry drawing                                     | Standard                                                                         | Application                                                                                          |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| BSW cylindrical Whitworth thread                 |                                                                                                        |                                                                                                      | BSF Whitworth fine thread cylindrical                |                                                                                  |                                                                                                      |
|                                                  | B.S. 84<br>British<br>Standard                                                                         | Threads for pipes,<br>pipe connections<br>and<br>fittings                                            |                                                      | B.S. 84<br>British<br>Standard<br>Fine                                           | Threads for pipes,<br>pipe connections<br>and<br>fittings                                            |
| BSP pipe thread cylindrical (identical to G)     |                                                                                                        |                                                                                                      | BSPT pipe thread tapered (identical to Rc)           |                                                                                  |                                                                                                      |
|                                                  | B.S. 93<br>British<br>Standard                                                                         | Threads for pipes,<br>pipe connections<br>and<br>fittings                                            |                                                      | B.S. 93<br>British<br>Standard                                                   | Internal thread for<br>pipe threads and<br>fittings                                                  |
| R Whitworth pie thread tapered external thread   |                                                                                                        |                                                                                                      | Rp Whitworth pipe thread cylindrical internal thread |                                                                                  |                                                                                                      |
|                                                  | DIN EN<br>10226-1<br>(based on<br>ISO 7-1)<br>replace-<br>ment for<br>DIN 2999-1                       | External thread for<br>pipe threads and<br>fittings<br>(for in the thread<br>sealing<br>connections) |                                                      | DIN EN<br>10226-1<br>(based on<br>ISO 7-1)<br>Replace-<br>ment for<br>DIN 2999-1 | Internal thread for<br>pipe threads and<br>fittings<br>(for in the thread<br>sealing<br>connections) |
| Rc Whitworth pipe thread tapered internal thread |                                                                                                        |                                                                                                      | RD cylindrical round thread                          |                                                                                  |                                                                                                      |
|                                                  | DIN ISO<br>10226-2<br>(hardly used<br>in Europe,<br>replaceable<br>with pipe<br>threads to<br>ISO 7-1) | Internal thread for<br>pipe threads and<br>fittings<br>(for in the thread<br>sealing<br>connections) |                                                      | DIN 405                                                                          | General, load<br>hook,<br>mining, food<br>industry                                                   |
| MJ thread metric thread                          |                                                                                                        |                                                                                                      | UNJ inch thread                                      |                                                                                  |                                                                                                      |
|                                                  | DIN ISO<br>5855-1                                                                                      | For the aerospace<br>industry                                                                        |                                                      | ISO 3161                                                                         | For the aerospace<br>industry                                                                        |
| Vg valve thread                                  |                                                                                                        |                                                                                                      | MSG lock nut thread                                  |                                                                                  |                                                                                                      |
|                                                  | DIN 7756                                                                                               | Valves for car tyres<br>manifold block                                                               |                                                      | Hartner<br>standard                                                              | Self-locking thread<br>transmission<br>housing etc.                                                  |
| MFS                                              |                                                                                                        |                                                                                                      |                                                      |                                                                                  |                                                                                                      |
|                                                  | DIN 8141                                                                                               | Interference fits in<br>Aluminium-cast<br>alloys                                                     |                                                      |                                                                                  |                                                                                                      |

external thread

internal thread

play



## Tapping size holes for thread cutting

| Std. ISO metric threads<br>DIN 13 |            |                           |                                     |            | ISO metric fine threads<br>DIN 13 |            |                           |                                    |            |             |            |                           |                                    |            | UNC threads<br>ASME B1.1 |             |                           |                                    |            |
|-----------------------------------|------------|---------------------------|-------------------------------------|------------|-----------------------------------|------------|---------------------------|------------------------------------|------------|-------------|------------|---------------------------|------------------------------------|------------|--------------------------|-------------|---------------------------|------------------------------------|------------|
| nom.<br>Ø                         | pitch<br>P | tapping<br>size<br>hole Ø | core diameter<br>of int. thread 6H* |            | nom. x<br>Ø                       | pitch<br>P | tapping<br>size<br>hole Ø | core diameter<br>of int. thread 6H |            | nom. x<br>Ø | pitch<br>P | tapping<br>size<br>hole Ø | core diameter<br>of int. thread 6H |            | nom.<br>Ø                | threads     | tapping<br>size<br>hole Ø | core diameter<br>of int. thread 2B |            |
|                                   | mm         | DIN 336<br>mm             | min.<br>mm                          | max.<br>mm |                                   | mm         | DIN 336<br>mm             | min.<br>mm                         | max.<br>mm |             | mm         | DIN 336<br>mm             | min.<br>mm                         | max.<br>mm |                          | per<br>inch | DIN 336<br>mm             | min.<br>mm                         | max.<br>mm |
| M 1                               | 0.25       | <b>0.75</b>               | 0.729                               | 0.785      | M 2.5 x 0.35                      |            | <b>2.15</b>               | 2.121                              | 2.221      | M 22 x 1.00 |            | <b>21.00</b>              | 20.917                             | 21.153     | Nr. 1 - 64               |             | <b>1.55</b>               | 1.425                              | 1.580      |
| M 1.1                             | 0.25       | <b>0.85</b>               | 0.829                               | 0.885      | M 3.0 x 0.35                      |            | <b>2.65</b>               | 2.621                              | 2.721      | M 22 x 1.50 |            | <b>20.50</b>              | 20.376                             | 20.676     | Nr. 2 - 56               |             | <b>1.85</b>               | 1.694                              | 1.872      |
| M 1.2                             | 0.25       | <b>0.95</b>               | 0.929                               | 0.985      | M 3.5 x 0.35                      |            | <b>3.15</b>               | 3.121                              | 3.221      | M 22 x 2.00 |            | <b>20.00</b>              | 19.835                             | 20.210     | Nr. 3 - 48               |             | <b>2.10</b>               | 1.941                              | 2.146      |
| M 1.4                             | 0.30       | <b>1.10</b>               | 1.075                               | 1.142      | M 4.0 x 0.50                      |            | <b>3.50</b>               | 3.459                              | 3.599      | M 24 x 1.00 |            | <b>23.00</b>              | 22.917                             | 23.153     | Nr. 4 - 40               |             | <b>2.35</b>               | 2.157                              | 2.385      |
| M 1.6                             | 0.35       | <b>1.25</b>               | 1.221                               | 1.321      | M 4.5 x 0.50                      |            | <b>4.00</b>               | 3.959                              | 4.099      | M 24 x 1.50 |            | <b>22.50</b>              | 22.376                             | 22.676     | Nr. 5 - 40               |             | <b>2.65</b>               | 2.487                              | 2.698      |
| M 1.8                             | 0.35       | <b>1.45</b>               | 1.421                               | 1.521      | M 5.0 x 0.50                      |            | <b>4.50</b>               | 4.459                              | 4.599      | M 24 x 2.00 |            | <b>22.00</b>              | 21.835                             | 22.210     | Nr. 6 - 32               |             | <b>2.85</b>               | 2.642                              | 2.896      |
| M 2                               | 0.40       | <b>1.60</b>               | 1.567                               | 1.679      | M 5.5 x 0.50                      |            | <b>5.00</b>               | 4.959                              | 5.099      | M 25 x 1.00 |            | <b>24.00</b>              | 23.917                             | 24.153     | Nr. 8 - 32               |             | <b>3.50</b>               | 3.302                              | 3.531      |
| M 2.2                             | 0.45       | <b>1.75</b>               | 1.713                               | 1.838      | M 6.0 x 0.75                      |            | <b>5.20</b>               | 5.188                              | 5.378      | M 25 x 1.50 |            | <b>23.50</b>              | 23.376                             | 23.676     | Nr. 10 - 24              |             | <b>3.90</b>               | 3.683                              | 3.937      |
| M 2.5                             | 0.45       | <b>2.05</b>               | 2.013                               | 2.138      | M 7.0 x 0.75                      |            | <b>6.20</b>               | 6.188                              | 6.378      | M 25 x 2.00 |            | <b>23.00</b>              | 22.835                             | 23.210     | Nr. 12 - 24              |             | <b>4.50</b>               | 4.343                              | 4.597      |
| M 3                               | 0.50       | <b>2.50</b>               | 2.459                               | 2.599      | M 8.0 x 0.50                      |            | <b>7.50</b>               | 7.459                              | 7.599      | M 27 x 1.00 |            | <b>26.00</b>              | 25.917                             | 26.153     | 1/4 - 20                 |             | <b>5.10</b>               | 4.978                              | 5.258      |
| M 3.5                             | 0.60       | <b>2.90</b>               | 2.850                               | 3.010      | M 8.0 x 0.75                      |            | <b>7.20</b>               | 7.188                              | 7.378      | M 27 x 1.50 |            | <b>25.50</b>              | 25.376                             | 25.676     | 5/16 - 18                |             | <b>6.60</b>               | 6.401                              | 6.731      |
| M 4                               | 0.70       | <b>3.30</b>               | 3.242                               | 3.422      | M 8.0 x 1.00                      |            | <b>7.00</b>               | 6.917                              | 7.153      | M 27 x 2.00 |            | <b>25.00</b>              | 24.835                             | 25.210     | 3/8 - 16                 |             | <b>8.00</b>               | 7.798                              | 8.153      |
| M 4.5                             | 0.75       | <b>3.70</b>               | 3.688                               | 3.878      | M 9.0 x 0.75                      |            | <b>8.20</b>               | 8.188                              | 8.378      | M 28 x 1.00 |            | <b>27.00</b>              | 26.917                             | 27.153     | 7/16 - 14                |             | <b>9.40</b>               | 9.144                              | 9.550      |
| M 5                               | 0.80       | <b>4.20</b>               | 4.134                               | 4.334      | M 9.0 x 1.00                      |            | <b>8.00</b>               | 7.917                              | 8.153      | M 28 x 1.50 |            | <b>26.50</b>              | 26.376                             | 26.676     | 1/2 - 13                 |             | <b>10.80</b>              | 10.592                             | 11.024     |
| M 6                               | 1.00       | <b>5.00</b>               | 4.917                               | 5.153      | M 10 x 0.75                       |            | <b>9.20</b>               | 9.188                              | 9.378      | M 28 x 2.00 |            | <b>26.00</b>              | 25.835                             | 26.210     | 9/16 - 12                |             | <b>12.20</b>              | 11.989                             | 12.446     |
| M 7                               | 1.00       | <b>6.00</b>               | 5.917                               | 6.153      | M 10 x 1.00                       |            | <b>9.00</b>               | 8.917                              | 9.153      | M 30 x 1.00 |            | <b>29.00</b>              | 28.917                             | 29.153     | 5/8 - 11                 |             | <b>13.50</b>              | 13.386                             | 13.868     |
| M 8                               | 1.25       | <b>6.80</b>               | 6.647                               | 6.912      | M 10 x 1.25                       |            | <b>8.80</b>               | 8.647                              | 8.912      | M 30 x 1.50 |            | <b>28.50</b>              | 28.376                             | 28.676     | 3/4 - 10                 |             | <b>16.50</b>              | 16.307                             | 16.840     |
| M 9                               | 1.25       | <b>7.80</b>               | 7.647                               | 7.912      | M 11 x 0.75                       |            | <b>10.20</b>              | 10.188                             | 10.378     | M 30 x 2.00 |            | <b>28.00</b>              | 27.835                             | 28.210     | 7/8 - 9                  |             | <b>19.50</b>              | 19.177                             | 19.761     |
| M 10                              | 1.50       | <b>8.50</b>               | 8.376                               | 8.676      | M 11 x 1.00                       |            | <b>10.00</b>              | 9.917                              | 10.153     | M 30 x 3.00 |            | <b>27.00</b>              | 26.752                             | 27.252     | 1 - 8                    |             | <b>22.25</b>              | 21.971                             | 22.606     |
| M 11                              | 1.50       | <b>9.50</b>               | 9.376                               | 9.676      | M 12 x 1.00                       |            | <b>11.00</b>              | 10.917                             | 11.153     | M 32 x 1.50 |            | <b>30.50</b>              | 30.376                             | 30.676     | 1 1/8 - 7                |             | <b>25.00</b>              | 24.638                             | 25.349     |
| M 12                              | 1.75       | <b>10.20</b>              | 10.106                              | 10.441     | M 12 x 1.25                       |            | <b>10.80</b>              | 10.647                             | 10.912     | M 32 x 2.00 |            | <b>30.00</b>              | 29.835                             | 30.210     | 1 1/4 - 7                |             | <b>28.00</b>              | 27.813                             | 28.524     |
| M 14                              | 2.00       | <b>12.00</b>              | 11.835                              | 12.210     | M 12 x 1.50                       |            | <b>10.50</b>              | 10.376                             | 10.676     | M 33 x 1.50 |            | <b>31.50</b>              | 31.376                             | 31.676     | 1 3/8 - 6                |             | <b>30.75</b>              | 30.353                             | 31.115     |
| M 16                              | 2.00       | <b>14.00</b>              | 13.835                              | 14.210     | M 14 x 1.00                       |            | <b>13.00</b>              | 12.917                             | 13.153     | M 33 x 2.00 |            | <b>31.00</b>              | 30.835                             | 31.210     | 1 1/2 - 6                |             | <b>34.00</b>              | 33.528                             | 34.290     |
| M 18                              | 2.50       | <b>15.50</b>              | 15.294                              | 15.744     | M 14 x 1.25                       |            | <b>12.80</b>              | 12.647                             | 12.912     | M 33 x 3.00 |            | <b>30.00</b>              | 29.752                             | 30.252     | 1 3/4 - 5                |             | <b>39.50</b>              | 38.938                             | 39.802     |
| M 20                              | 2.50       | <b>17.50</b>              | 17.294                              | 17.744     | M 14 x 1.50                       |            | <b>12.50</b>              | 12.376                             | 12.676     | M 35 x 1.50 |            | <b>33.50</b>              | 33.376                             | 33.676     | 2 - 4.5                  |             | <b>45.00</b>              | 44.679                             | 45.593     |
| M 22                              | 2.50       | <b>19.50</b>              | 19.294                              | 19.744     | M 15 x 1.00                       |            | <b>14.00</b>              | 13.917                             | 14.153     | M 36 x 1.50 |            | <b>34.50</b>              | 34.376                             | 34.676     |                          |             |                           |                                    |            |
| M 24                              | 3.00       | <b>21.00</b>              | 20.752                              | 21.252     | M 15 x 1.50                       |            | <b>13.50</b>              | 13.376                             | 13.676     |             |            |                           |                                    |            |                          |             |                           |                                    |            |
| M 27                              | 3.00       | <b>24.00</b>              | 23.752                              | 24.252     | M 16 x 1.00                       |            | <b>15.00</b>              | 14.917                             | 15.153     |             |            |                           |                                    |            |                          |             |                           |                                    |            |
| M 30                              | 3.50       | <b>26.50</b>              | 26.211                              | 26.771     | M 16 x 1.25                       |            | <b>14.80</b>              | 14.647                             | 14.912     |             |            |                           |                                    |            |                          |             |                           |                                    |            |
| M 33                              | 3.50       | <b>29.50</b>              | 29.211                              | 29.771     | M 16 x 1.50                       |            | <b>14.50</b>              | 14.376                             | 14.676     |             |            |                           |                                    |            |                          |             |                           |                                    |            |
| M 36                              | 4.00       | <b>32.00</b>              | 31.670                              | 32.270     | M 17 x 1.00                       |            | <b>16.00</b>              | 15.917                             | 16.153     |             |            |                           |                                    |            |                          |             |                           |                                    |            |
| M 39                              | 4.00       | <b>35.00</b>              | 34.670                              | 35.270     | M 17 x 1.50                       |            | <b>15.50</b>              | 15.376                             | 15.676     |             |            |                           |                                    |            |                          |             |                           |                                    |            |
| M 42                              | 4.50       | <b>37.50</b>              | 37.129                              | 37.799     | M 18 x 1.00                       |            | <b>17.00</b>              | 16.917                             | 17.153     |             |            |                           |                                    |            |                          |             |                           |                                    |            |
| M 45                              | 4.50       | <b>40.50</b>              | 40.129                              | 40.799     | M 18 x 1.50                       |            | <b>16.50</b>              | 16.376                             | 16.676     |             |            |                           |                                    |            |                          |             |                           |                                    |            |
| M 48                              | 5.00       | <b>43.00</b>              | 42.587                              | 43.297     | M 20 x 1.00                       |            | <b>19.00</b>              | 18.917                             | 19.153     |             |            |                           |                                    |            |                          |             |                           |                                    |            |
| M 52                              | 5.00       | <b>47.00</b>              | 46.587                              | 47.297     | M 20 x 1.50                       |            | <b>18.50</b>              | 18.376                             | 18.676     |             |            |                           |                                    |            |                          |             |                           |                                    |            |
| M 56                              | 5.50       | <b>50.50</b>              | 50.046                              | 50.796     | M 20 x 2.00                       |            | <b>18.00</b>              | 17.835                             | 18.210     |             |            |                           |                                    |            |                          |             |                           |                                    |            |

