



**MAKİNA TAKİM ENDÜSTRİSİ A.Ş.**

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**MAKİNA TAKİM ENDÜSTRİSİ A.Ş.**

**Product Catalog**



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MAKİNA TAKİM ENDÜSTRİSİ A.Ş.

|                                                                                    |                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Material                                                                           | <div>HSSHigh Speed Steel</div> <div>HSS-EHigh Speed Steel With Co</div> <div>KSMSolid Carbide</div>                                                                                                                                                                                                     |
| Norm                                                                               | <div>DIN 9</div> <div>DIN 8094</div>                                                                                                                                                                                                                                                                    |
| Type                                                                               | <div>N</div> <div>H</div> <div>W</div>                                                                                                                                                                                                                                                                  |
| Point Angle                                                                        | <div>118°</div> <div>130°</div> <div>140°</div> |
| Thread Type                                                                        | <div>M</div> <div>MF</div> <div>UNC</div> <div>UNF</div> <div>BSW</div> <div>BSP</div>                                                                                                                                                                                                                  |
| Thread Angle                                                                       | <div>55°</div> <div>60°</div> <div>60°</div> |
| Helix Angle                                                                        | <div>R25°</div> <div>R35°</div> <div>R45°</div>                                                                                                                                                                                                                                                         |
| Cutting Direction                                                                  | <div></div> <div></div>                                                                                                           |
| The Shank                                                                          | <div></div> <div></div> <div></div>          |
| <div><div>• Stocked and Ask Price.</div><div>◦ Ask Price and Deadline.</div></div> |                                                                                                                                                                                                                                                                                                         |

**TWIST DRILLS**



**MAKİNA TAKİM ENDÜSTRİSİ A.Ş.**





## TWIST DRILLS

| TOOL TYPE                                                    | QUALITY       | STANDARD     | PAGE |
|--------------------------------------------------------------|---------------|--------------|------|
| Straight Shank Twist Drills - Roll-Forged                    | HSS           | DIN 338      | 2    |
| Straight Shank Twist Drills - Ground                         | HSS           | DIN 338      | 4    |
| Straight Shank Twist Drills - Silver Series                  | HSS -E        | DIN 338      | 7    |
| Straight Shank Twist Drills - Gold Series                    | HSS -E        | DIN 338      | 8    |
| Straight Shank Twist Drills - TIN Coated                     | HSS -E        | DIN 338      | 9    |
| Straight Shank Twist Drills - Long Series                    | HSS           | DIN 340      | 10   |
| Straight Shank Twist Drills - Extra Long Series - Type N     | HSS           | DIN 1869 -1  | 11   |
| Straight Shank Twist Drills - Extra Long Series - Type GT100 | HSS           | DIN 1869 -1  | 11   |
| Straight Shank Twist Drills - Extra Long Series - Type GT100 | HSS -E        | DIN 1869 -1  | 12   |
| Straight Shank Twist Drills - Extra Long Series - Type N     | HSS           | DIN 1869 -2  | 12   |
| Straight Shank Twist Drills - Extra Long Series - Type GT100 | HSS           | DIN 1869 -2  | 13   |
| Straight Shank Twist Drills - Extra Long Series - Type GT100 | HSS -E        | DIN 1869 -2  | 13   |
| Straight Shank Twist Drills - Extra Long Series - Type N     | HSS           | DIN 1869 -3  | 14   |
| Straight Shank Twist Drills - Extra Long Series - Type GT100 | HSS           | DIN 1869 -3  | 14   |
| Morse Taper Shank Twist Drills                               | HSS           | DIN 345      | 15   |
| Morse Taper Shank Twist Drills - Long Series                 | HSS           | DIN 341      | 16   |
| MTE Hardox Drilling Bits                                     | HSS -E (%8Co) | MTE Standard | 17   |
| Morse Taper Shank Twist Drills - Extra Long Series           | HSS           | DIN 1870 -1  | 18   |
| Morse Taper Shank Twist Drills - Extra Long Series           | HSS           | DIN 1870 -2  | 18   |
| Straight Shank Twist Drills - Short Series                   | HSS           | DIN 1897     | 19   |
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| Spot Weld Drills - Short                                     | HSS -E (%8Co) | MTE Standard | 21   |
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| Center Drills - Form B                                       | HSS           | DIN 333 / B  | 22   |
| Center Drills - Form R                                       | HSS           | DIN 333 / R  | 23   |





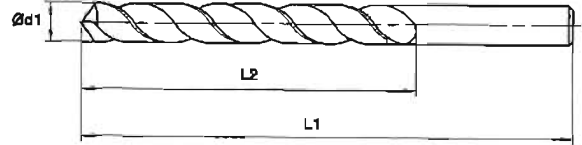
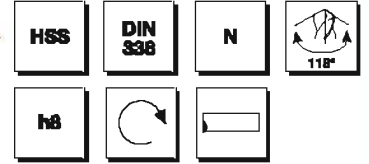
## Recommended Operating Values for Twist Drills