\* M 1.1 up to M 1.4 tapping size hole of int. thread 5H

| MJ threads<br>DIN ISO 5855 |   |            |                           |                                     |            | UNC threads<br>ISO 3161                                            |             |                           |                                    |            | UNF threads<br>ISO 3161 |             |                           |                                    |            |
|----------------------------|---|------------|---------------------------|-------------------------------------|------------|--------------------------------------------------------------------|-------------|---------------------------|------------------------------------|------------|-------------------------|-------------|---------------------------|------------------------------------|------------|
| nom.<br>Ø                  | x | pitch<br>P | tapping<br>size<br>hole Ø | core diameter<br>of int. thread 5H* |            | nom.<br>Ø                                                          | threads     | tapping<br>size<br>hole Ø | core diameter<br>of int. thread 3B |            | nom.<br>Ø               | threads     | tapping<br>size<br>hole Ø | core diameter<br>of int. thread 3B |            |
|                            |   | mm         | DIN 336<br>mm             | min.<br>mm                          | max.<br>mm |                                                                    | per<br>inch | DIN 336<br>mm             | min.<br>mm                         | max.<br>mm |                         | per<br>inch | DIN 336<br>mm             | min.<br>mm                         | max.<br>mm |
| MJ 3                       | x | 0.50       | 2.60                      | 2.513                               | 2.653      | Nr. 6                                                              | - 32        | 2.85                      | 2.733                              | 2.939      | Nr. 6                   | - 40        | 3.00                      | 2.888                              | 3.053      |
| MJ 4                       | x | 0.70       | 3.40                      | 3.318                               | 3.498      | Nr. 8                                                              | - 32        | 3.55                      | 3.393                              | 3.599      | Nr. 8                   | - 36        | 3.60                      | 3.480                              | 3.663      |
| MJ 5                       | x | 0.80       | 4.30                      | 4.221                               | 4.421      | Nr. 10                                                             | - 24        | 4.00                      | 3.795                              | 4.064      | Nr. 10                  | - 32        | 4.20                      | 4.054                              | 4.255      |
| MJ 6                       | x | 0.50       | 5.55                      | 5.513                               | 5.625      | Nr. 12                                                             | - 24        | 4.60                      | 4.455                              | 4.704      | Nr. 12                  | - 28        | 4.75                      | 4.602                              | 4.816      |
| MJ 6                       | x | 0.75       | 5.35                      | 5.269                               | 5.419      | 1/4                                                                | - 20        | 5.30                      | 5.113                              | 5.387      | 1/4                     | - 28        | 5.60                      | 5.466                              | 5.662      |
| MJ 6                       | x | 1.00       | 5.10                      | 5.026                               | 5.216      | 5/16                                                               | - 18        | 6.75                      | 6.563                              | 6.833      | 5/16                    | - 24        | 7.00                      | 6.906                              | 7.109      |
| MJ 8                       | x | 0.50       | 7.55                      | 7.513                               | 7.625      | 3/8                                                                | - 16        | 8.20                      | 7.978                              | 8.255      | 3/8                     | - 24        | 8.60                      | 8.494                              | 8.679      |
| MJ 8                       | x | 0.75       | 7.35                      | 7.269                               | 7.419      | 7/16                                                               | - 14        | 9.60                      | 9.346                              | 9.639      | 7/16                    | - 20        | 10.00                     | 9.876                              | 10.084     |
| MJ 8                       | x | 1.00       | 7.10                      | 7.026                               | 7.216      | 1/2                                                                | - 13        | 11.00                     | 10.798                             | 11.095     | 1/2                     | - 20        | 11.60                     | 11.463                             | 11.661     |
| MJ 8                       | x | 1.25       | 6.90                      | 6.782                               | 6.994      | 9/16                                                               | - 12        | 12.40                     | 12.228                             | 12.482     | 9/16                    | - 18        | 13.00                     | 12.913                             | 13.122     |
| MJ 10                      | x | 1.00       | 9.10                      | 9.026                               | 9.216      | 5/8                                                                | - 11        | 13.80                     | 13.627                             | 13.904     | 5/8                     | - 18        | 14.60                     | 14.501                             | 14.702     |
| MJ 10                      | x | 1.25       | 8.90                      | 8.782                               | 8.994      | * MJ3 x 0.50 up to MJ 5 x 0.80 tapping size hole of int. thread 6H |             |                           |                                    |            |                         |             |                           |                                    |            |
| MJ 10                      | x | 1.50       | 8.60                      | 8.539                               | 8.775      |                                                                    |             |                           |                                    |            |                         |             |                           |                                    |            |
| MJ 12                      | x | 1.75       | 10.40                     | 10.295                              | 10.560     |                                                                    |             |                           |                                    |            |                         |             |                           |                                    |            |
| MJ 16                      | x | 2.00       | 14.20                     | 14.051                              | 14.351     |                                                                    |             |                           |                                    |            |                         |             |                           |                                    |            |

\* MJ3 x 0.50 up to MJ 5 x 0.80 tapping size hole of int. thread 6H



## Tapping size holes for thread cutting

| UNF threads<br>ASME B1.1 |  |                           |                                    |            | BSW (Whitworth)<br>threads BS84 |  |                           |                                 |            | (Whitworth) threads<br>(DIN-ISO 228-1) |      |                           |                                 |               | Steel armoured conduit threads<br>to DIN 40430 |            |                           |                                 |               |            |            |
|--------------------------|--|---------------------------|------------------------------------|------------|---------------------------------|--|---------------------------|---------------------------------|------------|----------------------------------------|------|---------------------------|---------------------------------|---------------|------------------------------------------------|------------|---------------------------|---------------------------------|---------------|------------|------------|
| nom. threads<br>Ø        |  | tapping<br>size<br>hole Ø | core diameter<br>of int. thread 2B |            | nom. threads<br>Ø               |  | tapping<br>size<br>hole Ø | core diameter<br>of int. thread |            | nom. threads<br>Ø                      |      | tapping<br>size<br>hole Ø | core diameter<br>of int. thread |               | nom. threads<br>Ø                              |            | tapping<br>size<br>hole Ø | core diameter<br>of int. thread |               |            |            |
| per<br>inch              |  | DIN 336<br>mm             | min.<br>mm                         | max.<br>mm | inch                            |  | per<br>inch               | DIN 336<br>mm                   | min.<br>mm | max.<br>mm                             | inch |                           | per<br>inch                     | DIN 336<br>mm | min.<br>mm                                     | max.<br>mm | per<br>inch               |                                 | DIN 336<br>mm | min.<br>mm | max.<br>mm |
| Nr. 1 - 72               |  | 1.55                      | 1.473                              | 1.610      | W 1/16 60                       |  | 1.20                      | 1.045                           | 1.230      | G 1/16 28                              |      | 6.80                      | 6.561                           | 6.843         | Pg 7 20                                        |            | 11.40                     | 11.280                          | 11.430        |            |            |
| Nr. 2 - 64               |  | 1.85                      | 1.755                              | 1.910      | W 3/32 48                       |  | 1.80                      | 1.704                           | 1.912      | G 1/8 28                               |      | 8.80                      | 8.566                           | 8.848         | Pg 9 18                                        |            | 14.00                     | 13.860                          | 14.010        |            |            |
| Nr. 3 - 56               |  | 2.15                      | 2.024                              | 2.197      | W 1/8 40                        |  | 2.50                      | 2.362                           | 2.591      | G 1/4 19                               |      | 11.80                     | 11.445                          | 11.890        | Pg 11 18                                       |            | 17.30                     | 17.260                          | 17.410        |            |            |
| Nr. 4 - 48               |  | 2.40                      | 2.271                              | 2.459      | W 5/32 32                       |  | 3.20                      | 2.952                           | 3.214      | G 3/8 19                               |      | 15.25                     | 14.950                          | 15.395        | Pg 13.5 18                                     |            | 19.00                     | 19.060                          | 19.210        |            |            |
| Nr. 5 - 44               |  | 2.70                      | 2.550                              | 2.741      | W 3/16 24                       |  | 3.60                      | 3.407                           | 3.745      | G 1/2 14                               |      | 19.00                     | 18.631                          | 19.172        | Pg 16 18                                       |            | 21.30                     | 21.160                          | 21.310        |            |            |
| Nr. 6 - 40               |  | 2.95                      | 2.819                              | 3.023      | W 7/32 24                       |  | 4.50                      | 4.201                           | 4.539      | G 5/8 14                               |      | 21.00                     | 20.587                          | 21.128        | Pg 21 16                                       |            | 26.90                     | 26.780                          | 27.030        |            |            |
| Nr. 8 - 36               |  | 3.50                      | 3.404                              | 3.607      | W 1/4 20                        |  | 5.10                      | 4.724                           | 5.156      | G 3/4 14                               |      | 24.50                     | 24.117                          | 24.658        | Pg 29 16                                       |            | 35.50                     | 35.480                          | 35.730        |            |            |
| Nr. 10 - 32              |  | 4.10                      | 3.962                              | 4.166      | W 5/16 18                       |  | 6.50                      | 6.130                           | 6.590      | G 7/8 14                               |      | 28.25                     | 27.877                          | 28.418        | Pg 36 16                                       |            | 45.50                     | 45.480                          | 45.730        |            |            |
| Nr. 12 - 28              |  | 4.60                      | 4.496                              | 4.724      | W 3/8 16                        |  | 7.90                      | 7.492                           | 7.987      | G 1 11                                 |      | 30.75                     | 30.291                          | 30.931        | Pg 42 16                                       |            | 52.50                     | 52.480                          | 52.730        |            |            |
| 1/4 - 28                 |  | 5.50                      | 5.359                              | 5.588      | W 7/16 14                       |  | 9.20                      | 8.789                           | 9.330      | G 1 1/8 11                             |      | 35.50                     | 34.939                          | 35.579        | Pg 48 16                                       |            | 57.80                     | 57.780                          | 58.030        |            |            |
| 5/16 - 24                |  | 6.90                      | 6.782                              | 7.036      | W 1/2 12                        |  | 10.50                     | 9.989                           | 10.591     | G 1 1/4 11                             |      | 39.50                     | 38.952                          | 39.592        |                                                |            |                           |                                 |               |            |            |
| 3/8 - 24                 |  | 8.50                      | 8.382                              | 8.636      | W 9/16 12                       |  | 12.00                     | 11.577                          | 12.179     | G 1 1/2 11                             |      | 45.25                     | 44.845                          | 45.485        |                                                |            |                           |                                 |               |            |            |
| 7/16 - 20                |  | 9.90                      | 9.728                              | 10.033     | W 5/8 11                        |  | 13.50                     | 12.918                          | 13.558     | G 1 3/4 11                             |      | 51.00                     | 50.788                          | 51.428        |                                                |            |                           |                                 |               |            |            |
| 1/2 - 20                 |  | 11.50                     | 11.328                             | 11.608     | W 3/4 10                        |  | 16.25                     | 15.797                          | 16.483     | G 2 11                                 |      | 57.00                     | 56.656                          | 57.296        |                                                |            |                           |                                 |               |            |            |
| 9/16 - 18                |  | 12.90                     | 12.751                             | 13.081     | W 7/8 9                         |  | 19.25                     | 18.611                          | 19.353     |                                        |      |                           |                                 |               |                                                |            |                           |                                 |               |            |            |
| 5/8 - 18                 |  | 14.50                     | 14.351                             | 14.681     | W 1 8                           |  | 22.00                     | 21.334                          | 22.147     |                                        |      |                           |                                 |               |                                                |            |                           |                                 |               |            |            |
| 3/4 - 16                 |  | 17.50                     | 17.323                             | 17.678     | W 1 1/8 7                       |  | 24.50                     | 23.928                          | 24.832     |                                        |      |                           |                                 |               |                                                |            |                           |                                 |               |            |            |
| 7/8 - 14                 |  | 20.40                     | 20.269                             | 20.650     | W 1 1/4 7                       |  | 27.75                     | 27.103                          | 28.007     |                                        |      |                           |                                 |               |                                                |            |                           |                                 |               |            |            |
| 1 - 12                   |  | 23.25                     | 23.114                             | 23.571     | W 1 3/8 6                       |  | 30.50                     | 29.504                          | 30.528     |                                        |      |                           |                                 |               |                                                |            |                           |                                 |               |            |            |
| 1 1/8 - 12               |  | 26.50                     | 26.289                             | 26.746     | W 1 1/2 6                       |  | 33.50                     | 32.679                          | 33.703     |                                        |      |                           |                                 |               |                                                |            |                           |                                 |               |            |            |
| 1 1/4 - 12               |  | 29.50                     | 29.464                             | 29.921     | W 1 5/8 5                       |  | 35.50                     | 34.769                          | 35.963     |                                        |      |                           |                                 |               |                                                |            |                           |                                 |               |            |            |
| 1 3/8 - 12               |  | 32.75                     | 32.639                             | 33.096     | W 1 3/4 5                       |  | 39.00                     | 37.944                          | 39.138     |                                        |      |                           |                                 |               |                                                |            |                           |                                 |               |            |            |
| 1 1/2 - 12               |  | 36.00                     | 35.814                             | 36.271     | W 2 4.5                         |  | 44.50                     | 43.571                          | 44.877     |                                        |      |                           |                                 |               |                                                |            |                           |                                 |               |            |            |