| Material Groups                                        | Drill Bit Type | Material | Point Angle | Cutting Cooler Fluid (Coolant) | Cutting speed Vc (m/min.) | *1. Revolution (revolution/min) 2. Progress, (mm/revolution) |          |          |          |          |          |          |          |          |    |  |
|--------------------------------------------------------|----------------|----------|-------------|--------------------------------|---------------------------|--------------------------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----|--|
|                                                        |                |          |             |                                |                           | Drill Diameter - mm                                          |          |          |          |          |          |          |          |          |    |  |
|                                                        |                |          |             |                                |                           | *                                                            | 2        | 5        | 8        | 12       | 16       | 25       | 40       | 63       | 80 |  |
| Free -Cutting Steel < 500 N/mm <sup>2</sup>            | N              | HSS      | 118         | Emulsion                       | 30 - 50                   | 1. 5600                                                      | 2250     | 1400     | 930      | 700      | 450      | 280      | 180      | 160      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.12     | 0.2      | 0.25     | 0.3      | 0.4      | 0.4      | 0.5      | 0.5      |    |  |
| Unalloyed Structural Steel < 500 N/mm <sup>2</sup>     | N              | HSS      | 118         | Emulsion                       | 30 - 40                   | 1. 5600                                                      | 2250     | 1400     | 930      | 700      | 450      | 280      | 180      | 140      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.12     | 0.2      | 0.25     | 0.3      | 0.4      | 0.4      | 0.5      | 0.6      |    |  |
| Unalloyed Structural Steel 500 - 700 N/mm <sup>2</sup> | N              | HSS      | 118         | Emulsion                       | 25 - 35                   | 1. 4750                                                      | 1900     | 1200     | 800      | 600      | 400      | 240      | 150      | 120      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.12     | 0.2      | 0.25     | 0.3      | 0.35     | 0.4      | 0.5      | 0.6      |    |  |
| Unalloyed Structural Steel 700 - 900 N/mm <sup>2</sup> | N              | HSS      | 118         | Emulsion                       | 10 - 15                   | 1. 2100                                                      | 860      | 540      | 360      | 270      | 170      | 110      | 68       | 50       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.03                                                      | 0.07     | 0.1      | 0.16     | 0.2      | 0.25     | 0.32     | 0.4      | 0.5      |    |  |
| Unalloyed Cast Steel < 700 N/mm <sup>2</sup>           | N              | HSS      | 118         | Emulsion                       | 20 - 30                   | 1. 3980                                                      | 1580     | 995      | 665      | 495      | 320      | 200      | 125      | 100      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.03                                                      | 0.07     | 0.1      | 0.16     | 0.2      | 0.25     | 0.32     | 0.4      | 0.5      |    |  |
| Alloyed Cast Steel                                     | N              | HSS      | 118         | Emulsion Oil                   | 10 - 20                   | 1. 2380                                                      | 950      | 595      | 400      | 300      | 190      | 120      | 75       | 60       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.02                                                      | 0.05     | 0.08     | 0.12     | 0.14     | 0.18     | 0.23     | 0.27     | 0.32     |    |  |
| Alloyed Steel 700 - 900 N/mm <sup>2</sup>              | N              | HSS      | 118         | Emulsion                       | 10 - 15                   | 1. 2100                                                      | 860      | 540      | 360      | 270      | 170      | 110      | 68       | 50       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.02                                                      | 0.05     | 0.08     | 0.12     | 0.14     | 0.18     | 0.23     | 0.27     | 0.32     |    |  |
| Alloyed Cr-N Steel 1000-1100 N/mm <sup>2</sup>         | N              | HSS      | 118         | Emulsion                       | 8 - 12                    | 1. 1590                                                      | 635      | 400      | 265      | 200      | 125      | 80       | 50       | 40       |    |  |
|                                                        |                | HSS - E  | 130         | Oil                            |                           | 2. 0.02                                                      | 0.05     | 0.08     | 0.12     | 0.14     | 0.18     | 0.23     | 0.27     | 0.32     |    |  |
| Alloyed Cr-N Steel 1100-1400 N/mm <sup>2</sup>         |                | HSS - E  | 130         | Emulsion Oil                   | 6 - 10                    | 1. 1275                                                      | 505      | 320      | 210      | 160      | 100      | 65       | 40       | 32       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.02                                                      | 0.05     | 0.08     | 0.12     | 0.14     | 0.18     | 0.23     | 0.27     | 0.32     |    |  |
| Stainless and Heat Resistant Steel                     |                | HSS - E  | 130         | Emulsion Oil                   | 6 - 10                    | 1. 1275                                                      | 505      | 320      | 210      | 160      | 100      | 65       | 40       | 32       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.02                                                      | 0.05     | 0.08     | 0.12     | 0.14     | 0.18     | 0.23     | 0.27     | 0.32     |    |  |
| Manganese Alloyed Hard Steel                           | Special        | HSS - E  | 130         | Hot Air                        | 3 - 5                     | 1. 635                                                       | 255      | 160      | 105      | 80       | 50       | 30       | 20       | 16       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.02                                                      | 0.05     | 0.08     | 0.12     | 0.14     | 0.18     | 0.23     | 0.27     | 0.32     |    |  |
| Spring Steel                                           | Special        | HSS - E  | 130         | Emulsion Oil                   | 5 - 10                    | 1. 1590                                                      | 635      | 400      | 265      | 200      | 125      | 80       | 50       | 40       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.02                                                      | 0.05     | 0.08     | 0.12     | 0.14     | 0.18     | 0.23     | 0.27     | 0.32     |    |  |
| Nimonic, Hastelloy Inconel                             |                | HSS - E  | 130         | Oil                            | 3 - 8                     | 1. 875                                                       | 350      | 220      | 145      | 110      | 70       | 44       | 25       | 20       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.02                                                      | 0.05     | 0.08     | 0.12     | 0.14     | 0.18     | 0.23     | 0.27     | 0.32     |    |  |
| Titanium and Titanium Alloyed Steel                    |                | HSS - E  | 130         | Oil                            | 3 - 6                     | 1. 715                                                       | 285      | 180      | 120      | 90       | 60       | 35       | 20       | 16       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.02                                                      | 0.05     | 0.08     | 0.12     | 0.14     | 0.18     | 0.23     | 0.27     | 0.32     |    |  |
| Ferro - TiC                                            | Special        | HSS - E  | 130         | Compressed Dry Air             | 3 - 6                     | 1. 715                                                       | 285      | 180      | 120      | 90       | 60       | 35       | 20       | 16       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.02                                                      | 0.05     | 0.08     | 0.12     | 0.14     | 0.18     | 0.23     | 0.27     | 0.32     |    |  |
| Gray Cast < 200 HB                                     | N              | HSS      | 118         | Compressed Dry Air             | 15 - 25                   | 1. 3185                                                      | 1265     | 795      | 530      | 400      | 255      | 160      | 100      | 80       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.02                                                      | 0.12     | 0.2      | 0.25     | 0.3      | 0.4      | 0.4      | 0.5      | 0.6      |    |  |
| Gray Cast < 350 HB                                     | N              | HSS      | 118         | Compressed Dry Air             | 5 - 15                    | 1. 1590                                                      | 635      | 400      | 265      | 200      | 165      | 80       | 50       | 40       |    |  |
|                                                        |                | HSS - E  | 130         |                                |                           | 2. 0.03                                                      | 0.07     | 0.1      | 0.16     | 0.2      | 0.25     | 0.33     | 0.4      | 0.5      |    |  |
| Nickel and Nickel Alloys                               | N              | HSS      | 118         | Emulsion Oil                   | 10 - 15                   | 1. 2100                                                      | 860      | 540      | 360      | 270      | 170      | 110      | 68       | 50       |    |  |
|                                                        |                | HSS - E  | 130         |                                |                           | 2. 0.02                                                      | 0.05     | 0.08     | 0.12     | 0.14     | 0.18     | 0.23     | 0.27     | 0.32     |    |  |
| Brass - Brittle                                        | H              | HSS      | 130         | Emulsion Oil                   | 60 - 100                  | 1. 12740                                                     | 5100     | 3200     | 2100     | 1600     | 1020     | 640      | 400      | 320      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.08                                                      | 0.18     | 0.25     | 0.3      | 0.35     | 0.4      | 0.5      | 0.6      | 0.7      |    |  |
| Brass - Soft                                           | H (N)          | HSS      | 130 (118)   | Emulsion Oil                   | 35 - 60                   | 1. 7560                                                      | 3020     | 2000     | 1260     | 950      | 600      | 380      | 240      | 200      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.15     | 0.2      | 0.25     | 0.35     | 0.4      | 0.5      | 0.6      | 0.7      |    |  |
| Brass - Soft                                           | N              | HSS      | 118         | Emulsion Oil                   | 20 - 40                   | 1. 4745                                                      | 1900     | 1195     | 795      | 595      | 380      | 240      | 150      | 120      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.08     | 0.14     | 0.2      | 0.25     | 0.3      | 0.4      | 0.5      | 0.6      |    |  |
| Aluminium - Bronze Medium Hard - Hard Silver           | N              | HSS      | 118         | Emulsion Oil                   | 15 - 35                   | 1. 3980                                                      | 1585     | 995      | 665      | 495      | 320      | 200      | 125      | 100      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.08     | 0.14     | 0.2      | 0.25     | 0.3      | 0.4      | 0.5      | 0.6      |    |  |
| Copper                                                 | W (N)          | HSS      | 130 (118)   | Emulsion Oil                   | 35 - 65                   | 1. 7960                                                      | 3170     | 1990     | 1325     | 995      | 635      | 400      | 250      | 200      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.14     | 0.18     | 0.22     | 0.3      | 0.4      | 0.45     | 0.5      | 0.6      |    |  |
| Electrolytic Copper                                    | N              | HSS      | 118         | Emulsion Oil                   | 20 - 35                   | 1. 4400                                                      | 1750     | 1100     | 730      | 550      | 350      | 220      | 140      | 110      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.14     | 0.18     | 0.22     | 0.3      | 0.4      | 0.45     | 0.5      | 0.6      |    |  |
| Aluminium                                              | W              | HSS      | 130         | Emulsion                       | 40 - 100                  | 1. 11140                                                     | 4435     | 2785     | 1855     | 1395     | 890      | 555      | 350      | 280      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.14     | 0.18     | 0.22     | 0.3      | 0.4      | 0.45     | 0.5      | 0.6      |    |  |
| Aluminium Alloys - Long Chipping                       | W              | HSS      | 130         | Emulsion                       | 30 - 65                   | 1. 7600                                                      | 3030     | 1900     | 1260     | 950      | 600      | 380      | 240      | 190      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.14     | 0.18     | 0.22     | 0.3      | 0.4      | 0.45     | 0.5      | 0.6      |    |  |
| Aluminium Alloys - Short Chipping                      | N (W)          | HSS      | 118 (130)   | Emulsion                       | 30 - 60                   | 1. 7200                                                      | 2900     | 1800     | 1200     | 900      | 580      | 360      | 230      | 180      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.14     | 0.18     | 0.22     | 0.3      | 0.4      | 0.45     | 0.5      | 0.6      |    |  |
| Aluminium - Silicon Alloy                              | W (N)          | HSS      | 130 (118)   | Emulsion                       | 30 - 50                   | 1. 6365                                                      | 2535     | 1590     | 1060     | 795      | 510      | 320      | 200      | 160      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.08     | 0.14     | 0.2      | 0.25     | 0.3      | 0.4      | 0.5      | 0.6      |    |  |
| Magnesium Alloy Electron                               | H              | HSS      | 130         | Dry                            | 60 - 100                  | 1. 12740                                                     | 5100     | 3200     | 2100     | 1600     | 1020     | 640      | 400      | 320      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.08                                                      | 0.18     | 0.25     | 0.3      | 0.35     | 0.4      | 0.5      | 0.6      | 0.7      |    |  |
| Zinc                                                   | N              | HSS      | 118         | Emulsion                       | 35 - 50                   | 1. 6800                                                      | 2700     | 1700     | 1130     | 850      | 540      | 340      | 215      | 170      |    |  |
|                                                        | (W)            |          | (130)       |                                |                           | 2. 0.05                                                      | 0.14     | 0.18     | 0.2      | 0.25     | 0.3      | 0.4      | 0.5      | 0.6      |    |  |
| Zinc Alloy                                             |                |          |             |                                |                           |                                                              |          |          |          |          |          |          |          |          |    |  |
| Duroplastic                                            | H              | HSS      | 80          | Compressed -Dry Air            | 10 - 20                   | 1. 2380                                                      | 950      | 595      | 400      | 300      | 190      | 120      | 75       | 60       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.08     | 0.14     | 0.2      | 0.25     | 0.3      | 0.4      | 0.5      | 0.6      |    |  |
| Plastic - Soft                                         | W              | HSS      | 130         | Dry                            | 20 - 40                   | 1. 4745                                                      | 1900     | 1195     | 795      | 595      | 380      | 240      | 150      | 120      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.08     | 0.14     | 0.2      | 0.25     | 0.3      | 0.4      | 0.5      | 0.6      |    |  |
| Plexiglass                                             | H              | HSS - E  | 80          | Water                          | 15 - 25                   | 1. 3185                                                      | 1265     | 795      | 530      | 400      | 255      | 160      | 100      | 80       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.08     | 0.14     | 0.2      | 0.25     | 0.3      | 0.4      | 0.5      | 0.6      |    |  |
| Printing Paper, Fabric Wood                            | W H            | HSS      | 130 80      | Compressed -Dry Air            | 15 - 25                   | 1. 3185                                                      | 1265     | 795      | 530      | 400      | 255      | 160      | 100      | 80       |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.05                                                      | 0.08     | 0.14     | 0.2      | 0.25     | 0.3      | 0.4      | 0.5      | 0.6      |    |  |
| Hard Plastic                                           | H              | HSS - E  | 80          | Compressed -Dry Air            | 15 - 35                   | 1. 3980                                                      | 1585     | 995      | 665      | 495      | 320      | 200      | 125      | 100      |    |  |
|                                                        |                |          |             |                                |                           | 2. 0.08                                                      | 0.18     | 0.25     | 0.3      | 0.35     | 0.4      | 0.5      | 0.6      | 0.7      |    |  |
| Marble - Graphite                                      | H              | HSS - E  | 80          | Compressed -Dry Air            | 3 - 6                     | 1. Manually                                                  | Manually | Manually | Manually | Manually | Manually | Manually | Manually | Manually |    |  |
|                                                        |                |          |             |                                |                           | 2.                                                           |          |          |          |          |          |          |          |          |    |  |



## Straight Shank Twist Drills - ROLL-FORGED

**Application :** Produced by hot roll-forged technology. The high twisting moment and elasticity enable using by hand drilling devices and conventional machinery for low alloyed steel, cast, ferrous and non-ferrous metals.