### NPT ANSI B 2.1 American tapered pipe thread 1:16

| Version A<br>(avoid if possible) |  | Version B |  | nom. threads<br>Ø | tapp. size hole Ø<br>cylindrical (A)<br>d <sub>1</sub> | tapp. size hole Ø<br>conical (B)<br>D <sub>1</sub> | cutting depth<br>ET<br>mm | cutting depth<br>BT (min)<br>mm |
|----------------------------------|--|-----------|--|-------------------|--------------------------------------------------------|----------------------------------------------------|---------------------------|---------------------------------|
|                                  |  |           |  | 1/16 - 27         | <b>6.15</b>                                            | 6.39                                               | 9.29                      | 10.7                            |
|                                  |  |           |  | 1/8 - 27          | <b>8.40</b>                                            | 8.74                                               | 9.32                      | 10.8                            |
|                                  |  |           |  | 1/4 - 18          | <b>11.10</b>                                           | <b>11.36</b>                                       | 13.52                     | 15.6                            |
|                                  |  |           |  | 3/8 - 18          | <b>14.30</b>                                           | <b>14.80</b>                                       | 13.83                     | 16.0                            |
|                                  |  |           |  | 1/2 - 14          | <b>17.90</b>                                           | <b>18.32</b>                                       | 18.07                     | 20.8                            |
|                                  |  |           |  | 3/4 - 14          | <b>23.30</b>                                           | <b>23.67</b>                                       | 18.55                     | 21.3                            |
|                                  |  |           |  | 1 - 11.5          | <b>29.00</b>                                           | <b>29.69</b>                                       | 22.29                     | 25.6                            |
|                                  |  |           |  | 1 1/4 - 11.5      | <b>37.70</b>                                           | <b>38.45</b>                                       | 22.80                     | 26.1                            |
|                                  |  |           |  | 1 1/2 - 11.5      | <b>43.70</b>                                           | <b>44.52</b>                                       | 22.80                     | 26.1                            |
|                                  |  |           |  | 2 - 11.5          | <b>55.60</b>                                           | <b>56.56</b>                                       | 23.20                     | 26.5                            |
|                                  |  |           |  | 2 1/2 - 8         | <b>66.30</b>                                           | <b>67.62</b>                                       | 31.75                     | 36.3                            |
|                                  |  |           |  | 3 - 8             | <b>82.30</b>                                           | <b>83.52</b>                                       | 33.74                     | 38.5                            |

| Metric/metric fine EG-threads (EG M14 x 1.25)<br>for wire thread inserts DIN 8140 |              |                           |                                 |            | UNC (UNC-STI) EG-threads<br>for wire thread inserts ASME B18.29.1 |         |                           |                                 |            | UNF (UNF-STI) EG-threads<br>for wire thread inserts ASME B18.29.1 |         |                           |                                 |            |
|-----------------------------------------------------------------------------------|--------------|---------------------------|---------------------------------|------------|-------------------------------------------------------------------|---------|---------------------------|---------------------------------|------------|-------------------------------------------------------------------|---------|---------------------------|---------------------------------|------------|
| nom. Ø                                                                            | x pitch<br>P | tapping<br>size<br>hole Ø | core diameter<br>of int. thread |            | nom. Ø                                                            | threads | tapping<br>size<br>hole Ø | core diameter<br>of int. thread |            | nom. Ø                                                            | threads | tapping<br>size<br>hole Ø | core diameter<br>of int. thread |            |
|                                                                                   |              |                           | min.<br>mm                      | max.<br>mm |                                                                   |         |                           | min.<br>mm                      | max.<br>mm |                                                                   |         |                           | min.<br>mm                      | max.<br>mm |
| EG M 4                                                                            | 0.70         | <b>4.20</b>               | 4.152                           | 4.292      | EG Nr. 6                                                          | - 32    | <b>3.80</b>               | 3.678                           | 3.879      | EG Nr. 6                                                          | - 40    | <b>3.70</b>               | 3.644                           | 3.818      |
| EG M 5                                                                            | 0.80         | <b>5.25</b>               | 5.174                           | 5.334      | EG Nr. 8                                                          | - 32    | <b>4.40</b>               | 4.338                           | 4.524      | EG Nr. 8                                                          | - 36    | <b>4.40</b>               | 4.321                           | 4.498      |
| EG M 6                                                                            | 1.00         | <b>6.30</b>               | 6.217                           | 6.407      | EG Nr. 10                                                         | - 24    | <b>5.20</b>               | 5.055                           | 5.283      | EG Nr. 10                                                         | - 32    | <b>5.10</b>               | 4.999                           | 5.184      |
| EG M 8                                                                            | 1.25         | <b>8.40</b>               | 8.271                           | 8.483      | EG Nr. 12                                                         | - 24    | <b>5.80</b>               | 5.715                           | 5.944      | EG Nr. 12                                                         | - 28    | <b>5.70</b>               | 5.682                           | 5.809      |
| EG M10                                                                            | 1.50         | <b>10.50</b>              | 10.324                          | 10.560     | EG 1/4                                                            | - 20    | <b>6.70</b>               | 6.624                           | 6.868      | EG 1/4                                                            | - 28    | <b>6.60</b>               | 6.546                           | 6.721      |
| EG M12                                                                            | 1.75         | <b>12.50</b>              | 12.379                          | 12.644     | EG 5/16                                                           | - 18    | <b>8.40</b>               | 8.242                           | 8.489      | EG 5/16                                                           | - 24    | <b>8.25</b>               | 8.166                           | 8.352      |
| EG M14 x 1.25                                                                     | <b>14.40</b> |                           | 14.271                          | 14.483     | EG 3/8                                                            | - 16    | <b>10.00</b>              | 9.868                           | 10.127     | EG 3/8                                                            | - 24    | <b>9.80</b>               | 9.754                           | 9.931      |
| EG M16                                                                            | 2.00         | <b>16.50</b>              | 16.433                          | 16.733     | EG 7/16                                                           | - 14    | <b>11.60</b>              | 11.506                          | 11.783     | EG 7/16                                                           | - 20    | <b>11.50</b>              | 11.389                          | 11.585     |
|                                                                                   |              |                           |                                 |            | EG 1/2                                                            | - 13    | <b>13.30</b>              | 13.122                          | 13.393     | EG 1/2                                                            | - 20    | <b>13.10</b>              | 12.974                          | 13.172     |
|                                                                                   |              |                           |                                 |            | EG 9/16                                                           | - 12    | <b>14.90</b>              | 14.747                          | 15.032     | EG 9/16                                                           | - 18    | <b>14.70</b>              | 14.592                          | 14.798     |
|                                                                                   |              |                           |                                 |            | EG 5/8                                                            | - 11    | <b>16.50</b>              | 16.375                          | 16.673     | EG 5/8                                                            | - 18    | <b>16.25</b>              | 16.180                          | 16.386     |



## Recommended tapping size holes for thread forming

| Std. ISO metric threads<br>DIN 13 |       |                   |                   |         |                           | ISO metric fine threads<br>DIN 13 |              |       |                   |                   |         |                           |             |          |       |                   |                   |         |                           |         |
|-----------------------------------|-------|-------------------|-------------------|---------|---------------------------|-----------------------------------|--------------|-------|-------------------|-------------------|---------|---------------------------|-------------|----------|-------|-------------------|-------------------|---------|---------------------------|---------|
| nom. Ø                            | pitch | tapp. size hole Ø | tapp. size hole Ø |         | core Ø of int. thread 7H* |                                   | nom. x Ø     | pitch | tapp. size hole Ø | tapp. size hole Ø |         | core Ø of int. thread 7H* |             | nom. x Ø | pitch | tapp. size hole Ø | tapp. size hole Ø |         | core Ø of int. thread 7H* |         |
|                                   | mm    |                   | min. mm           | max. mm | min. mm                   | max. mm                           |              | mm    |                   | min. mm           | max. mm | min. mm                   | max. mm     |          | mm    |                   | min. mm           | max. mm | min. mm                   | max. mm |
| M 2                               | 0.40  | 1.85              | 1.84              | 1.88    | 1.567                     | 1.679                             | M 2.5 x 0.35 | 2.35  | 2.35              | 2.38              | 2.121   | 2.221                     | M 17 x 1.00 | 16.55    | 16.52 | 16.62             | 15.917            | 16.217  |                           |         |
| M 2.2                             | 0.45  | 2.00              | 2.01              | 2.05    | 1.713                     | 1.838                             | M 3 x 0.35   | 2.85  | 2.85              | 2.88              | 2.621   | 2.721                     | M 17 x 1.50 | 16.30    | 16.26 | 16.38             | 15.376            | 15.751  |                           |         |
| M 2.5                             | 0.45  | 2.30              | 2.28              | 2.32    | 2.013                     | 2.138                             | M 4 x 0.35   | 3.85  | 3.85              | 3.88              | 3.621   | 3.721                     | M 18 x 1.00 | 17.55    | 17.52 | 17.62             | 16.917            | 17.217  |                           |         |
| M 3                               | 0.50  | 2.80              | 2.78              | 2.85    | 2.459                     | 2.639                             | M 4 x 0.50   | 3.80  | 3.78              | 3.83              | 3.459   | 3.639                     | M 18 x 1.50 | 17.30    | 17.26 | 17.38             | 16.376            | 16.751  |                           |         |
| M 3.5                             | 0.60  | 3.25              | 3.23              | 3.30    | 2.850                     | 3.050                             | M 5 x 0.50   | 4.80  | 4.78              | 4.83              | 4.459   | 4.639                     | M 18 x 2.00 | 17.10    | 17.05 | 17.20             | 15.835            | 16.310  |                           |         |
| M 4                               | 0.70  | 3.70              | 3.68              | 3.76    | 3.242                     | 3.466                             | M 5.5 x 0.50 | 5.30  | 5.28              | 5.33              | 4.959   | 5.139                     | M 20 x 1.00 | 19.55    | 19.52 | 19.62             | 18.917            | 19.217  |                           |         |
| M 4.5                             | 0.75  | 4.20              |                   |         |                           |                                   | M 6 x 0.75   | 5.65  | 5.62              | 5.70              | 5.188   | 5.424                     | M 20 x 1.50 | 19.30    | 19.26 | 19.38             | 18.376            | 19.751  |                           |         |
| M 5                               | 0.80  | 4.65              | 4.62              | 4.71    | 4.134                     | 4.384                             | M 7 x 0.75   | 6.65  | 6.62              | 6.70              | 6.188   | 6.424                     | M 24 x 1.00 | 23.55    | 23.52 | 23.62             | 22.917            | 23.217  |                           |         |
| M 6                               | 1.00  | 5.55              | 5.52              | 5.62    | 4.917                     | 5.217                             | M 8 x 0.75   | 7.65  | 7.62              | 7.70              | 7.188   | 7.424                     | M 24 x 1.50 | 23.30    | 23.26 | 23.38             | 22.376            | 22.751  |                           |         |
| M 7                               | 1.00  | 6.55              | 6.52              | 6.62    | 5.917                     | 6.217                             | M 8 x 1.00   | 7.55  | 7.52              | 7.62              | 6.917   | 7.217                     | M 24 x 2.00 | 23.10    | 23.05 | 23.20             | 21.835            | 22.310  |                           |         |
| M 8                               | 1.25  | 7.40              | 7.36              | 7.47    | 6.647                     | 6.982                             | M 9 x 0.75   | 8.65  | 8.62              | 8.70              | 8.188   | 8.424                     | M 27 x 1.50 | 26.30    | 26.26 | 26.38             | 25.376            | 25.751  |                           |         |
| M 9                               | 1.25  | 8.40              | 8.36              | 8.47    | 7.647                     | 7.982                             | M 9 x 1.00   | 8.55  | 8.52              | 8.62              | 7.917   | 8.217                     | M 30 x 1.50 | 29.30    | 29.26 | 29.38             | 28.376            | 28.751  |                           |         |
| M 10                              | 1.50  | 9.30              | 9.26              | 9.38    | 8.376                     | 8.751                             | M 10 x 0.75  | 9.65  | 9.62              | 9.70              | 9.188   | 9.424                     | M 33 x 1.50 | 32.30    | 32.26 | 32.38             | 31.376            | 31.751  |                           |         |
| M 11                              | 1.50  | 10.30             | 10.26             | 10.38   | 9.376                     | 9.751                             | M 10 x 1.00  | 9.55  | 9.52              | 9.62              | 8.917   | 9.217                     | M 36 x 1.50 | 35.30    | 35.26 | 35.38             | 34.376            | 34.751  |                           |         |
| M 12                              | 1.75  | 11.20             | 11.15             | 11.29   | 10.106                    | 10.531                            | M 10 x 1.25  | 9.40  | 9.36              | 9.47              | 8.647   | 8.982                     | M 39 x 1.50 | 38.30    | 38.26 | 38.38             | 37.376            | 37.751  |                           |         |
| M 14                              | 2.00  | 13.10             | 13.05             | 13.20   | 11.835                    | 12.310                            | M 11 x 0.75  | 10.65 | 10.62             | 10.70             | 10.188  | 10.424                    | M 42 x 1.50 | 41.30    | 41.26 | 41.38             | 42.376            | 42.751  |                           |         |
| M 16                              | 2.00  | 15.10             | 15.05             | 15.20   | 13.835                    | 14.310                            | M 11 x 1.00  | 10.55 | 10.52             | 10.62             | 9.917   | 10.217                    |             |          |       |                   |                   |         |                           |         |
| M 18                              | 2.50  | 16.90             | 16.83             | 17.02   | 15.294                    | 15.854                            | M 12 x 1.00  | 11.55 | 11.52             | 11.62             | 10.917  | 11.217                    |             |          |       |                   |                   |         |                           |         |
| M 20                              | 2.50  | 18.90             | 18.83             | 19.02   | 17.294                    | 17.854                            | M 12 x 1.25  | 11.40 | 11.36             | 11.47             | 10.647  | 10.982                    |             |          |       |                   |                   |         |                           |         |
| M 22                              | 2.50  | 20.90             | 20.83             | 21.02   | 19.294                    | 19.854                            | M 12 x 1.50  | 11.30 | 11.26             | 11.38             | 10.376  | 10.751                    |             |          |       |                   |                   |         |                           |         |
| M 24                              | 3.00  | 22.70             | 22.62             | 22.80   | 20.752                    | 21.382                            | M 14 x 1.00  | 13.55 | 13.52             | 13.62             | 12.917  | 13.217                    |             |          |       |                   |                   |         |                           |         |
| M 27                              | 3.00  | 25.70             | 25.62             | 25.80   | 23.752                    | 24.382                            | M 14 x 1.25  | 13.40 | 13.36             | 13.47             | 12.647  | 12.982                    |             |          |       |                   |                   |         |                           |         |
| M 30                              | 3.50  | 28.50             | 28.40             | 28.60   | 26.211                    | 26.921                            | M 14 x 1.50  | 13.30 | 13.26             | 13.38             | 12.376  | 12.751                    |             |          |       |                   |                   |         |                           |         |
| M 33                              | 3.50  | 31.50             | 31.40             | 31.60   | 29.211                    | 29.921                            | M 15 x 1.00  | 14.55 | 14.52             | 14.62             | 13.917  | 14.217                    |             |          |       |                   |                   |         |                           |         |
| M 36                              | 4.00  | 34.30             | 34.17             | 34.40   | 31.670                    | 32.420                            | M 15 x 1.50  | 14.30 | 14.26             | 14.38             | 13.376  | 13.751                    |             |          |       |                   |                   |         |                           |         |
| M 39                              | 4.00  | 37.30             | 37.17             | 37.40   | 34.670                    | 35.420                            | M 16 x 1.00  | 15.55 | 15.52             | 15.62             | 14.917  | 15.217                    |             |          |       |                   |                   |         |                           |         |
| M 42                              | 4.50  | 40.10             | 39.95             | 40.20   | 37.129                    | 37.979                            | M 16 x 1.50  | 15.30 | 15.26             | 15.38             | 14.376  | 14.751                    |             |          |       |                   |                   |         |                           |         |

\* M 2 up to M 2.5 tapping size hole of int. thread 6H

\* M 2.5 x 0.35 up to M 4 x 0.35 tapping size hole of int. thread 6H

### Tapping size hole diameter tolerance zone for thread forming (to DIN 13, section 50)

Due to the tensile strength it is not necessary to adhere to the tapping size hole diameter tolerance class 6H; tolerance class 7H satisfies the requirement that the flank coverage of external and internal threads should not fall below 0.32 x P. In addition, formed threads generally possess a higher tensile strength in comparison to cut threads thanks to an uninterrupted grain flow and subsequent work hardening.





## Recommended tapping size holes for thread forming

| UNC threads<br>ASME B1.1 |                        |                         |                      |            |                             |            |
|--------------------------|------------------------|-------------------------|----------------------|------------|-----------------------------|------------|
| nom. Ø                   | threads<br>per<br>inch | tapp.<br>size<br>hole Ø | tapp. size<br>hole Ø |            | core Ø<br>of int. thread 2B |            |
|                          |                        | mm                      | min.<br>mm           | max.<br>mm | min.<br>mm                  | max.<br>mm |
| Nr. 1 - 64               |                        | <b>1.68</b>             | 1.67                 | 1.70       | 1.425                       | 1.580      |
| Nr. 2 - 56               |                        | <b>1.98</b>             | 1.97                 | 2.01       | 1.694                       | 1.872      |
| Nr. 3 - 48               |                        | <b>2.28</b>             | 2.27                 | 2.32       | 1.941                       | 2.146      |
| Nr. 4 - 40               |                        | <b>2.55</b>             | 2.54                 | 2.59       | 2.157                       | 2.385      |
| Nr. 5 - 40               |                        | <b>2.90</b>             | 2.89                 | 2.94       | 2.487                       | 2.698      |
| Nr. 6 - 32               |                        | <b>3.15</b>             | 3.14                 | 3.19       | 2.642                       | 2.896      |
| Nr. 8 - 32               |                        | <b>3.80</b>             | 3.78                 | 3.82       | 3.302                       | 3.531      |
| Nr. 10 - 24              |                        | <b>4.35</b>             | 4.33                 | 4.39       | 3.683                       | 3.937      |
| Nr. 12 - 24              |                        | <b>5.00</b>             | 4.97                 | 5.03       | 4.343                       | 4.597      |
| 1/4 - 20                 |                        | <b>5.75</b>             | 5.72                 | 5.80       | 4.978                       | 5.258      |
| 5/16 - 18                |                        | <b>7.30</b>             | 7.26                 | 7.37       | 6.401                       | 6.731      |
| 3/8 - 16                 |                        | <b>8.80</b>             | 8.77                 | 8.88       | 7.798                       | 8.153      |
| 7/16 - 14                |                        | <b>10.30</b>            | 10.27                | 10.37      | 9.144                       | 9.550      |
| 1/2 - 13                 |                        | <b>11.80</b>            | 11.77                | 11.88      | 10.592                      | 11.024     |
| 9/16 - 12                |                        | <b>13.30</b>            | 13.28                | 13.39      | 11.989                      | 12.446     |
| 5/8 - 11                 |                        | <b>14.80</b>            | 14.78                | 14.90      | 13.386                      | 13.868     |
| 3/4 - 10                 |                        | <b>17.90</b>            | 17.85                | 17.97      | 16.307                      | 16.840     |
| 7/8 - 9                  |                        | <b>21.00</b>            | 20.95                | 21.10      | 19.177                      | 19.761     |
| 1 - 8                    |                        | <b>24.00</b>            | 23.95                | 24.12      | 21.971                      | 22.606     |

| UNF threads<br>ASME B1.1 |                        |                         |                      |            |                             |            |
|--------------------------|------------------------|-------------------------|----------------------|------------|-----------------------------|------------|
| nom. Ø                   | threads<br>per<br>inch | tapp.<br>size<br>hole Ø | tapp. size<br>hole Ø |            | core Ø<br>of int. thread 2B |            |
|                          |                        | mm                      | min.<br>mm           | max.<br>mm | min.<br>mm                  | max.<br>mm |
| Nr. 1 - 72               |                        | <b>1.70</b>             | 1.69                 | 1.72       | 1.473                       | 1.610      |
| Nr. 2 - 64               |                        | <b>2.00</b>             | 1.99                 | 2.03       | 1.755                       | 1.910      |
| Nr. 3 - 56               |                        | <b>2.30</b>             | 2.29                 | 2.34       | 2.024                       | 2.197      |
| Nr. 4 - 48               |                        | <b>2.60</b>             | 2.59                 | 2.63       | 2.271                       | 2.459      |
| Nr. 5 - 44               |                        | <b>2.90</b>             | 2.89                 | 2.93       | 2.550                       | 2.741      |
| Nr. 6 - 40               |                        | <b>3.20</b>             | 3.19                 | 3.24       | 2.819                       | 3.023      |
| Nr. 8 - 36               |                        | <b>3.85</b>             | 3.83                 | 3.88       | 3.404                       | 3.607      |
| Nr. 10 - 32              |                        | <b>4.45</b>             | 4.43                 | 4.49       | 3.962                       | 4.166      |
| Nr. 12 - 28              |                        | <b>5.10</b>             | 5.07                 | 5.13       | 4.496                       | 4.724      |
| 1/4 - 28                 |                        | <b>5.95</b>             | 5.92                 | 5.99       | 5.359                       | 5.588      |
| 5/16 - 24                |                        | <b>7.45</b>             | 7.42                 | 7.50       | 6.782                       | 7.036      |
| 3/8 - 24                 |                        | <b>9.05</b>             | 9.02                 | 9.10       | 8.838                       | 9.636      |
| 7/16 - 20                |                        | <b>10.55</b>            | 10.48                | 10.58      | 9.728                       | 10.033     |
| 1/2 - 20                 |                        | <b>12.10</b>            | 12.08                | 12.18      | 11.328                      | 11.608     |
| 9/16 - 18                |                        | <b>13.65</b>            | 13.61                | 13.72      | 12.751                      | 13.081     |
| 5/8 - 18                 |                        | <b>15.25</b>            | 15.21                | 15.32      | 14.351                      | 14.681     |
| 3/4 - 16                 |                        | <b>18.35</b>            | 18.30                | 18.41      | 17.323                      | 17.678     |
| 7/8 - 14                 |                        | <b>21.40</b>            | 21.35                | 21.49      | 20.269                      | 20.650     |
| 1 - 12                   |                        | <b>24.45</b>            | 24.40                | 24.54      | 23.114                      | 23.571     |

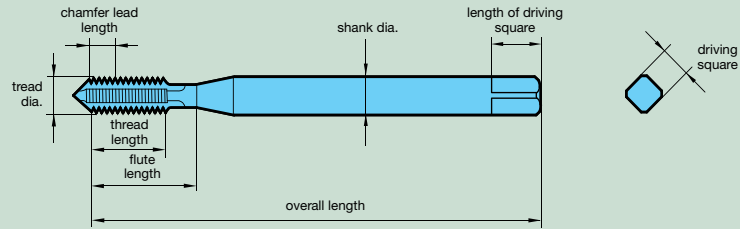
| (Whitworth) threads<br>DIN EN ISO 228-1 |                        |                         |                      |            |                          |            |
|-----------------------------------------|------------------------|-------------------------|----------------------|------------|--------------------------|------------|
| nom. Ø                                  | threads<br>per<br>inch | tapp.<br>size<br>hole Ø | tapp. size<br>hole Ø |            | core Ø<br>of int. thread |            |
|                                         |                        | mm                      | min.<br>mm           | max.<br>mm | min.<br>mm               | max.<br>mm |
| G 1/16 28                               |                        | <b>7.30</b>             | 7.28                 | 7.35       | 6.561                    | 6.843      |
| G 1/8 28                                |                        | <b>9.30</b>             | 9.28                 | 9.35       | 8.566                    | 8.848      |
| G 1/4 19                                |                        | <b>12.50</b>            | 12.48                | 12.55      | 11.445                   | 11.890     |
| G 3/8 19                                |                        | <b>16.00</b>            | 15.98                | 16.05      | 14.950                   | 15.395     |
| G 1/2 14                                |                        | <b>20.00</b>            | 19.98                | 20.12      | 18.631                   | 19.172     |
| G 5/8 14                                |                        | <b>22.00</b>            | 21.98                | 22.12      | 20.587                   | 21.128     |
| G 3/4 14                                |                        | <b>25.50</b>            | 25.48                | 25.62      | 24.117                   | 24.658     |
| G 7/8 14                                |                        | <b>29.25</b>            | 29.23                | 29.37      | 27.877                   | 28.418     |
| G 1 11                                  |                        | <b>32.00</b>            | 31.98                | 32.15      | 30.291                   | 30.931     |
| G 1 1/4 11                              |                        | <b>40.75</b>            | 40.70                | 40.85      | 38.952                   | 39.592     |