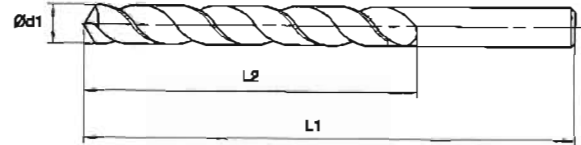
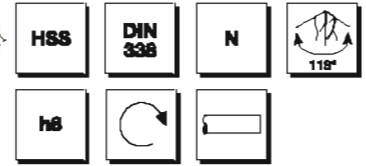
| Product Code | d1 mm | L1 mm | L2 mm | Stock | Product Code | d1 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|--------------|-------|-------|-------|-------|
| B0000000200  | 2,0   | 49    | 24    | •     | B00000010490 | 4,9   | 86    | 52    | •     |
| B00000010210 | 2,1   | 49    | 24    | •     | B00000000500 | 5,0   | 86    | 52    | •     |
| B00000010220 | 2,2   | 53    | 27    | •     | B00000010510 | 5,1   | 86    | 52    | •     |
| B00000010230 | 2,3   | 53    | 27    | •     | B00000010520 | 5,2   | 86    | 52    | •     |
| B00000010240 | 2,4   | 57    | 30    | •     | B00000010530 | 5,3   | 86    | 52    | •     |
| B00000000250 | 2,5   | 57    | 30    | •     | B00000010540 | 5,4   | 83    | 57    | •     |
| B00000010260 | 2,6   | 57    | 30    | •     | B00000000550 | 5,5   | 93    | 57    | •     |
| B00000010270 | 2,7   | 61    | 33    | •     | B00000010560 | 5,6   | 93    | 57    | •     |
| B00000010280 | 2,8   | 61    | 33    | •     | B00000010570 | 5,7   | 93    | 57    | •     |
| B00000010290 | 2,9   | 61    | 33    | •     | B00000010580 | 5,8   | 93    | 57    | •     |
| B00000000300 | 3,0   | 61    | 33    | •     | B00000010590 | 5,9   | 93    | 57    | •     |
| B00000010310 | 3,1   | 65    | 36    | •     | B00000000800 | 6,0   | 93    | 57    | •     |
| B00000010320 | 3,2   | 65    | 36    | •     | B00000010610 | 6,1   | 101   | 63    | •     |
| B00000010330 | 3,3   | 65    | 36    | •     | B00000010620 | 6,2   | 101   | 63    | •     |
| B00000010340 | 3,4   | 70    | 39    | •     | B00000010630 | 6,3   | 101   | 63    | •     |
| B00000000350 | 3,5   | 70    | 39    | •     | B00000010640 | 6,4   | 101   | 63    | •     |
| B00000010360 | 3,6   | 70    | 39    | •     | B00000000850 | 6,5   | 101   | 63    | •     |
| B00000010370 | 3,7   | 70    | 39    | •     | B00000010660 | 6,6   | 101   | 63    | •     |
| B00000010380 | 3,8   | 75    | 43    | •     | B00000010670 | 6,7   | 101   | 63    | •     |
| B00000010390 | 3,9   | 75    | 43    | •     | B00000010680 | 6,8   | 109   | 69    | •     |
| B00000000400 | 4,0   | 75    | 43    | •     | B00000010690 | 6,9   | 109   | 69    | •     |
| B00000010410 | 4,1   | 75    | 43    | •     | B00000000700 | 7,0   | 109   | 69    | •     |
| B00000010420 | 4,2   | 75    | 43    | •     | B00000010710 | 7,1   | 109   | 69    | •     |
| B00000010430 | 4,3   | 80    | 47    | •     | B00000010720 | 7,2   | 109   | 69    | •     |
| B00000010440 | 4,4   | 80    | 47    | •     | B00000010730 | 7,3   | 109   | 69    | •     |
| B00000000450 | 4,5   | 80    | 47    | •     | B00000010740 | 7,4   | 109   | 69    | •     |
| B00000010460 | 4,6   | 80    | 47    | •     | B00000000750 | 7,5   | 109   | 69    | •     |
| B00000010470 | 4,7   | 80    | 47    | •     | B00000010760 | 7,6   | 117   | 75    | •     |
| B00000010480 | 4,8   | 86    | 52    | •     |              |       |       |       |       |

Continued 3. page.



## Straight Shank Twist Drills - ROLL-FORGED

**Application :** Produced by hot roll-forged technology. The high twisting moment and elasticity enable using by hand drilling devices and conventional machinery for low alloyed steel, cast, ferrous and non-ferrous metals.

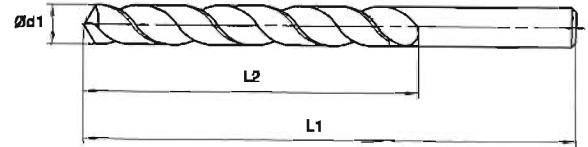
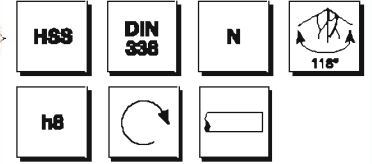


| Product Code | d1 mm | L1 mm | L2 mm | Stock | Product Code | d1 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|--------------|-------|-------|-------|-------|
| B00000010770 | 7,7   | 117   | 75    | •     | B0000001050  | 10,5  | 133   | 87    | •     |
| B00000010780 | 7,8   | 117   | 75    | •     | B00000011060 | 10,6  | 133   | 87    | •     |
| B00000010790 | 7,9   | 117   | 75    | •     | B00000011070 | 10,7  | 142   | 94    | •     |
| B0000000800  | 8,0   | 117   | 75    | •     | B00000011080 | 10,8  | 142   | 94    | •     |
| B00000010810 | 8,1   | 117   | 75    | •     | B00000011090 | 10,9  | 142   | 94    | •     |
| B00000010820 | 8,2   | 117   | 75    | •     | B00000011100 | 11,0  | 142   | 94    | •     |
| B00000010830 | 8,3   | 117   | 75    | •     | B00000011110 | 11,1  | 142   | 94    | •     |
| B00000010840 | 8,4   | 117   | 75    | •     | B00000011120 | 11,2  | 142   | 94    | •     |
| B0000000850  | 8,5   | 117   | 75    | •     | B00000011130 | 11,3  | 142   | 94    | •     |
| B00000010860 | 8,6   | 125   | 81    | •     | B00000011140 | 11,4  | 142   | 94    | •     |
| B00000010870 | 8,7   | 125   | 81    | •     | B00000011150 | 11,5  | 142   | 94    | •     |
| B00000010880 | 8,8   | 125   | 81    | •     | B00000011160 | 11,6  | 142   | 94    | •     |
| B00000010890 | 8,9   | 125   | 81    | •     | B00000011170 | 11,7  | 142   | 94    | •     |
| B0000000900  | 9,0   | 125   | 81    | •     | B00000011180 | 11,8  | 142   | 94    | •     |
| B00000010910 | 9,1   | 125   | 81    | •     | B00000011190 | 11,9  | 151   | 101   | •     |
| B00000010920 | 9,2   | 125   | 81    | •     | B0000001200  | 12,0  | 151   | 101   | •     |
| B00000010930 | 9,3   | 125   | 81    | •     | B00000011210 | 12,1  | 151   | 101   | •     |
| B00000010940 | 9,4   | 125   | 81    | •     | B00000011220 | 12,2  | 151   | 101   | •     |
| B0000000950  | 9,5   | 125   | 81    | •     | B00000011230 | 12,3  | 151   | 101   | •     |
| B00000010960 | 9,6   | 133   | 87    | •     | B00000011240 | 12,4  | 151   | 101   | •     |
| B00000010970 | 9,7   | 133   | 87    | •     | B0000001250  | 12,5  | 151   | 101   | •     |
| B00000010980 | 9,8   | 133   | 87    | •     | B00000011260 | 12,6  | 151   | 101   | •     |
| B00000010990 | 9,9   | 133   | 87    | •     | B00000011270 | 12,7  | 151   | 101   | •     |
| B0000001000  | 10,0  | 133   | 87    | •     | B00000011280 | 12,8  | 151   | 101   | •     |
| B00000011010 | 10,1  | 133   | 87    | •     | B00000011290 | 12,9  | 151   | 101   | •     |
| B00000011020 | 10,2  | 133   | 87    | •     | B0000001300  | 13,0  | 151   | 101   | •     |
| B00000011030 | 10,3  | 133   | 87    | •     | B00000011310 | 13,1  | 151   | 101   | •     |
| B00000011040 | 10,4  | 133   | 87    | •     | B00000011320 | 13,2  | 151   | 101   | •     |



## Straight Shank Twist Drills - GROUND

**Application :** Fully ground, balanced geometry and precise point sharpening provide the size accuracy. Used with stable machines for alloyed and non-alloyed steel, cast steel, gray and malleable cast, die-casting, round cast, hardened iron, graphitic, Al-alloyed and bronze materials.

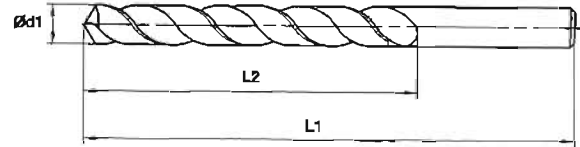
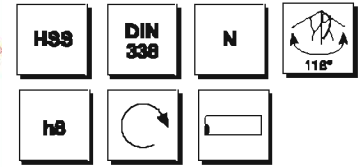


| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|--------------|----------|----------|----------|-------|
| B00007000040 | 0,40     | 20       | 5        | •     | B00007000530 | 5,30     | 86       | 52       | •     |
| B00007000050 | 0,50     | 22       | 6        | •     | B00007000540 | 5,40     | 93       | 57       | •     |
| B00007000060 | 0,60     | 24       | 7        | •     | B00007000550 | 5,50     | 93       | 57       | •     |
| B00007000070 | 0,70     | 28       | 9        | •     | B00007000560 | 5,60     | 93       | 57       | •     |
| B00007000080 | 0,80     | 30       | 10       | •     | B00007000570 | 5,70     | 93       | 57       | •     |
| B00007000090 | 0,90     | 32       | 11       | •     | B00007000580 | 5,80     | 93       | 57       | •     |
| B00007000100 | 1,00     | 34       | 12       | •     | B00007000590 | 5,90     | 93       | 57       | •     |
| B00007000110 | 1,10     | 36       | 14       | •     | B00007000600 | 6,00     | 93       | 57       | •     |
| B00007000120 | 1,20     | 38       | 16       | •     | B00007000610 | 6,10     | 101      | 63       | •     |
| B00007000130 | 1,30     | 38       | 16       | •     | B00007000620 | 6,20     | 101      | 63       | •     |
| B00007000140 | 1,40     | 40       | 18       | •     | B00007000630 | 6,30     | 101      | 63       | •     |
| B00007000150 | 1,50     | 40       | 18       | •     | B00007000640 | 6,40     | 101      | 63       | •     |
| B00007000160 | 1,60     | 43       | 20       | •     | B00007000650 | 6,50     | 101      | 63       | •     |
| B00007000170 | 1,70     | 43       | 20       | •     | B00007000660 | 6,60     | 101      | 63       | •     |
| B00007000180 | 1,80     | 46       | 22       | •     | B00007000670 | 6,70     | 101      | 63       | •     |
| B00007000190 | 1,90     | 46       | 22       | •     | B00007000680 | 6,80     | 109      | 69       | •     |
| B00007000200 | 2,00     | 48       | 24       | •     | B00007000690 | 6,90     | 109      | 69       | •     |
| B00007000210 | 2,10     | 49       | 24       | •     | B00007000700 | 7,00     | 109      | 69       | •     |
| B00007000220 | 2,20     | 53       | 27       | •     | B00007000710 | 7,10     | 109      | 69       | •     |
| B00007000230 | 2,30     | 53       | 27       | •     | B00007000720 | 7,20     | 109      | 69       | •     |
| B00007000240 | 2,40     | 57       | 30       | •     | B00007000730 | 7,30     | 109      | 69       | •     |
| B00007000250 | 2,50     | 57       | 30       | •     | B00007000740 | 7,40     | 109      | 69       | •     |
| B00007000260 | 2,60     | 57       | 30       | •     | B00007000750 | 7,50     | 109      | 69       | •     |
| B00007000270 | 2,70     | 61       | 33       | •     | B00007000760 | 7,60     | 117      | 75       | •     |
| B00007000280 | 2,80     | 61       | 33       | •     | B00007000770 | 7,70     | 117      | 75       | •     |
| B00007000290 | 2,90     | 61       | 33       | •     | B00007000780 | 7,80     | 117      | 75       | •     |
| B00007000300 | 3,00     | 61       | 33       | •     | B00007000790 | 7,90     | 117      | 75       | •     |
| B00007000310 | 3,10     | 65       | 36       | •     | B00007000800 | 8,00     | 117      | 75       | •     |
| B00007000320 | 3,20     | 65       | 36       | •     | B00007000810 | 8,10     | 117      | 75       | •     |
| B00007000330 | 3,30     | 65       | 36       | •     | B00007000820 | 8,20     | 117      | 75       | •     |
| B00007000340 | 3,40     | 70       | 39       | •     | B00007000830 | 8,30     | 117      | 75       | •     |
| B00007000350 | 3,50     | 70       | 39       | •     | B00007000840 | 8,40     | 117      | 75       | •     |
| B00007000360 | 3,60     | 70       | 39       | •     | B00007000850 | 8,50     | 117      | 75       | •     |
| B00007000370 | 3,70     | 70       | 39       | •     | B00007000860 | 8,60     | 125      | 81       | •     |
| B00007000380 | 3,80     | 75       | 43       | •     | B00007000870 | 8,70     | 125      | 81       | •     |
| B00007000390 | 3,90     | 75       | 43       | •     | B00007000880 | 8,80     | 125      | 81       | •     |
| B00007000400 | 4,00     | 75       | 43       | •     | B00007000890 | 8,90     | 125      | 81       | •     |
| B00007000410 | 4,10     | 75       | 43       | •     | B00007000900 | 9,00     | 125      | 81       | •     |
| B00007000420 | 4,20     | 75       | 43       | •     | B00007000910 | 9,10     | 125      | 81       | •     |
| B00007000430 | 4,30     | 80       | 47       | •     | B00007000920 | 9,20     | 125      | 81       | •     |
| B00007000440 | 4,40     | 80       | 47       | •     | B00007000930 | 9,30     | 125      | 81       | •     |
| B00007000450 | 4,50     | 80       | 47       | •     | B00007000940 | 9,40     | 125      | 81       | •     |
| B00007000460 | 4,60     | 80       | 47       | •     | B00007000950 | 9,50     | 125      | 81       | •     |
| B00007000470 | 4,70     | 80       | 47       | •     | B00007000960 | 9,60     | 133      | 87       | •     |
| B00007000480 | 4,80     | 86       | 52       | •     | B00007000970 | 9,70     | 133      | 87       | •     |
| B00007000490 | 4,90     | 86       | 52       | •     | B00007000980 | 9,80     | 133      | 87       | •     |
| B00007000500 | 5,00     | 86       | 52       | •     | B00007000990 | 9,90     | 133      | 87       | •     |
| B00007000510 | 5,10     | 86       | 52       | •     | B00007001000 | 10,00    | 133      | 87       | •     |
| B00007000520 | 5,20     | 86       | 52       | •     | B00007001010 | 10,10    | 133      | 87       | •     |



## Straight Shank Twist Drills - GROUND

**Application :** Fully ground, balanced geometry and precise point sharpening provide the size accuracy. Used with stable machines for alloyed and non-alloyed steel, cast steel, gray and malleable cast, die-casting, round cast, hardened iron, graphitic, Al-alloyed and bronze materials.



| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|--------------|----------|----------|----------|-------|
| B00007001020 | 10,20    | 133      | 87       | •     | B00007001410 | 14,10    | 169      | 114      | •     |
| B00007001030 | 10,30    | 133      | 87       | •     | B00007001420 | 14,20    | 169      | 114      | •     |
| B00007001040 | 10,40    | 133      | 87       | •     | B00007001430 | 14,30    | 169      | 114      | •     |
| B00007001050 | 10,50    | 133      | 87       | •     | B00007001440 | 14,40    | 169      | 114      | •     |
| B00007001060 | 10,60    | 133      | 87       | •     | B00007001450 | 14,50    | 169      | 114      | •     |
| B00007001070 | 10,70    | 142      | 94       | •     | B00007001460 | 14,60    | 169      | 114      | •     |
| B00007001080 | 10,80    | 142      | 94       | •     | B00007001470 | 14,70    | 169      | 114      | •     |
| B00007001090 | 10,90    | 142      | 94       | •     | B00007001480 | 14,80    | 169      | 114      | •     |
| B00007001100 | 11,00    | 142      | 94       | •     | B00007001490 | 14,90    | 169      | 114      | •     |
| B00007001110 | 11,10    | 142      | 94       | •     | B00007001500 | 15,00    | 169      | 114      | •     |
| B00007001120 | 11,20    | 142      | 94       | •     | B00007001510 | 15,10    | 178      | 120      | •     |
| B00007001130 | 11,30    | 142      | 94       | •     | B00007001520 | 15,20    | 178      | 120      | •     |
| B00007001140 | 11,40    | 142      | 94       | •     | B00007001530 | 15,30    | 178      | 120      | •     |
| B00007001150 | 11,50    | 142      | 94       | •     | B00007001540 | 15,40    | 178      | 120      | •     |
| B00007001160 | 11,60    | 142      | 94       | •     | B00007001550 | 15,50    | 178      | 120      | •     |
| B00007001170 | 11,70    | 142      | 94       | •     | B00007001560 | 15,60    | 178      | 120      | •     |
| B00007001180 | 11,80    | 142      | 94       | •     | B00007001570 | 15,70    | 178      | 120      | •     |
| B00007001190 | 11,90    | 151      | 101      | •     | B00007001580 | 15,80    | 178      | 120      | •     |
| B00007001200 | 12,00    | 151      | 101      | •     | B00007001590 | 15,90    | 178      | 120      | •     |
| B00007001210 | 12,10    | 151      | 101      | •     | B00007001600 | 16,00    | 178      | 120      | •     |
| B00007001220 | 12,20    | 151      | 101      | •     | B00007001650 | 16,50    | 184      | 125      | •     |
| B00007001230 | 12,30    | 151      | 101      | •     | B00007001700 | 17,00    | 184      | 125      | •     |
| B00007001240 | 12,40    | 151      | 101      | •     | B00007001750 | 17,50    | 191      | 130      | •     |
| B00007001250 | 12,50    | 151      | 101      | •     | B00007001800 | 18,00    | 191      | 130      | •     |
| B00007001260 | 12,60    | 151      | 101      | •     | B00007001850 | 18,50    | 198      | 135      | •     |
| B00007001270 | 12,70    | 151      | 101      | •     | B00007001900 | 19,00    | 198      | 135      | •     |
| B00007001280 | 12,80    | 151      | 101      | •     | B00007001950 | 19,50    | 205      | 140      | •     |
| B00007001290 | 12,90    | 151      | 101      | •     | B00007002000 | 20,00    | 205      | 140      | •     |
| B00007001300 | 13,00    | 151      | 101      | •     | B00002102050 | 20,50    | 213      | 145      | •     |
| B00007001310 | 13,10    | 151      | 101      | •     | B00002102100 | 21,00    | 213      | 145      | •     |
| B00007001320 | 13,20    | 151      | 101      | •     | B00002102150 | 21,50    | 221      | 150      | •     |
| B00007001330 | 13,30    | 160      | 108      | •     | B00002102200 | 22,00    | 221      | 150      | •     |
| B00007001340 | 13,40    | 160      | 108      | •     | B00002102250 | 22,50    | 229      | 155      | •     |
| B00007001350 | 13,50    | 160      | 108      | •     | B00002102300 | 23,00    | 229      | 155      | •     |
| B00007001360 | 13,60    | 160      | 108      | •     | B00002102350 | 23,50    | 229      | 155      | •     |
| B00007001370 | 13,70    | 160      | 108      | •     | B00002102400 | 24,00    | 236      | 160      | •     |
| B00007001380 | 13,80    | 160      | 108      | •     | B00002102450 | 24,50    | 236      | 160      | •     |
| B00007001390 | 13,90    | 160      | 108      | •     | B00002102500 | 25,00    | 236      | 160      | •     |
| B00007001400 | 14,00    | 160      | 108      | •     |              |          |          |          |       |

H - W TYPES - LEFT HAND AND TIN COATED UPON REQUEST



## Why Use Silver Series Twist Drills?

In the machining world of today, there is not available an economic and suitable for any kind of material universal twist drill yet. On the other hand, in the competitive market conditions, the labor cost and production time per unit are two most important parameters for cutting tool end users with above reasons, Makina Takim Endüstrisi A.Ş., thanking to owned superior technology and accumulated extensive knowledge developed and manufactured a new twist drill, suitable for a certain group of materials. This new product is the Silver Series Twist Drill.