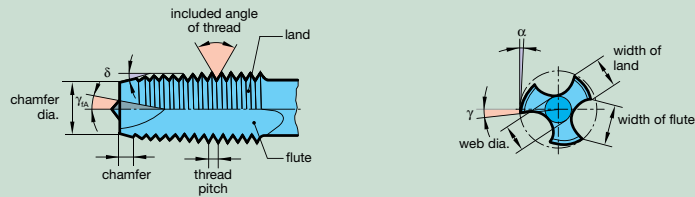
# HARTNER

## General information for tapping

### Definitions and angles, centres and flute forms



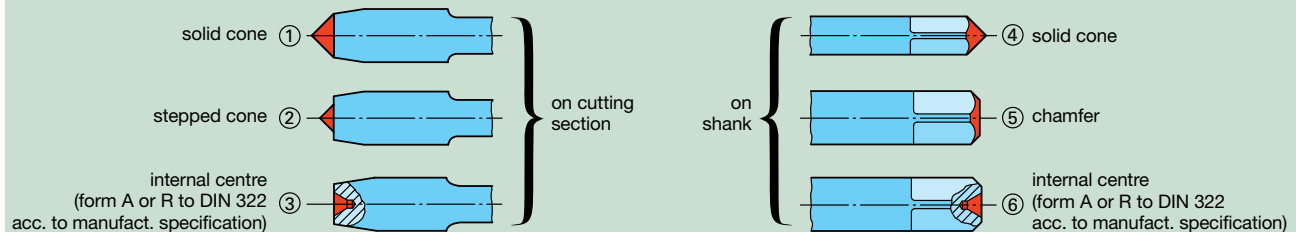
$\delta$  = try square  
 $\gamma_{fA}$  = spiral point angle  
 $\alpha$  = clearance angle  
 $\gamma$  = rake angle



### Flute forms

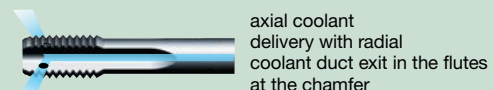


### Types of centres (standard, to DIN 2197/DIN 2175)



| Thread dia. range<br>mm | Centre on cutting section        |                        | Centre on shank |
|-------------------------|----------------------------------|------------------------|-----------------|
|                         | with chamfer forms<br>A, C, D, E | with chamfer form<br>B |                 |
| ≤ 4.2                   | ①                                | ①                      | ④ ⑤ ⑥           |
| > 4.2 ... 5.6           | ① ②                              | ①                      | ④ ⑤ ⑥           |
| > 5.6 ... 10.0          | ① ② ③                            | ① ② ③                  | ④ ⑤ ⑥           |
| > 10.0                  | ③                                | ③                      | ⑥               |

### Coolant duct geometries





## General information for tapping

### Chamfer forms, selection and application

When cutting internal threads, all the machining is carried out by the cutting teeth of the chamfer. Therefore, a decision on the best type of chamfer form has to be carefully made as both tool life and quality of thread are thereby greatly affected.

Generally speaking, the form and length of chamfer depend on the type of hole to be tapped. The tapping of through holes does not normally give rise to any difficulties whereas the production of blind holes can create certain problems associated with the need to evacuate swarf in the reverse direction to the feed, i.e. up to the flutes of the tap and then cut off such swarf when the tap is reversed out of the hole.

The length of chamfer is determined by taking into account various conflicting factors. To avoid overloading, premature bluntness and oversize threads the number of chamfer cutting threads must not be kept too low. A too long chamfer lead, however, increases the torque and thus the danger of breakage. The spiral point with form B ensures a chip removal always in the direction of feed.



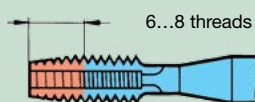
through hole



blind hole

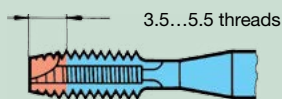
#### Chamfer forms to DIN 2197

##### Form A



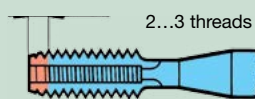
long, 6 - 8 threads  
for short  
through holes

##### Form B



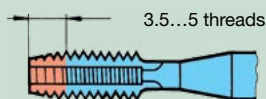
medium, 3.5 - 5.5 threads,  
with spiral point,  
for all through holes  
and deep tapping holes in medium  
and long-chipping materials

##### Form C



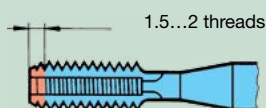
short, 2 - 3 threads  
for blind holes  
and generally for  
aluminium, grey cast iron  
and brass

##### Form D



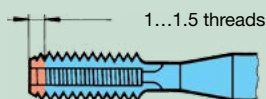
medium, 3.5 - 5 threads  
for short  
through holes

##### Form E



very short, 1.5-2 threads,  
for blind holes with  
little run-out depth.

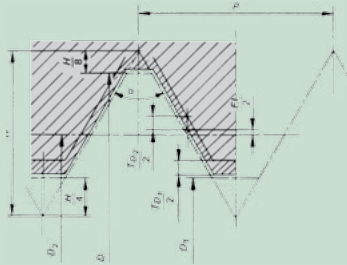
##### Form F



extremely short, 1-1.5 threads,  
for blind holes with  
little run-out depth.  
Avoid use if possible.



### Taps for ISO metric threads DIN EN 22857 (extract)



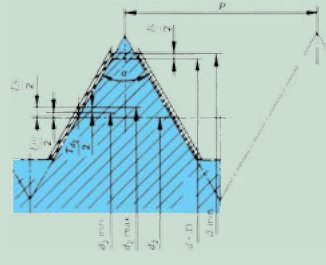
#### Profile of the nut thread

##### Basic profile:

major diameter  
nom. dia. of tapping size hole  
basic pitch diameter  
pitch of diameter  
included angle of thread  
height of peak to peak  
thread profile  
basic deviation of pitch, zero  
with tolerance zone H, positive  
with tolerance zone G

##### Tolerances:

tolerance on tapping size hole dia  
tolerance on tap pitch dia.



#### Profile of the tap

##### Basic profile:

major diameter  
d min. permissible min. tap major dia.  
minimum clearance on major diameter  
basic pitch diameter  
minimum tap pitch diameter  
maximum tap pitch diameter  
upper deviation of pitch diameter  
lower deviation of pitch diameter

##### Tolerance:

tolerance on tap pitch diameter

With the aim of unifying threads on an international basis, the ISO thread was brought out and has in the meantime been accepted by all concerned. Nowadays the ISO metric thread is the most common type. As you can see, our tap program demonstrates this fact in the clearest possible way.

We recommend the application of taps in accordance with the adjacent table:

#### Tolerance qualities (figure identification)

Tolerance qualities of external threads are defined by figures 3 to 9, those of nut threads by figures 4 to 8. 3 stands for the narrowest and 9 for the widest tolerance.

#### Tolerance positions (letter identification)

ISO metric internal threads are identified by capital letters A to H, ISO metric external threads by small letters a to h. Tolerance zones A to G have positive and a to g negative basic pitch deviations in contrast to the tolerance zones H and h which commence at zero. Generally, tolerance zones H and g are used. For threads destined for surface treatment tolerance zones G and e are applied.

When manufacturing ISO-external threads the deviations that are determined for the major diameter with regard to the tolerance zones a to g have to be taken into account.

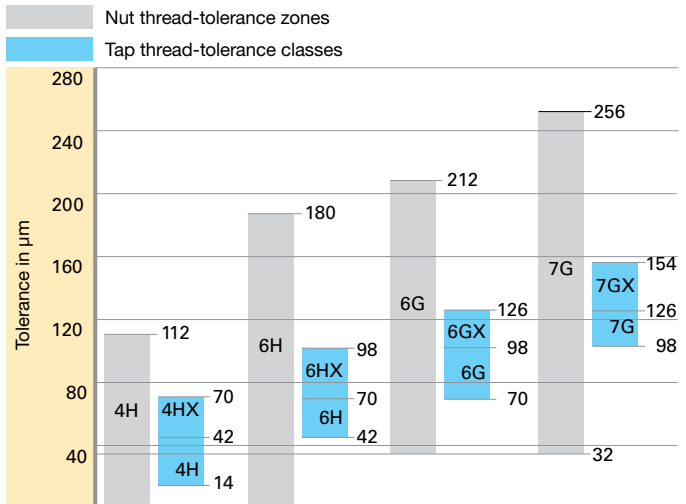
#### Tolerance zones (nut thread)/

#### Tolerance classes (tap thread)

Quality and position of tolerance determine the tolerance zone, which is identified by the appropriate figures and letters.

The abbreviation for the tolerance class of tap corresponds to the tolerance zone of the internal thread for which the tap is used in most cases. Therefore, it is not identical with the tolerance zone of the cut nut thread in every application. Taps with deviating tolerances according to DIN 802 part 1 will be given additional marking "X" (6 HX, 6 GX).

#### Tolerance zone / tolerance class allocation



| DIN EN 22857             |           | Tolerance zone of internal thread to be cut |    |    |    | DIN 802 part 1 (withdrawn) |  |
|--------------------------|-----------|---------------------------------------------|----|----|----|----------------------------|--|
| Application class of tap |           |                                             |    |    |    | Tolerance class of tap     |  |
| Designation*             | Reference |                                             |    |    |    |                            |  |
| Class 1                  | ISO 1     | 4H                                          | 5H |    |    |                            |  |
| Class 2                  | ISO 2     |                                             |    | 6H |    |                            |  |
| Class 3                  | ISO 3     |                                             |    |    | 6G |                            |  |
| -                        | -         |                                             |    |    |    | 7G                         |  |

\* The tolerance of the 3 application classes is calculated in accordance to the following data dependent on one tolerance unit t the value of which corresponds to the value of the basic pitch diameter TD2 in tolerance class 5 of the nut thread (polished to a pitch of 0.2 mm):  
t = t<sub>D2</sub> Tolerance class 5 of nut thread

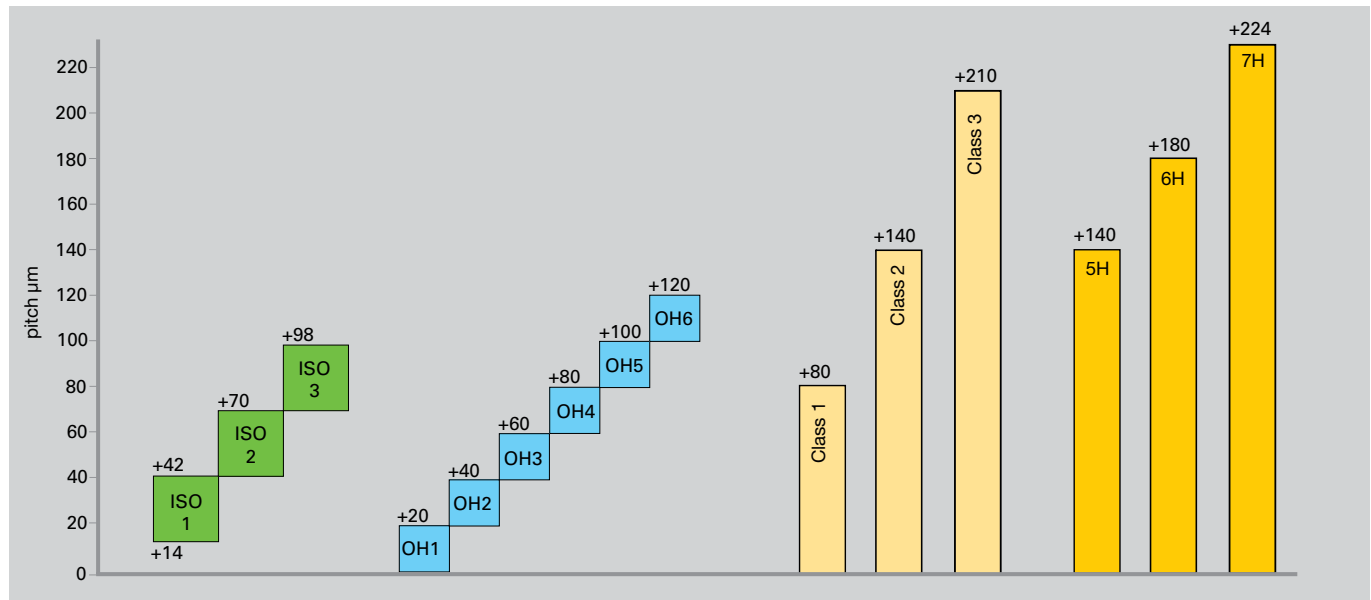


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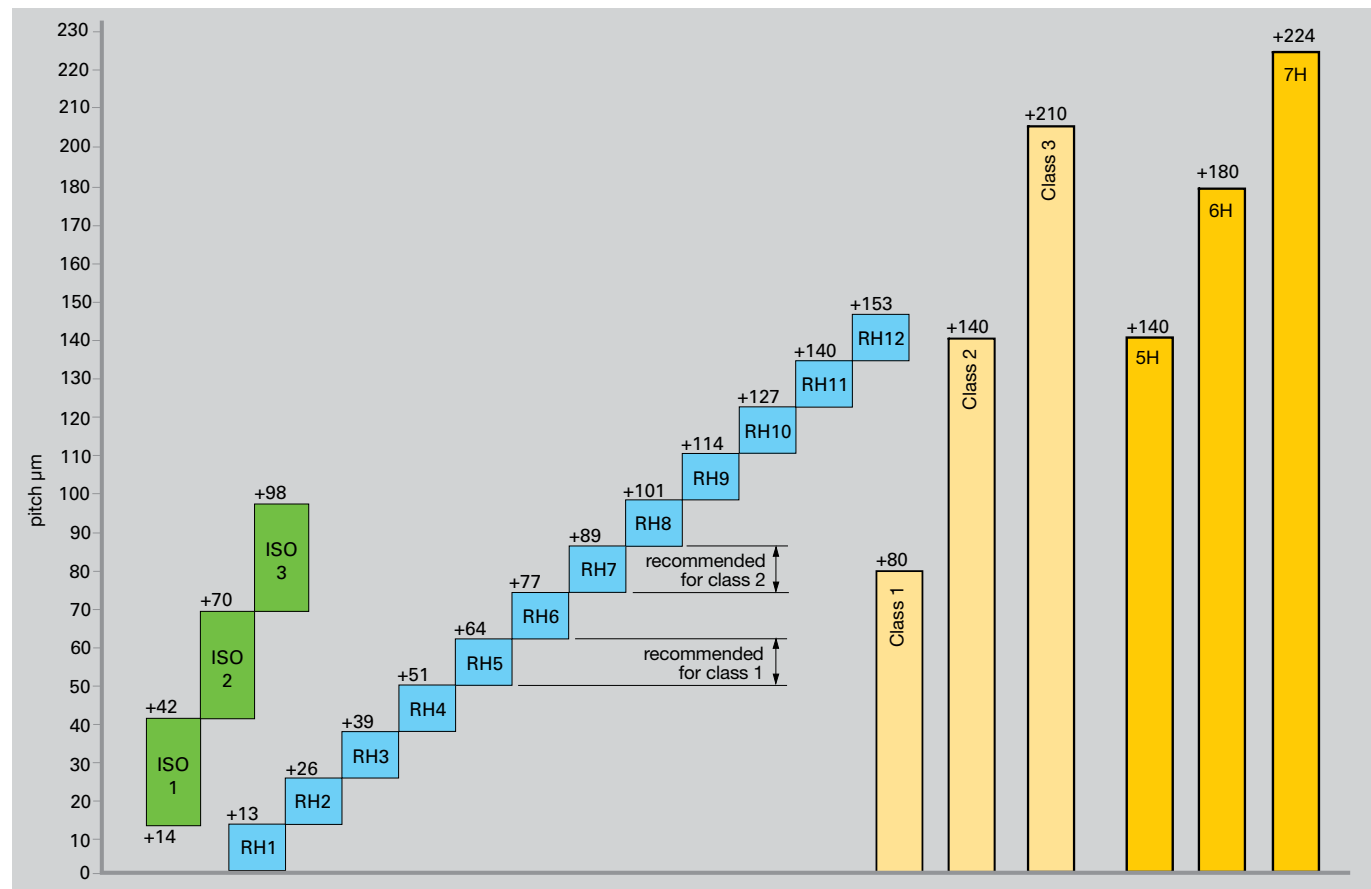
## General information for tapping