**Silver Series Twist Drills** are suitable and give very good results in ductile and high-alloyed, adhesive and hard-to-machining metals, which blunt quickly the cutting edges.

The using of **Silver Series Twist Drills** in the below specified operating conditions increases the production speed and provides the significant savings in cutting tools cost.

**Silver Series Twist Drills** are special production in terms of geometry, sizes, material and heat treatment conditions.

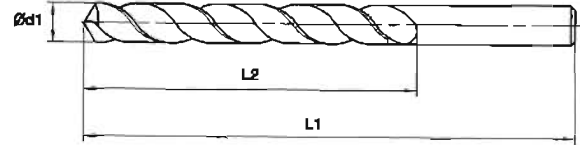
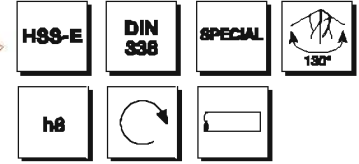
## Application of Silver Series Twist Drills

| Intended Use                 | Material No                                    | DIN Norm                                             | Tensile Strength (N/mm²)                       | Hardness                                        | Cutting Speed (m/min)                  | Coolant                        |                                               |                                        |        |               |                                |    |                |
|------------------------------|------------------------------------------------|------------------------------------------------------|------------------------------------------------|-------------------------------------------------|----------------------------------------|--------------------------------|-----------------------------------------------|----------------------------------------|--------|---------------|--------------------------------|----|----------------|
| Sulphuric Stainless Steel    | 1.4005<br>1.4104<br>1.4105<br>1.4305           | X12CrS13<br>X14CrMoS17<br>X6CrMoS17<br>X8CrNiS18 9   | ≤ 850                                          | 252 HB<br>265 HV <sub>10</sub>                  | 10 - 14                                | Cooling Fluid                  |                                               |                                        |        |               |                                |    |                |
| Austenitic Stainless Steel   | 1.4301<br>1.4541<br>1.4571                     | X5CrNi18 10<br>X6CrNiTi18 10<br>X6CrNiMoTi17 12 2    |                                                |                                                 |                                        |                                |                                               |                                        |        |               |                                |    |                |
| Martensitic Stainless Steel  | 1.4057<br>1.4122<br>1.4521                     | X17CrNi16-1<br>X39CrMo17-1<br>X2CrMoTi18 2           |                                                |                                                 |                                        |                                |                                               |                                        |        |               |                                |    |                |
| Titanium and Titanium Alloys | 3.7024<br>3.7114<br>3.7124<br>3.7154<br>3.7164 | Ti99.5<br>TiAl5Sn2.5<br>TiCu2<br>TiAl6Zr5<br>TiAl6V4 |                                                |                                                 |                                        |                                | ≤ 850                                         | 252 HB<br>265 HV <sub>10</sub>         | 6 - 10 | Cooling Fluid |                                |    |                |
|                              | 3.7184                                         | TiAl4Mo4Sn2.5                                        |                                                |                                                 |                                        |                                | 850 - 1200                                    | 252-352 HB<br>265-374 HV <sub>10</sub> |        |               |                                |    |                |
|                              | Aluminium and Titanium Alloys                  | 3.0255<br>3.2315<br>3.3515                           |                                                |                                                 |                                        |                                | Al 99.5<br>AlMgSi1<br>AlMg1                   | ≤ 850                                  |        |               | 256 HB<br>265 HV <sub>10</sub> | 90 | Oil (Emulsion) |
|                              | Aluminium Alloys                               | 3.0615<br>3.1325<br>3.3245<br>3.4365                 |                                                |                                                 |                                        |                                | AlMgSiPb<br>AlCuMg1<br>AlMg3Si<br>AlZnMgCu1.5 | ≤ 450                                  |        |               | 133 HB<br>265 HV <sub>10</sub> | 90 | Oil (Emulsion) |
|                              |                                                | Aluminium Cast ≤ %10 Si                              | 3.2131<br>3.2153<br>3.2573                     | G-AlSi5Cu1<br>G-AlSi7Cu3<br>G-AlSi9             | ≤ 600                                  | 178 HB<br>187 HV <sub>10</sub> | 55 - 70                                       | Oil (Emulsion)                         |        |               |                                |    |                |
| Aluminium Cast > %10 Si      |                                                | 3.2581<br>3.2583                                     | G-AlSi12<br>G-AlSi12Cu                         |                                                 |                                        |                                |                                               |                                        |        |               |                                |    |                |
| Copper, Low Alloyed          |                                                | 2.0070<br>2.1020<br>2.1096                           | SE-Cu<br>CuSn6<br>G-CuSn5ZnPb                  | ≤ 400                                           | 119 HB<br>125 HV <sub>10</sub>         | 36                             | Oil (Emulsion)                                |                                        |        |               |                                |    |                |
|                              | Brass, Long Chipping                           | 2.0250<br>2.0280<br>2.0332                           | CuZn20<br>CuZn33<br>CuZn37Pb0.5                | ≤ 600                                           | 178 HB<br>187 HV <sub>10</sub>         | 45                             | Oil (Emulsion)                                |                                        |        |               |                                |    |                |
|                              |                                                | Bronze, Long Chipping                                | 2.0916<br>2.0960<br>2.1050<br>2.0980<br>2.1247 | CuAl5<br>CuAl9Mn<br>CuSn10<br>CuAl11Ni<br>CuBe2 | ≤ 850                                  | 252 HB<br>265 HV <sub>10</sub> | 22 - 28                                       | Oil (Emulsion)                         |        |               |                                |    |                |
|                              |                                                |                                                      |                                                | 850 - 1000                                      | 252-298 HB<br>265-314 HV <sub>10</sub> |                                |                                               |                                        |        |               |                                |    |                |



## Straight Shank Twist Drills - SILVER SERIES

**Application :** Ground profile, precise point sharpening and Cobalt alloy provide long tools life and high-speed cutting advantages. Used in CNC and NC machines for alloyed and non-alloyed steel, cast steel, gray and malleable cast, die-casting, sintered iron, graphitic, Al-alloyed and bronze materials.



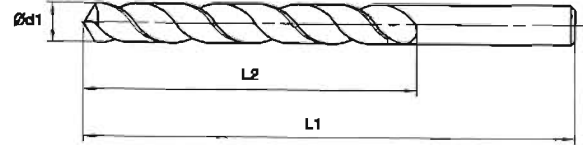
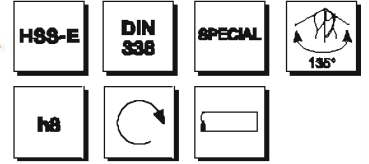
| Product Code  | d1 mm | L1 mm | L2 mm | Stock | Product Code  | d1 mm | L1 mm | L2 mm | Stock |
|---------------|-------|-------|-------|-------|---------------|-------|-------|-------|-------|
| B00005000150G | 1,50  | 40    | 18    | •     | B00005000750G | 7,50  | 109   | 69    | •     |
| B00005000200G | 2,00  | 48    | 24    | •     | B00005000800G | 8,00  | 117   | 75    | •     |
| B00005000250G | 2,50  | 57    | 30    | •     | B00005000820G | 8,20  | 117   | 75    | □     |
| B00005000260G | 2,60  | 57    | 30    | □     | B00005000850G | 8,50  | 117   | 75    | •     |
| B00005000270G | 2,70  | 61    | 33    | □     | B00005000860G | 8,60  | 125   | 81    | □     |
| B00005000280G | 2,80  | 61    | 33    | □     | B00005000870G | 8,70  | 125   | 81    | □     |
| B00005000290G | 2,90  | 61    | 33    | □     | B00005000880G | 8,80  | 125   | 81    | □     |
| B00005000300G | 3,00  | 61    | 33    | •     | B00005000890G | 8,90  | 125   | 81    | □     |
| B00005000320G | 3,20  | 65    | 36    | □     | B00005000900G | 9,00  | 125   | 81    | •     |
| B00005000330G | 3,30  | 65    | 36    | •     | B00005000950G | 9,50  | 125   | 81    | •     |
| B00005000350G | 3,50  | 70    | 39    | •     | B00005001000G | 10,00 | 133   | 87    | •     |
| B00005000370G | 3,70  | 70    | 39    | •     | B00005001020G | 10,20 | 133   | 87    | •     |
| B00005000380G | 3,80  | 75    | 43    | □     | B00005001050G | 10,50 | 133   | 87    | •     |
| B00005000400G | 4,00  | 75    | 43    | •     | B00005001080G | 10,80 | 142   | 94    | •     |
| B00005000420G | 4,20  | 75    | 43    | •     | B00005001100G | 11,00 | 142   | 94    | •     |
| B00005000450G | 4,50  | 80    | 47    | •     | B00005001150G | 11,50 | 142   | 94    | •     |
| B00005000500G | 5,00  | 88    | 52    | •     | B00005001200G | 12,00 | 151   | 101   | •     |
| B00005000510G | 5,10  | 86    | 52    | •     | B00005001250G | 12,50 | 151   | 101   | •     |
| B00005000520G | 5,20  | 86    | 52    | •     | B00005001300G | 13,00 | 151   | 101   | •     |
| B00005000550G | 5,50  | 93    | 57    | •     | B00005001350G | 13,50 | 160   | 108   | •     |
| B00005000600G | 6,00  | 93    | 57    | •     | B00005001400G | 14,00 | 160   | 108   | •     |
| B00005000650G | 6,50  | 101   | 63    | •     | B00005001450G | 14,50 | 169   | 114   | •     |
| B00005000660G | 6,60  | 101   | 63    | •     | B00005001500G | 15,00 | 169   | 114   | •     |
| B00005000680G | 6,80  | 109   | 69    | •     | B00005001550G | 15,50 | 178   | 120   | •     |
| B00005000700G | 7,00  | 109   | 69    | •     | B00005001600G | 16,00 | 178   | 120   | •     |

□ Ask Price and Deadline.



## Straight Shank Twist Drills - GOLD SERIES

**Application :** The special geometry and precise point sharpening provide successful drilling results in hard machining, corroded and acid-resistance steel, high Chrome alloyed heat-resistance steel, steel and cast steel, spring steel, gray cast and malleable cast.



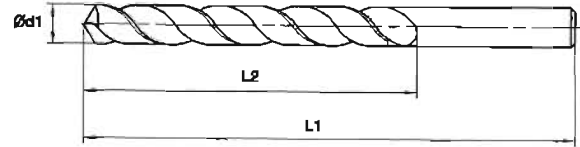
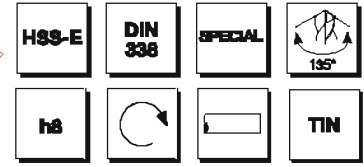
| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|--------------|----------|----------|----------|-------|
| B00005000200 | 2,00     | 49       | 24       | •     | B00005000800 | 8,00     | 117      | 75       | •     |
| B00005000250 | 2,50     | 57       | 30       | •     | B00005000820 | 8,20     | 117      | 75       | •     |
| B00005000280 | 2,80     | 57       | 30       | •     | B00005000850 | 8,50     | 117      | 75       | •     |
| B00005000270 | 2,70     | 61       | 33       | •     | B00005000860 | 8,60     | 125      | 81       | •     |
| B00005000280 | 2,80     | 61       | 33       | •     | B00005000870 | 8,70     | 125      | 81       | •     |
| B00005000290 | 2,90     | 61       | 33       | •     | B00005000880 | 8,80     | 125      | 81       | •     |
| B00005000300 | 3,00     | 61       | 33       | •     | B00005000890 | 8,90     | 125      | 81       | •     |
| B00005000320 | 3,20     | 65       | 36       | •     | B00005000900 | 9,00     | 125      | 81       | •     |
| B00005000330 | 3,30     | 65       | 36       | •     | B00005000950 | 9,50     | 125      | 81       | •     |
| B00005000350 | 3,50     | 70       | 39       | •     | B00005001000 | 10,00    | 133      | 87       | •     |
| B00005000380 | 3,80     | 75       | 43       | •     | B00005001020 | 10,20    | 133      | 87       | ○     |
| B00005000400 | 4,00     | 75       | 43       | •     | B00005001050 | 10,50    | 133      | 87       | •     |
| B00005000420 | 4,20     | 75       | 43       | •     | B00005001080 | 10,80    | 142      | 94       | ○     |
| B00005000450 | 4,50     | 80       | 47       | •     | B00005001100 | 11,00    | 142      | 94       | •     |
| B00005000500 | 5,00     | 86       | 52       | •     | B00005001150 | 11,50    | 142      | 94       | •     |
| B00005000510 | 5,10     | 86       | 52       | ○     | B00005001200 | 12,00    | 151      | 101      | •     |
| B00005000520 | 5,20     | 86       | 52       | •     | B00005001250 | 12,50    | 151      | 101      | •     |
| B00005000550 | 5,50     | 93       | 57       | •     | B00005001300 | 13,00    | 151      | 101      | •     |
| B00005000600 | 6,00     | 93       | 57       | •     | B00005001350 | 13,50    | 160      | 108      | •     |
| B00005000650 | 6,50     | 101      | 63       | •     | B00005001400 | 14,00    | 160      | 108      | •     |
| B00005000680 | 6,80     | 101      | 63       | •     | B00005001450 | 14,50    | 169      | 114      | •     |
| B00005000680 | 6,80     | 109      | 69       | •     | B00005001500 | 15,00    | 169      | 114      | •     |
| B00005000700 | 7,00     | 109      | 69       | •     | B00005001550 | 15,50    | 178      | 120      | •     |
| B00005000750 | 7,50     | 109      | 69       | •     | B00005001600 | 16,00    | 178      | 120      | •     |

○ Ask Price and Deadline.



## Straight Shank Twist Drills - TiN COATED

**Application :** High quality and high-performance drill, with wear resistant TiN coating, high-cutting speed and feed rates. Suitable for alloyed and non-alloyed steel, cast steel, gray cast, malleable and round cast, sintered iron, graphitic, Al-alloyed and bronze materials.



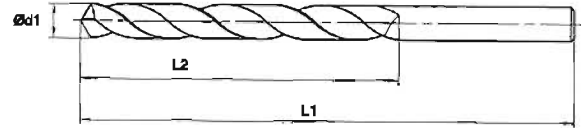
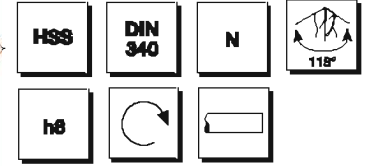
| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|--------------|----------|----------|----------|-------|
| B00006000150 | 1,50     | 40       | 18       | ○     | B00006000850 | 8,50     | 117      | 75       | ●     |
| B00006000200 | 2,00     | 49       | 24       | ●     | B00006000900 | 9,00     | 125      | 81       | ●     |
| B00006000250 | 2,50     | 57       | 30       | ●     | B00006000950 | 9,50     | 125      | 81       | ●     |
| B00006000300 | 3,00     | 61       | 33       | ●     | B00006001000 | 10,00    | 133      | 87       | ●     |
| B00006000330 | 3,30     | 65       | 36       | ●     | B00006001050 | 10,50    | 133      | 87       | ●     |
| B00006000350 | 3,50     | 70       | 39       | ●     | B00006001100 | 11,00    | 142      | 94       | ●     |
| B00006000400 | 4,00     | 75       | 43       | ●     | B00006001150 | 11,50    | 142      | 94       | ●     |
| B00006000420 | 4,20     | 75       | 43       | ●     | B00006001200 | 12,00    | 151      | 101      | ●     |
| B00006000450 | 4,50     | 80       | 47       | ●     | B00006001250 | 12,50    | 151      | 101      | ○     |
| B00006000500 | 5,00     | 86       | 52       | ●     | B00006001300 | 13,00    | 151      | 101      | ○     |
| B00006000550 | 5,50     | 83       | 57       | ●     | B00006001350 | 13,50    | 160      | 108      | ○     |
| B00006000600 | 6,00     | 93       | 57       | ●     | B00006001400 | 14,00    | 160      | 108      | ○     |
| B00006000650 | 6,50     | 101      | 63       | ●     | B00006001450 | 14,50    | 169      | 114      | ○     |
| B00006000680 | 6,80     | 109      | 69       | ●     | B00006001500 | 15,00    | 169      | 114      | ○     |
| B00006000700 | 7,00     | 109      | 69       | ●     | B00006001550 | 15,50    | 178      | 120      | ○     |
| B00006000750 | 7,50     | 109      | 69       | ●     | B00006001800 | 16,00    | 178      | 120      | ○     |
| B00006000800 | 8,00     | 117      | 75       | ●     |              |          |          |          |       |

○ Ask Price and Deadline.



## Straight Shank Twist Drills - LONG SERIES

**Application :** Ground profile and better machining performance for deep drilling. Suitable for gray cast, malleable and round cast, alloyed and non-alloyed steel, sintered iron and aluminium.



| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|
| B00007200150 | 1,50     | 70       | 45       | •     |
| B00007200200 | 2,00     | 85       | 56       | •     |
| B00007200250 | 2,50     | 95       | 62       | •     |
| B00007200300 | 3,00     | 100      | 66       | •     |
| B00007200320 | 3,20     | 106      | 69       | •     |
| B00007200330 | 3,30     | 112      | 73       | •     |
| B00007200350 | 3,50     | 112      | 73       | •     |
| B00007200380 | 3,80     | 119      | 78       | •     |
| B00007200400 | 4,00     | 119      | 78       | •     |
| B00007200420 | 4,20     | 119      | 78       | •     |
| B00007200450 | 4,50     | 126      | 82       | •     |
| B00007200500 | 5,00     | 132      | 87       | •     |
| B00007200550 | 5,50     | 139      | 91       | •     |
| B00007200600 | 6,00     | 139      | 91       | •     |
| B00007200650 | 6,50     | 148      | 97       | •     |
| B00007200700 | 7,00     | 156      | 102      | •     |
| B00007200750 | 7,50     | 156      | 102      | •     |
| B00007200800 | 8,00     | 165      | 109      | •     |
| B00007200850 | 8,50     | 165      | 109      | •     |
| B00007200900 | 9,00     | 175      | 115      | •     |
| B00007200950 | 9,50     | 175      | 115      | •     |
| B00007201000 | 10,00    | 184      | 121      | •     |
| B00007201050 | 10,50    | 184      | 121      | •     |
| B00007201100 | 11,00    | 195      | 128      | •     |
| B00007201150 | 11,50    | 195      | 128      | •     |

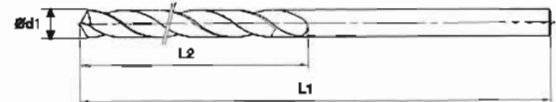
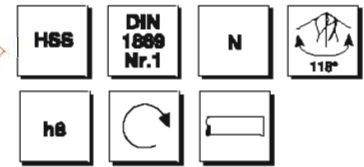
| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|
| B00007201200 | 12,00    | 205      | 134      | •     |
| B00007201250 | 12,50    | 205      | 134      | •     |
| B00007201300 | 13,00    | 205      | 134      | •     |
| B00007201350 | 13,50    | 214      | 140      | •     |
| B00007201400 | 14,00    | 214      | 140      | •     |
| B00007201450 | 14,50    | 220      | 144      | •     |
| B00007201500 | 15,00    | 220      | 144      | •     |
| B00007201550 | 15,50    | 227      | 149      | •     |
| B00007201600 | 16,00    | 227      | 149      | •     |
| B00007201650 | 16,50    | 235      | 154      | •     |
| B00007201700 | 17,00    | 235      | 154      | •     |
| B00007201750 | 17,50    | 241      | 158      | •     |
| B00007201800 | 18,00    | 241      | 158      | •     |
| B00007201850 | 18,50    | 247      | 162      | •     |
| B00007201900 | 19,00    | 247      | 162      | •     |
| B00007201950 | 19,50    | 254      | 166      | •     |
| B00004292000 | 20,00    | 254      | 166      | •     |
| B00004292200 | 22,00    | 268      | 176      | ○     |
| B00004292300 | 23,00    | 275      | 180      | ○     |
| B00004292400 | 24,00    | 282      | 185      | ○     |
| B00004292500 | 25,00    | 282      | 185      | ○     |
| B00004292600 | 26,00    | 290      | 190      | ○     |
| B00004292700 | 27,00    | 298      | 195      | ○     |
| B00004292800 | 28,00    | 298      | 195      | ○     |
| B00004293000 | 30,00    | 307      | 201      | ○     |

○ Ask Price and Deadline.