### JIS-Taps

OH limits for JIS-taps



RH limits for JIS fluteless taps



upper limit:  $0.0127 \times n$   
lower limit:  $0.0127 \times n - 0.0127$   
unit: mm / n = RH number



### Taps for ISO metric threads DIN EN 22857 (extract)

#### Thread clearances and fits

Fits between internal and external threads are separated by a diagonal stroke, as for example 6H/6g (internal/external thread). The fit has to be selected in conjunction with the appropriate thread connection.

The tolerance zones of the tolerance classes fine, medium and coarse are allocated to three screw-in lengths short (S), normal (N) and long (L). Generally, the following rules apply for selecting a tolerance class:

#### Fine tolerance zone (S):

For precision threads, when only a small variation in the fit is permitted.

#### Medium tolerance zone (N):

General application

#### Coarse tolerance zone (L):

There are no special precision requirements and in cases where production difficulties may occur, e.g. thread production in hot-rolled rods, deep blind holes or plastic components.

#### Screw-in lengths

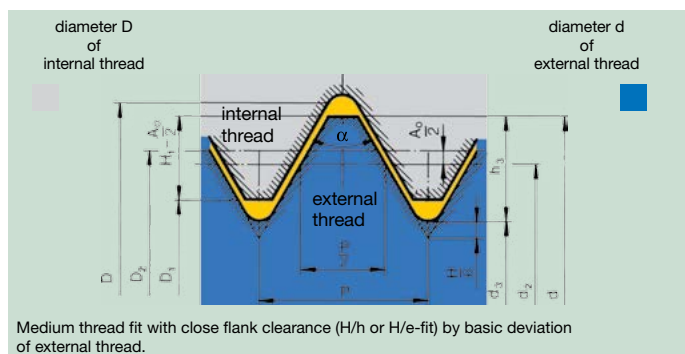
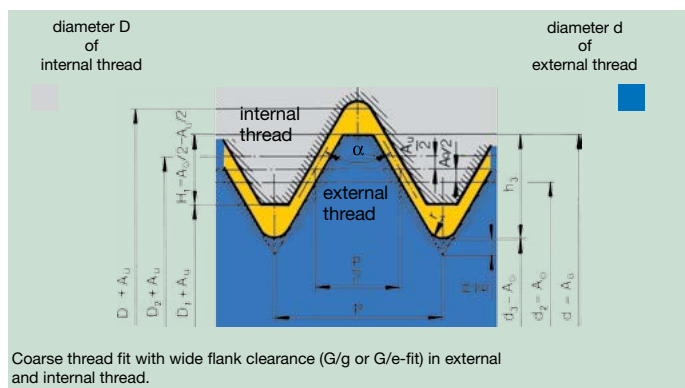
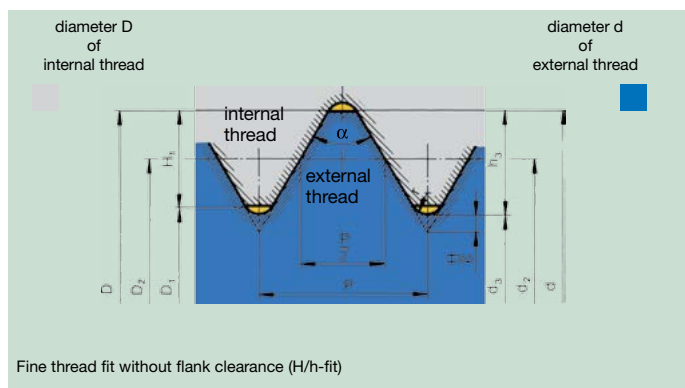
The quality of thread connection is also affected by the screw-in length. The ISO tolerance system was, especially as regards the pitch diameter, divided into three groups, i.e.

|   |          |                          |
|---|----------|--------------------------|
| S | (Short)  | = short screw-in length  |
| N | (Normal) | = normal screw-in length |
| L | (Long)   | = long screw-in length   |

The following fit should be selected for normal screw-in length N:

To ensure a tighter fit of thread connections, we recommend for short screw-in lengths a narrower fit. As far as long screw-in lengths are concerned, fits with a larger tolerance must be used to compensate for pitch deviations.

#### Thread fits with varying flank clearance



#### Explanation of symbols

|                |   |                                        |
|----------------|---|----------------------------------------|
| D              | = | Ø nom. of internal thread              |
| D <sub>1</sub> | = | Tapping size hole Ø of internal thread |
| D <sub>2</sub> | = | Basic pitch Ø of internal thread       |
| d              | = | Ø nom. of external thread              |
| d <sub>2</sub> | = | Basic pitch Ø of external thread       |
| d <sub>3</sub> | = | Tapping size hole Ø of external thread |
| P              | = | Pitch                                  |
| α              | = | Included angle of thread               |
| H              | = | Height of peak to peak thread profile  |
| A <sub>0</sub> | = | Upper tolerance limit                  |
| A <sub>u</sub> | = | Lower tolerance limit                  |

## Application problems with new taps

| Problem                                                                                                                          | Possible causes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Solution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1 Thread produced is too large</b><br><br>   | <ul style="list-style-type: none"> <li>■ incorrect tap, tap geometry not suitable for the application</li> <li>■ tapping size hole too small</li> <li>■ alignment error of tapping size hole or position</li> <li>■ machine spindle axially restricted</li> <li>■ cold welding at the flank of the tap</li> <li>■ lead of tap unsatisfactory due to insufficient thread depth</li> <li>■ cutting speed too high</li> <li>■ lubrication or coolant supply insufficient</li> <li>■ tolerance specification on tap does not correspond to specifications on drawing and/or thread gauge</li> </ul> | <ul style="list-style-type: none"> <li>■ apply correct tap for the material to be machined</li> <li>■ observe tapping size hole table in the technical section. Note different tapping size hole diameters for fluteless taps.</li> <li>■ - check for correct tool clamping</li> <li>■ - apply floating tap holder</li> <li>■ - check core drill</li> <li>■ - use mechanical feed</li> <li>■ - apply tension/compression tap chuck</li> <li>■ - apply new tap</li> <li>■ - apply coated tap</li> <li>■ - optimise lubrication</li> <li>■ - tap with forced feed</li> <li>■ - apply tap with modified lead</li> <li>■ - reduce cutting speed</li> <li>■ - improve lubrication</li> <li>■ ensure sufficient and suitable coolant supply and check concentration</li> <li>■ apply correct tap for required tolerances</li> </ul> |
| <b>2 Thread axially miscut</b><br><br>        | <ul style="list-style-type: none"> <li>■ spiral-fluted taps, corresponding to our design, are applied with too much pressure for initial tapping</li> <li>■ initial tapping pressure too low for taps with spiral point corresponding to our form "B"</li> </ul>                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>■ with spiral-fluted taps only light pressure required for initial tapping. The tap should immediately be applied within the tension/compression range</li> <li>■ taps with spiral point or left hand spiral require higher axial pressure. Ensure tap operates within the tension/compression range</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>3 Thread produced is too small</b><br><br> | <ul style="list-style-type: none"> <li>■ tolerance specification on tap does not correspond to specifications on drawing and/or thread gauge</li> <li>■ incorrect tap</li> <li>■ tap does not cut accurately (thread plug gauge)</li> <li>■ machine spindle is axially too rigid</li> </ul>                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>■ apply correct tap for required tolerance</li> <li>■ apply correct tap for the material to be machined</li> <li>■ avoid strong axial forces during the cutting process</li> <li>■ apply tension/compression chuck</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Application problems with new taps

| Problem                                                                                                                                    | Possible causes                                                                                                                                                                                                                                                                                                                                                                                                                        | Solution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>4 Thread surface not according to requirements</b><br> | <ul style="list-style-type: none"> <li>■ cutting edge geometry not suitable for the application</li> <li>■ cutting speed too high</li> <li>■ insufficient coolant (concentration and supply)</li> <li>■ chip congestion</li> <li>■ tapping size hole too small</li> <li>■ with tough, hard materials loading on tool too much or pitch too steep</li> <li>■ built-up edge</li> <li>■ cold welding</li> </ul>                           | <ul style="list-style-type: none"> <li>■ apply "correct" tap for the material to be machined</li> <li>■ - reduce cutting speed</li> <li>■ - optimise lubrication</li> <li>■ ensure suitable coolant and sufficient volume</li> <li>■ apply suitable tap type</li> <li>■ observe tapping size hole diameter specifications to DIN 336 or respective standards. Observe table for fluteless taps</li> <li>■ apply hand tap sets</li> <li>■ apply coated tap</li> <li>■ improve coolant supply</li> </ul>                                                                                                            |
| <b>5 Tool life insufficient</b>                                                                                                            | <ul style="list-style-type: none"> <li>■ surface hardening of tapping size hole</li> <li>■ reasons listed under: "thread surface not according to requirements"</li> <li>■ chip congestion</li> </ul>                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>■ - check drill (cutting edge) for wear</li> <li>■ - heat or surface treatment following thread production</li> <li>■ reasons listed under: thread surface "not according to requirements"</li> <li>■ apply correct tap</li> </ul>                                                                                                                                                                                                                                                                                                                                         |
| <b>6 Tool breakage during advance or return</b><br>     | <ul style="list-style-type: none"> <li>■ tapping size hole too small</li> <li>■ teeth of chamfer lead overloaded</li> <li>■ tap hits bottom of tapping size hole</li> <li>■ - lack of or incorrect chamfer of tapping size hole</li> <li>■ - positional or angle error of tapping size hole</li> <li>■ - tool hardness not suitable for the application</li> <li>■ - cutting edge geometry not suitable for the application</li> </ul> | <ul style="list-style-type: none"> <li>■ observe tapping size hole dia. acc. to DIN 336 or respective standards</li> <li>■ - longer chamfer lead (blind or through hole)</li> <li>■ - increase no. of teeth of chamfer lead by increasing no. of flutes</li> <li>■ - apply tap sets</li> <li>■ - check hole depth</li> <li>■ - apply tension/compression tap chuck</li> <li>■ - correct chamfer angle of tapping size hole</li> <li>■ - ensure correct tool clamping</li> <li>■ - apply floating tap holder</li> <li>■ - check core drill</li> <li>■ apply suitable tap for the individual application</li> </ul> |



## Application problems with reground taps

| Problem                                                | Possible causes                                                                                                                                                                                                                                          | Solution                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>7</b> Thread produced is too large                  | <ul style="list-style-type: none"> <li>burrs</li> <li>cutting edge geometry (chamfer lead, rake-, chamfer-, spiral point angle) not retained</li> </ul>                                                                                                  | <ul style="list-style-type: none"> <li>remove burrs</li> <li>- observe technical specifications when regrinding.</li> <li>- observe regrinding instruction</li> </ul>                                                                                                                           |
| <b>8</b> Thread produced is too small                  | <ul style="list-style-type: none"> <li>worn section has not been reground correctly</li> <li>tap too small due to no. of regrinds</li> </ul>                                                                                                             | <ul style="list-style-type: none"> <li>- regrind again or apply new tool.</li> <li>- observe max. regrinding limits.</li> <li>- max. regrinding limit reached.</li> <li>- apply new tap</li> </ul>                                                                                              |
| <b>9</b> Thread produced not according to requirements | <ul style="list-style-type: none"> <li>burrs</li> <li>cutting edge geometry (chamfer lead, rake-, chamfer-, spiral point angle) not retained</li> <li>peak-to-valley height of the reground tap too large</li> <li>cold welding at the flanks</li> </ul> | <ul style="list-style-type: none"> <li>remove burrs</li> <li>- observe technical specifications when regrinding.</li> <li>- observe regrinding instruction</li> <li>- regrind again or apply new tool.</li> <li>- observe max. regrinding limits.</li> <li>remove cold welding marks</li> </ul> |
| <b>10</b> Tool life insufficient                       | <ul style="list-style-type: none"> <li>cutting edge geometry (chamfer lead, rake-, chamfer-, spiral point angle) not retained</li> <li>loss of tap hardness due to heat development during the regrinding process</li> <li>loss of coating</li> </ul>    | <ul style="list-style-type: none"> <li>- regrind again or apply new tool.</li> <li>- observe max. regrinding limits.</li> <li>- check quality of grinding wheel</li> <li>- check coolant supply</li> <li>- recoat</li> <li>- check coating of the material to be machined</li> </ul>            |

## General information thread forming

Fluteless taps are used for the forming of internal threads without chip removal. In contrast to conventional tapping where material is cut from the workpiece, thread forming is a pressure deformation process without chip removal for the production of internal threads. During the process the material is cold formed without interrupting the grain flow.

According to DIN 8583, thread forming is described as “pressing the thread into the workpiece with a tool possessing a spiral working area”. The spiral threaded, polygonal portion of the fluteless tap is “screwed” into the pre-drilled workpiece with an appropriate constant feed rate equal to the thread pitch. Hereby the thread profile is pressed gradually via the forming lead into the material of the workpiece so to speak. Subsequently, the pressure in the deformation zone exceeds the compression limit, the workpiece becomes ductile and is deformed. The material yields radially, “flows” along the thread profile in the unoccupied base of the tool and forms the minor diameter of the nut thread. The flow process creates the process specific form pockets (claws).

The tapping size hole diameter is heavily dependent on the formability of the material, the workpiece geometry and the required effective depth of the thread. In comparison to conventional tapping, a larger diameter tapping size hole should be selected. With a larger diameter tapping size hole the load on the tool is reduced whilst increasing the tool life. Thanks to the uninterrupted grain flow, the loading capacity of the thread remains sufficient with a 50% effective thread depth.

The partially formed crests of the thread with decreasing effective thread depth are a typical characteristic of threads

produced by the thread forming process. With the flanks of the thread fully formed, they have no influence on the tensile strength of the thread. If necessary, the required deformation level of the thread should be determined by performing a test.

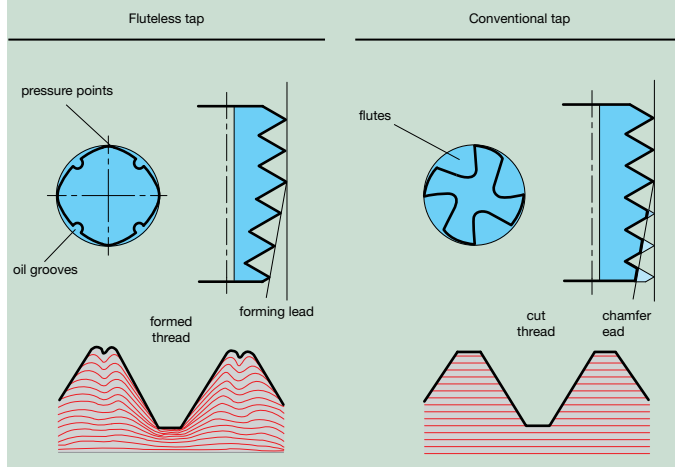
Lubrication is of significant importance. The lubrication prevents material from building up on the thread flanks and ensures that the necessary torque for the forming process is not too high. Therefore, under no circumstances should there ever be a break-down in lubrication! Preference should be given to lubricants such as cooling agents or oils containing graphite such as those used in rolling processes. Always follow the rule: “The better the lubrication the easier the thread forming process!”

### It offers the following advantages:

- no chip formation.
- one tool for the production of threads in through and blind holes.
- application in wide range of materials.
- no cutting errors.
- pitch and angle of thread errors that can occur with thread cutting are eliminated.
- internal threads produced by thread forming possess a higher tensile strength particularly at the thread flanks thanks to the so-called “uninterrupted grain flow” and the cold forming process.
- the surface of the thread is improved.
- fluteless taps can be applied at higher speeds because the formability of many materials increases with the forming speed. This does not have a negative effect on the tool life.
- reduced danger of breakage through rigid design.

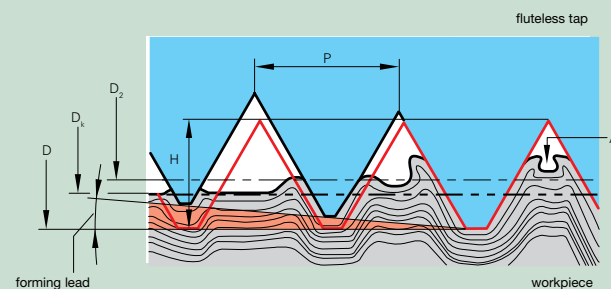
### Process

The production of internal threads without chip removal (thread forming) in comparison to conventional tapping



### Flow characteristics of the material during thread forming and the deformation process

- D = nom.-Ø
- D<sub>2</sub> = flank-Ø
- D<sub>k</sub> = hole-Ø
- H = profile height
- P = pitch
- A = form pocket (claw)
- finished nut thread





# HARTNER

## General information thread forming

Conventional fluteless taps, produced by a grinding process only, show traces of microscopic, very fine grinding marks on the surface of the tool. This also applies to the threaded portion of the tool required to perform the thread forming operation.

This surface topography (structure) has a negative effect on the friction between the tool and the material to be re-formed as well as on the herewith associated heat development, on the necessary torque and last but not least on the wear of the pressure points of the fluteless tap. In addition, the "grinding marks" encourage the build-up of the material to be re-formed in the thread flanks of the fluteless tap. This is also called cold welding.

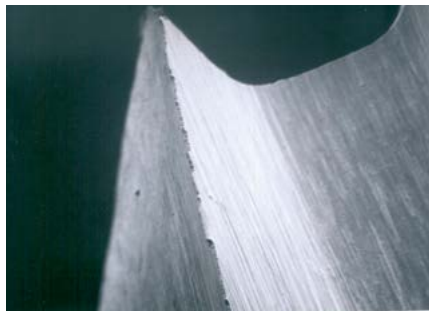
Thanks to a special process to improve the surface topography (structure), Hartner's new fluteless taps no longer possess these "grinding marks". This has been confirmed in research and tool life studies in varying materials under production conditions.

For the user, a longer tool life and increased cutting speeds are the benefits of this special process. The tool life can be increased considerably depending on the material to be machined and the application conditions. A 100% increase in tool life is not unusual.

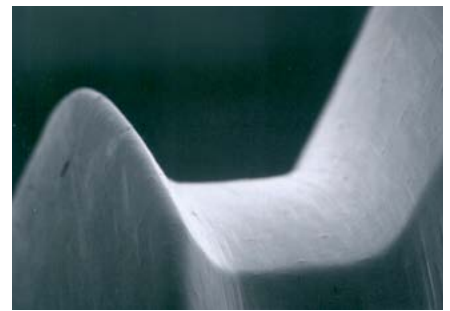
The improved surface topography is not only of benefit to tools with bright finish. Particularly coated tools also benefit from the new process. Outer contour and forming lead greatly determine the performance of the fluteless tap. Numerous tests have shown that

fluteless taps with optimal pressure point geometry and quantity achieve increased tool life and dimensional accuracy.

Further improvements in quality are achieved when the fluteless tap is produced completely in one setting and with one grinding wheel - set-up with a special roll. Pitch errors between the thread crests and former lead transition area do not occur as with the conventional grinding process.

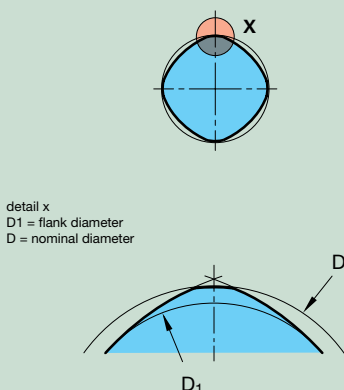


Surface of a conventional fluteless tap

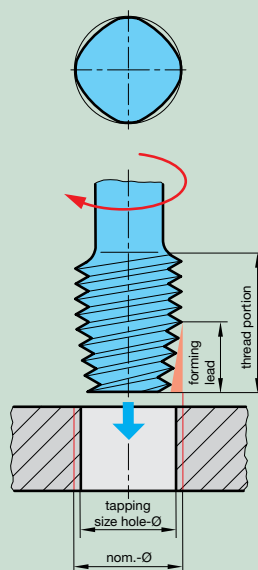


Optimised surface of a Hartner Profile fluteless tap

Cross section of fluteless tap



The principle



Types of tapping size hole

with fluteless taps without oil grooves  
for thread depth  $\leq 1 \times D$



for thread depth  $\geq 1 \times D$



with fluteless taps with oil grooves  
for all thread depths

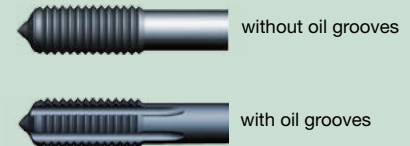
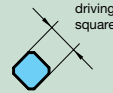
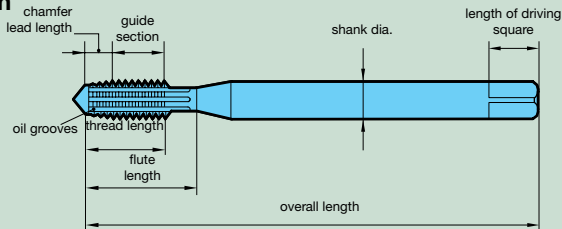




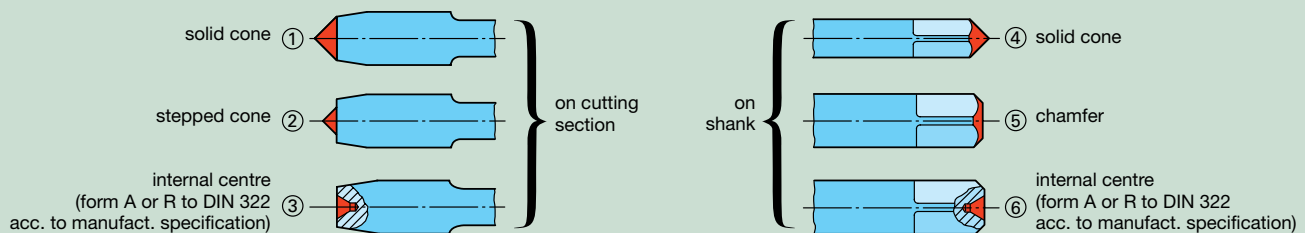
## General information thread forming

### Definitions, angles, centres, thread tolerances and fits

#### Thread portion



#### Types of centres (standard, to DIN 2197/DIN 2175)



| Thread dia. range<br>mm | Centre on cutting section        |                        | Centre on shank |
|-------------------------|----------------------------------|------------------------|-----------------|
|                         | with chamfer forms<br>A, C, D, E | with chamfer form<br>B |                 |
| ≤ 5.6                   | ①                                | ①                      | ④ ⑤ ⑥           |
| > 5.6 ... 12.8          | ① ② ③                            | ① ② ③                  | ④ ⑤ ⑥           |
| > 12.8                  | ③                                | ③                      | ⑥               |

#### Thread tolerances and fits

Fits between internal and external threads are separated by a diagonal stroke, as for example 6H/6g (internal/external thread). The fit has to be selected in conjunction with the appropriate thread connection.

The tolerance zones of the tolerance classes fine, medium and coarse are allocated to three screw-in lengths short S), normal (N) and long (L). Generally, the following rules apply for selecting a tolerance class:

##### Fine tolerance zone (S):

For precision threads, when only a small variation in the fit is permitted.

##### Screw-in lengths

The quality of thread connection is also affected by the screw-in length. The ISO tolerance system was, especially as regards the pitch diameter, divided into three groups, i.e.

|            |                          |
|------------|--------------------------|
| S (Short)  | = short screw-in length  |
| N (Normal) | = normal screw-in length |
| L (Long)   | = long screw-in length   |

##### Medium tolerance zone (N):

General application

##### Coarse tolerance zone (L):

There are no special precision requirements and in cases where production difficulties may occur, e.g. thread production in hot-rolled rods, deep blind holes or plastic components.

The following fit should be selected for normal screw-in length N:

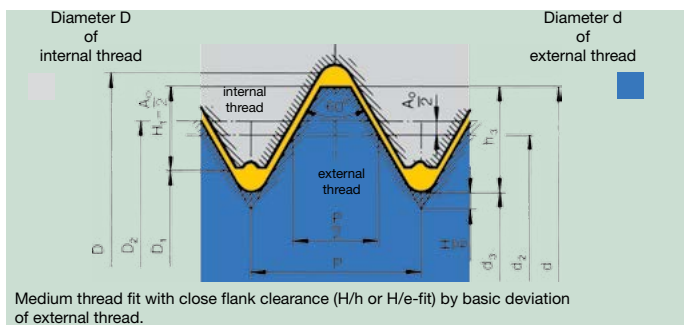
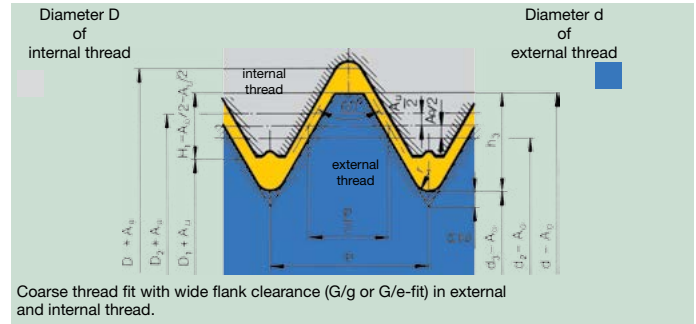
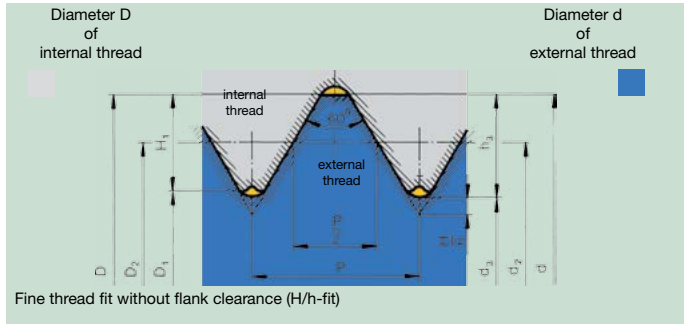
To ensure a tighter fit of thread connections, we recommend for short screw-in lengths a narrower fit.