## Straight Shank Twist Drills - EXTRA LONG SERIES TYPE N

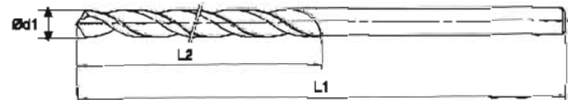
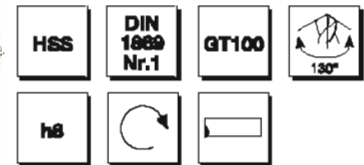
**Application :** Ground profile, round grinding and better machining performance for deeper drilling. Suitable for gray cast, malleable and round cast, alloyed and non-alloyed steel and sintered iron.



| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|--------------|----------|----------|----------|-------|
| B00007500200 | 2,0      | 125      | 85       | •     | B00007500800 | 8,0      | 240      | 185      | •     |
| B00007500250 | 2,5      | 140      | 95       | •     | B00007500850 | 8,5      | 240      | 165      | •     |
| B00007500300 | 3,0      | 150      | 100      | •     | B00007500900 | 9,0      | 250      | 175      | •     |
| B00007500350 | 3,5      | 165      | 115      | •     | B00007500950 | 9,5      | 250      | 175      | •     |
| B00007500400 | 4,0      | 175      | 120      | •     | B00007501000 | 10,0     | 265      | 185      | •     |
| B00007500450 | 4,5      | 185      | 125      | •     | B00007501050 | 10,5     | 265      | 185      | •     |
| B00007500500 | 5,0      | 195      | 135      | •     | B00007501100 | 11,0     | 280      | 195      | •     |
| B00007500550 | 5,5      | 205      | 140      | •     | B00007501150 | 11,5     | 280      | 195      | •     |
| B00007500600 | 6,0      | 205      | 140      | •     | B00007501200 | 12,0     | 295      | 205      | •     |
| B00007500850 | 6,5      | 215      | 150      | •     | B00007501250 | 12,5     | 295      | 205      | •     |
| B00007500700 | 7,0      | 225      | 155      | •     | B00007501300 | 13,0     | 295      | 205      | •     |
| B00007500750 | 7,5      | 225      | 155      | •     |              |          |          |          |       |

## Straight Shank Twist Drills - EXTRA LONG SERIES TYPE GT 100

**Application :** 38° wide Helix angle, point grinding as per DIN 1412/A, strong Web thickness, long flutes. Ideal for 10XD deep drilling. Also known as crankshaft drill bit. Suitable for alloyed and non-alloyed steel, cast steel, gray cast, malleable and round cast, sintered iron, graphite, bronze, sintered iron and Al-alloyed with resistance 900 N/mm<sup>2</sup>.

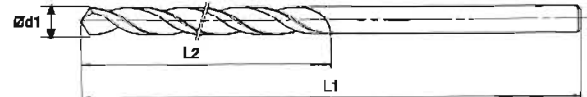
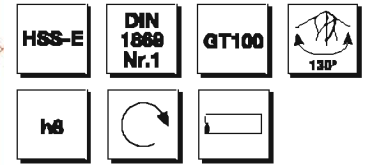


| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|--------------|----------|----------|----------|-------|
| B00007520200 | 2,0      | 125      | 85       | •     | B00007520800 | 8,0      | 240      | 185      | •     |
| B00007520250 | 2,5      | 140      | 95       | •     | B00007520850 | 8,5      | 240      | 165      | •     |
| B00007520300 | 3,0      | 150      | 100      | •     | B00007520900 | 9,0      | 250      | 175      | •     |
| B00007520350 | 3,5      | 165      | 115      | •     | B00007520950 | 9,5      | 250      | 175      | •     |
| B00007520400 | 4,0      | 175      | 120      | •     | B00007521000 | 10,0     | 265      | 185      | •     |
| B00007520450 | 4,5      | 185      | 125      | •     | B00007521050 | 10,5     | 265      | 185      | •     |
| B00007520500 | 5,0      | 195      | 135      | •     | B00007521100 | 11,0     | 280      | 195      | •     |
| B00007520550 | 5,5      | 205      | 140      | •     | B00007521150 | 11,5     | 280      | 195      | •     |
| B00007520600 | 6,0      | 205      | 140      | •     | B00007521200 | 12,0     | 295      | 205      | •     |
| B00007520650 | 6,5      | 215      | 150      | •     | B00007521250 | 12,5     | 295      | 205      | •     |
| B00007520700 | 7,0      | 225      | 155      | •     | B00007521300 | 13,0     | 295      | 205      | •     |
| B00007520750 | 7,5      | 225      | 155      | •     |              |          |          |          |       |



## Straight Shank Twist Drills - EXTRA LONG SERIES TYPE GT 100

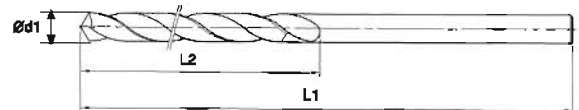
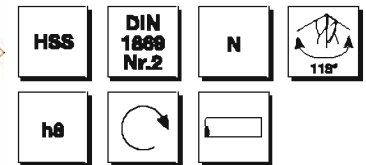
**Application :** Recommended for more hard steel grades, when the operation requires higher performance.



| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|--------------|----------|----------|----------|-------|
| B00005550200 | 2,0      | 125      | 85       | •     | B00005550800 | 8,0      | 240      | 165      | •     |
| B00005550250 | 2,5      | 140      | 95       | •     | B00005550850 | 8,5      | 240      | 165      | •     |
| B00005550300 | 3,0      | 150      | 100      | •     | B00005550900 | 9,0      | 250      | 175      | •     |
| B00005550350 | 3,5      | 165      | 115      | •     | B00005550950 | 9,5      | 250      | 175      | •     |
| B00005550400 | 4,0      | 175      | 120      | •     | B00005551000 | 10,0     | 265      | 185      | •     |
| B00005550450 | 4,5      | 185      | 125      | •     | B00005551050 | 10,5     | 265      | 185      | •     |
| B00005550500 | 5,0      | 195      | 135      | •     | B00005551100 | 11,0     | 280      | 195      | •     |
| B00005550550 | 5,5      | 205      | 140      | •     | B00005551150 | 11,5     | 280      | 195      | •     |
| B00005550800 | 8,0      | 205      | 140      | •     | B00005551200 | 12,0     | 295      | 205      | •     |
| B00005550650 | 6,5      | 215      | 150      | •     | B00005551250 | 12,5     | 295      | 205      | •     |
| B00005550700 | 7,0      | 225      | 155      | •     | B00005551300 | 13,0     | 295      | 205      | •     |
| B00005550750 | 7,5      | 225      | 155      | •     |              |          |          |          |       |

## Straight Shank Twist Drills - EXTRA LONG SERIES TYPE N

**Application :** Ground profile, round grinding and better machining performance for more deeper drilling. Suitable for gray cast, malleable and round cast, alloyed and non-alloyed steel and sintered iron.

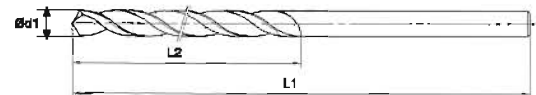
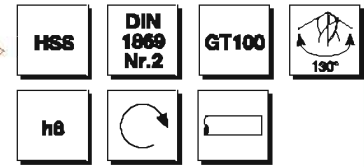


| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|--------------|----------|----------|----------|-------|
| B00007530300 | 3,0      | 190      | 130      | •     | B00007530850 | 8,5      | 305      | 210      | •     |
| B00007530350 | 3,5      | 210      | 145      | •     | B00007530900 | 9,0      | 320      | 220      | •     |
| B00007530400 | 4,0      | 220      | 150      | •     | B00007530950 | 9,5      | 320      | 220      | •     |
| B00007530450 | 4,5      | 235      | 160      | •     | B00007531000 | 10,0     | 340      | 235      | •     |
| B00007530500 | 5,0      | 245      | 170      | •     | B00007531050 | 10,5     | 340      | 235      | •     |
| B00007530550 | 5,5      | 260      | 180      | •     | B00007531100 | 11,0     | 365      | 250      | •     |
| B00007530600 | 6,0      | 260      | 180      | •     | B00007531150 | 11,5     | 365      | 250      | •     |
| B00007530850 | 6,5      | 275      | 190      | •     | B00007531200 | 12,0     | 375      | 260      | •     |
| B00007530700 | 7,0      | 290      | 200      | •     | B00007531250 | 12,5     | 375      | 260      | •     |
| B00007530750 | 7,5      | 290      | 200      | •     | B00007531300 | 13,0     | 375      | 260      | •     |
| B00007530800 | 8,0      | 305      | 210      | •     |              |          |          |          |       |



## Straight Shank Twist Drills - EXTRA LONG SERIES TYPE GT 100

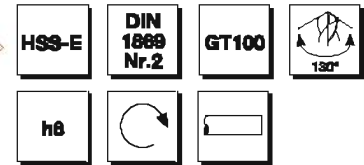
**Application:** 38° wide Helix angle, point grinding as per DIN 1412/A, a strong web thickness, long flutes. Ideal for 10XD deep drilling. Also known as crankshaft drill bit. Suitable for alloyed and non-alloyed steel, cast steel, gray cast, malleable and round cast, sintered iron, graphitic, bronze and Al-alloyed with resistance 900 N/mm<sup>2</sup>.