## General information thread forming

### Definitions, angles, centres, thread tolerances and fits

#### Thread fit with varying flank clearance



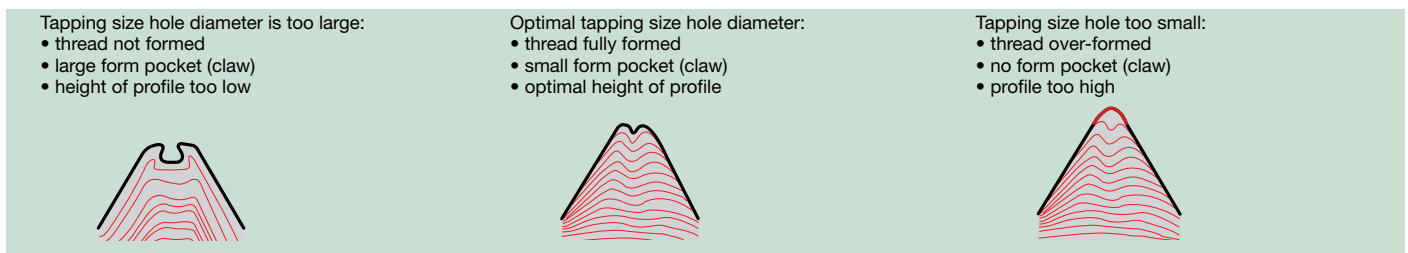
#### Explanation of symbols

|    |                                           |
|----|-------------------------------------------|
| D  | = major diameter of internal thread       |
| D1 | = nominal diameter of tapping size hole   |
| D2 | = effective diameter of internal thread   |
| d  | = major diameter of external thread       |
| d2 | = effective diameter of external thread   |
| d3 | = root diameter of external thread        |
| P  | = pitch                                   |
| s  | = pitch angle                             |
| H  | = peak to valley height of thread profile |
| Ao | = positive tolerance                      |
| Au | = negative tolerance                      |

#### Tapping size hole diameter

With fluteless tapping, the tapping size hole diameter influences the distinction of the formed thread. A too small tapping size hole diameter results in an over-forming of the thread which must definitely be prevented because this can lead to tool

breakage. A too large tapping size hole is acceptable with certain tolerances because formed threads have a sufficient loading capacity from a 50% bearing depth.



#### Cooling lubricants with fluteless taps

With fluteless taps the main task of the coolant is lubrication. The better the lubrication with the maximum concentration, the longer the tool life.

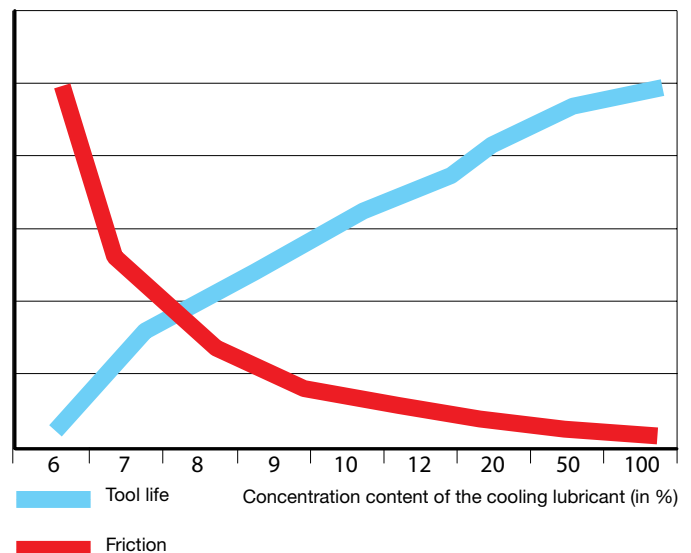
There are two different types of lubricant:

##### Oil based lubricants

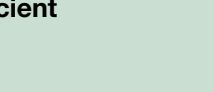
These are mineral oils with the best lubricating characteristics. They reduce friction and achieve optimal life.

##### Soluble lubricants

These soluble lubricants are a concentrate thinned to an emulsion prior to the use with water. The concentration must not be below 6%. A content more than 12% is ideal in order to achieve a long life thanks to a good lubrication effect.



## Application problems with new fluteless taps

| Problem                                                                                                                                      | Possible causes                                                                                                                                                                                 | Solution                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> Thread produced is too large<br>                   | <ul style="list-style-type: none"> <li>Insufficient tool clamping</li> <li>Fluteless tap with short cutting portion</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>Apply synchro chuck</li> <li>Apply fluteless tap with long cutting portion</li> </ul>                                                                                                        |
| <b>2</b> Thread produced is too small<br>                 | <ul style="list-style-type: none"> <li>Tapping size hole diameter too large</li> </ul>                                                                                                          | <ul style="list-style-type: none"> <li>Select correct tapping size hole diameter according to table</li> </ul>                                                                                                                      |
| <b>3</b> Thread overformed<br>                            | <ul style="list-style-type: none"> <li>Tapping size hole diameter too small</li> </ul>                                                                                                          | <ul style="list-style-type: none"> <li>Select correct tapping size hole diameter according to table</li> </ul>                                                                                                                      |
| <b>4</b> Thread surface not according to requirements<br> | <ul style="list-style-type: none"> <li>Cold welding on the tool</li> <li>Lubricant with too little oil content</li> </ul>                                                                       | <ul style="list-style-type: none"> <li>Increase oil content in lubricant or apply neat oil</li> <li>Increase oil content in lubricant or apply neat oil</li> </ul>                                                                  |
| <b>5</b> Tool life insufficient<br>                       | <ul style="list-style-type: none"> <li>Lubricant with too little oil content</li> <li>Tapping size hole diameter too small</li> <li>Cutting speed too high</li> <li>Lubricant soiled</li> </ul> | <ul style="list-style-type: none"> <li>Increase oil content in lubricant or apply neat oil</li> <li>Select correct tapping size hole diameter according to table</li> <li>Adjust cutting speed</li> <li>Check filtration</li> </ul> |

## Application problems with new fluteless taps

| Problem                                                                                                     | Possible causes                                                                                                                                                                                                                                                                 | Solution                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>6 Tool breakage</b><br> | <ul style="list-style-type: none"> <li><span style="color: red;">■</span> Lubricant with too little oil content</li> <li><span style="color: red;">■</span> Tapping size hole diameter too small</li> <li><span style="color: red;">■</span> Incorrect tool clamping</li> </ul> | <ul style="list-style-type: none"> <li><span style="color: black;">■</span> Increase oil content in lubricant or apply neat oil</li> <li><span style="color: black;">■</span> Select correct tapping size hole diameter according to table</li> <li><span style="color: black;">■</span> Check tool clamping</li> </ul> |



## Application recommendations

|                                                                 | Material group                                                | Material examples<br>Figures in bold = material no. to DIN EN 10 027                                                                                                         |
|-----------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General steels</b><br>$\leq 1000 \text{ N/mm}^2$             | common structural steels                                      | <b>1.0035</b> S185, <b>1.0486</b> P275N, <b>1.0345</b> P235GH, <b>1.0425</b> P265GH<br><b>1.0050</b> E295, <b>1.0070</b> E360, <b>1.8937</b> P500NH                          |
|                                                                 | free-cutting steels                                           | <b>1.0718</b> 11SMnPb30, <b>1.0736</b> 11SMn37<br><b>1.0727</b> 46 S20, <b>1.0728</b> 60 S20, <b>1.0757</b> 46SPb20                                                          |
|                                                                 | unalloyed heat-treatable steels                               | <b>1.0402</b> C22, <b>1.1178</b> C30E<br><b>1.0503</b> C45, <b>1.1191</b> C45E<br><b>1.0601</b> C60, <b>1.1221</b> C60E                                                      |
|                                                                 | unalloyed case hard. steels                                   | <b>1.0301</b> C10, <b>1.1121</b> C10E                                                                                                                                        |
| <b>Stainless and acid-resistant steels</b>                      | stainless steels, sulphured                                   | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18 9                                                                         |
|                                                                 | stainless steels, austenitic<br>stainless steels, martensitic | <b>1.4301</b> X5CrNi18-10, <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17 12 2<br><b>1.4057</b> X20CrNi17-2, <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18 2 |
| <b>High tensile steels</b><br>$800-1200 \text{ N/mm}^2$         | alloyed heat-treatable steels                                 | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4                                         |
|                                                                 | alloyed case hard. steels                                     | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13, <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5                                                                                  |
|                                                                 | nitriding steels                                              | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7                                                                                                     |
|                                                                 | tool steels                                                   | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4           |
|                                                                 | high speed steels                                             | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3                                                                                                        |
| <b>Cast materials</b>                                           | cast iron                                                     | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)                                             |
|                                                                 | spheroidal graphite iron and malleable cast iron              | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMW-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)                               |
| <b>Brass</b>                                                    | brass, short-chipping                                         | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2                                                                                                    |
|                                                                 | brass, long-chipping                                          | <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5                                                                                                        |
| <b>Long-chipping Al-alloys <math>\leq 6\% \text{ Si}</math></b> | aluminium and Al-alloys                                       | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1                                                                                                             |
|                                                                 | Al wrought alloys                                             | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5                                                                              |
| <b>Aluminium and Al-alloys <math>\geq 6\% \text{ Si}</math></b> | Al cast alloys $\leq 10\% \text{ Si}$                         | <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9                                                                                                                              |
|                                                                 | Al cast alloys $> 10\% \text{ Si}$                            | <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg                                                                                                           |





# HARTNER

## Application recommendations



| Tensile strength<br>N/mm <sup>2</sup> | Hardness | TG 100 U |                        | TG 100 T |                        | TG 100 GG |                        | TG 300 T<br>(application with IC) |                        | Fluteless Taps |                        |
|---------------------------------------|----------|----------|------------------------|----------|------------------------|-----------|------------------------|-----------------------------------|------------------------|----------------|------------------------|
|                                       |          |          | v <sub>c</sub> (m/min) |          | v <sub>c</sub> (m/min) |           | v <sub>c</sub> (m/min) |                                   | v <sub>c</sub> (m/min) |                | v <sub>c</sub> (m/min) |
| ≤500                                  |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| >500-850                              |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| ≤850                                  |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| 850-1000                              |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| ≤ 700                                 |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| 700-850                               |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| 850-1000                              |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| ≤750                                  |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| ≤850                                  |          | OO       | 6-10                   | OOO      | 6-15                   | x         | -                      | OO                                | 6-10                   | OOO            | 4-8                    |
| ≤850                                  |          | OO       | 6-10                   | OOO      | 6-15                   | x         | -                      | OO                                | 6-10                   | OOO            | 4-8                    |
| ≤850                                  |          | OO       | 6-10                   | OOO      | 6-15                   | x         | -                      | OO                                | 6-10                   | OOO            | 4-8                    |
| 850-1000                              |          | OO       | 6-10                   | OOO      | 6-12                   | x         | -                      | OOO                               | 10-20                  | OOO            | 6-12                   |
| 1000-1200                             |          | OO       | 6-10                   | OOO      | 6-12                   | x         | -                      | OOO                               | 10-20                  | OOO            | 6-12                   |
| 850-1000                              |          | OO       | 6-10                   | OOO      | 6-12                   | x         | -                      | OOO                               | 10-20                  | OOO            | 6-12                   |
| 1000-1200                             |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| ≥850-1000                             |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| 1000-1200                             |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| ≤850                                  |          | OO       | 6-10                   | OOO      | 6-12                   | x         | -                      | OOO                               | 10-20                  | OOO            | 6-12                   |
| 850-1000                              |          | OO       | 6-10                   | OOO      | 6-12                   | x         | -                      | OOO                               | 10-20                  | OOO            | 6-12                   |
| ≥650-1000                             |          | OO       | 6-10                   | OOO      | 6-12                   | x         | -                      | OOO                               | 10-20                  | OOO            | 6-12                   |
|                                       | < 350 HB | O        | 15-20                  | O        | 15-20                  | OOO       | 15-20                  | OOO                               | 15-30                  | x              | -                      |
|                                       | ≤240 HB  | O        | 10-20                  | O        | 10-20                  | OOO       | 15-20                  | OOO                               | 15-25                  | O              | 15-20                  |
|                                       | < 350 HB | O        | 15-20                  | O        | 15-20                  | OOO       | 15-20                  | OOO                               | 15-30                  | O              | 15-20                  |
| ≤600                                  |          | x        | -                      | x        | -                      | OOO       | 15-20                  | OOO                               | 15-30                  | OO             | 10-15                  |
| ≤600                                  |          | x        | -                      | x        | -                      | OOO       | 15-20                  | OOO                               | 15-30                  | OO             | 10-15                  |
| ≤400                                  |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| ≤450                                  |          | OOO      | 10-20                  | OOO      | 10-20                  | x         | -                      | OOO                               | 15-25                  | OOO            | 10-20                  |
| ≤600                                  |          | OO       | 10-20                  | OO       | 10-20                  | OOO       | 15-20                  | OOO                               | 20-40                  | OOO            | 10-20                  |
| ≤600                                  |          | OO       | 10-20                  | OO       | 10-20                  | OOO       | 15-20                  | OOO                               | 20-40                  | x              | -                      |

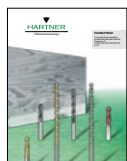
OOO optimal

OO good suitable

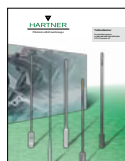
O suitable

x not suitable

Our programme:



FU 500/FN500



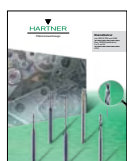
Gun Drills



INOX Drills



Multiplex



Micro Precision Drills



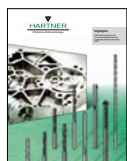
Multiplex HPC



TS-Drills



Standard Range



Highlights



TM Vending Machines



Solid Carbide  
High Performance Milling Cutters

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