| Product Code | d1 mm | L1 mm | L2 mm | Stock | Product Code | d1 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|--------------|-------|-------|-------|-------|
| B00007550300 | 3,0   | 190   | 130   | •     | B00007550850 | 8,5   | 305   | 210   | •     |
| B00007550350 | 3,5   | 210   | 145   | •     | B00007550900 | 9,0   | 320   | 220   | •     |
| B00007550400 | 4,0   | 220   | 150   | •     | B00007550950 | 9,5   | 320   | 220   | •     |
| B00007550450 | 4,5   | 235   | 180   | •     | B00007551000 | 10,0  | 340   | 235   | •     |
| B00007550500 | 5,0   | 245   | 170   | •     | B00007551050 | 10,5  | 340   | 235   | •     |
| B00007550550 | 5,5   | 260   | 180   | •     | B00007551100 | 11,0  | 365   | 250   | •     |
| B00007550600 | 6,0   | 260   | 180   | •     | B00007551150 | 11,5  | 365   | 250   | •     |
| B00007550650 | 6,5   | 275   | 190   | •     | B00007551200 | 12,0  | 375   | 260   | •     |
| B00007550700 | 7,0   | 290   | 200   | •     | B00007551250 | 12,5  | 375   | 260   | •     |
| B00007550750 | 7,5   | 290   | 200   | •     | B00007551300 | 13,0  | 375   | 260   | •     |
| B00007550800 | 8,0   | 305   | 210   | •     |              |       |       |       |       |

## Straight Shank Twist Drills - EXTRA LONG SERIES TYPE GT 100

**Application :** Recommended for steels with high hardness value, when is required higher performance.

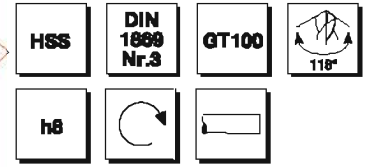


| Product Code | d1 mm | L1 mm | L2 mm | Stock | Product Code | d1 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|--------------|-------|-------|-------|-------|
| B00005610300 | 3,0   | 190   | 130   | •     | B00005610850 | 8,5   | 305   | 210   | •     |
| B00005610350 | 3,5   | 210   | 145   | •     | B00005610900 | 9,0   | 320   | 220   | •     |
| B00005610400 | 4,0   | 220   | 150   | •     | B00005610950 | 9,5   | 320   | 220   | •     |
| B00005610450 | 4,5   | 235   | 160   | •     | B00005611000 | 10,0  | 340   | 235   | •     |
| B00005610500 | 5,0   | 245   | 170   | •     | B00005611050 | 10,5  | 340   | 235   | •     |
| B00005610550 | 5,5   | 260   | 180   | •     | B00005611100 | 11,0  | 365   | 250   | •     |
| B00005610600 | 6,0   | 260   | 180   | •     | B00005611150 | 11,5  | 365   | 250   | •     |
| B00005610650 | 6,5   | 275   | 190   | •     | B00005611200 | 12,0  | 375   | 260   | •     |
| B00005610700 | 7,0   | 290   | 200   | •     | B00005611250 | 12,5  | 375   | 260   | •     |
| B00005610750 | 7,5   | 290   | 200   | •     | B00005611300 | 13,0  | 375   | 260   | •     |
| B00005610800 | 8,0   | 305   | 210   | •     |              |       |       |       |       |



## Straight Shank Twist Drills - EXTRA LONG SERIES TYPE N

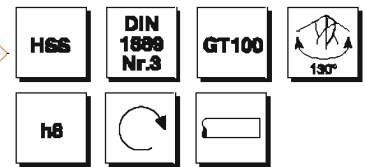
**Application :** Ground profile and better machining performance for more deeper drilling. Suitable for gray cast, malleable and round cast, alloyed and non-alloyed steel and sintered iron.



| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|--------------|----------|----------|----------|-------|
| B00007580350 | 3,5      | 265      | 180      | •     | B00007580850 | 8,5      | 390      | 265      | •     |
| B00007580400 | 4,0      | 280      | 190      | •     | B00007580900 | 9,0      | 410      | 280      | •     |
| B00007580450 | 4,5      | 295      | 200      | •     | B00007580950 | 9,5      | 410      | 280      | •     |
| B00007580500 | 5,0      | 315      | 210      | •     | B00007581000 | 10,0     | 430      | 295      | •     |
| B00007580550 | 5,5      | 330      | 225      | •     | B00007581050 | 10,5     | 430      | 295      | •     |
| B00007580600 | 6,0      | 330      | 225      | •     | B00007581100 | 11,0     | 455      | 310      | •     |
| B00007580650 | 6,5      | 350      | 235      | •     | B00007581150 | 11,5     | 455      | 310      | •     |
| B00007580700 | 7,0      | 370      | 250      | •     | B00007581200 | 12,0     | 480      | 330      | •     |
| B00007580750 | 7,5      | 370      | 250      | •     | B00007581250 | 12,5     | 480      | 330      | •     |
| B00007580800 | 8,0      | 390      | 265      | •     | B00007581300 | 13,0     | 480      | 330      | •     |

## Straight Shank Twist Drills - EXTRA LONG SERIES TYPE GT 100

**Application:** Wide Helix angle 35° - 38°, point grinding as per DIN 1412/A, a strong web thickness, long flutes. Ideal for very deep drilling. Suitable for alloyed and non-alloyed steel, cast steel, gray cast, malleable and round cast, sintered iron, graphitic, bronze and Al- alloys with resistance 900 N/mm<sup>2</sup>.

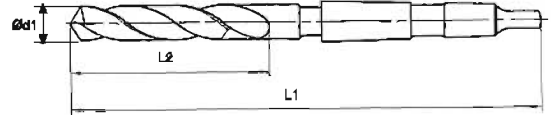
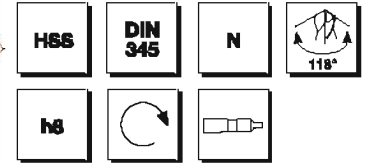


| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|--------------|----------|----------|----------|-------|
| B00007580350 | 3,5      | 265      | 180      | •     | B00007580850 | 8,5      | 390      | 265      | •     |
| B00007580400 | 4,0      | 280      | 190      | •     | B00007580900 | 9,0      | 410      | 280      | •     |
| B00007580450 | 4,5      | 295      | 200      | •     | B00007580950 | 9,5      | 410      | 280      | •     |
| B00007580500 | 5,0      | 315      | 210      | •     | B00007581000 | 10,0     | 430      | 295      | •     |
| B00007580550 | 5,5      | 330      | 225      | •     | B00007581050 | 10,5     | 430      | 295      | •     |
| B00007580600 | 6,0      | 330      | 225      | •     | B00007581100 | 11,0     | 455      | 310      | •     |
| B00007580650 | 6,5      | 350      | 235      | •     | B00007581150 | 11,5     | 455      | 310      | •     |
| B00007580700 | 7,0      | 370      | 250      | •     | B00007581200 | 12,0     | 480      | 330      | •     |
| B00007580750 | 7,5      | 370      | 250      | •     | B00007581250 | 12,5     | 480      | 330      | •     |
| B00007580800 | 8,0      | 390      | 265      | •     | B00007581300 | 13,0     | 480      | 330      | •     |



## Morse Taper Shank Twist Drills

**Application :** High performance drill, suitable for alloyed and non-alloyed steel, cast steel, gray cast, malleable and round cast, sintered iron, graphitic, bronze, Al and Aluminium alloys with resistance 900 N/mm<sup>2</sup>.



| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Morse<br>Taper | Stock |
|--------------|----------|----------|----------|----------------|-------|
| B00007400800 | 8,00     | 158      | 75       | 1              | •     |
| B00007400850 | 8,50     | 156      | 75       | 1              | •     |
| B00007400900 | 9,00     | 162      | 81       | 1              | •     |
| B00007400950 | 9,50     | 162      | 81       | 1              | •     |
| B00007401000 | 10,00    | 168      | 87       | 1              | •     |
| B00007401050 | 10,50    | 168      | 87       | 1              | •     |
| B00007401100 | 11,00    | 175      | 94       | 1              | •     |
| B00007401150 | 11,50    | 175      | 94       | 1              | •     |
| B00007401200 | 12,00    | 182      | 101      | 1              | •     |
| B00007401250 | 12,50    | 182      | 101      | 1              | •     |
| B00007401300 | 13,00    | 182      | 101      | 1              | •     |
| B00007401350 | 13,50    | 189      | 108      | 1              | •     |
| B00007401400 | 14,00    | 189      | 108      | 1              | •     |
| B00007401450 | 14,50    | 212      | 114      | 2              | •     |
| B00007401500 | 15,00    | 212      | 114      | 2              | •     |
| B00007401550 | 15,50    | 218      | 120      | 2              | •     |
| B00007401600 | 16,00    | 218      | 120      | 2              | •     |
| B00007401650 | 16,50    | 223      | 125      | 2              | •     |
| B00007401700 | 17,00    | 223      | 125      | 2              | •     |
| B00007401750 | 17,50    | 228      | 130      | 2              | •     |
| B00007401800 | 18,00    | 228      | 130      | 2              | •     |
| B00007401850 | 18,50    | 233      | 135      | 2              | •     |
| B00007401900 | 19,00    | 233      | 135      | 2              | •     |
| B00007401950 | 19,50    | 238      | 140      | 2              | •     |
| B00007402000 | 20,00    | 238      | 140      | 2              | •     |
| B00004002050 | 20,50    | 243      | 145      | 2              | •     |
| B00004002100 | 21,00    | 243      | 145      | 2              | •     |
| B00004002150 | 21,50    | 248      | 150      | 2              | •     |
| B00004002200 | 22,00    | 248      | 150      | 2              | •     |
| B00004002250 | 22,50    | 253      | 155      | 2              | •     |
| B00004002300 | 23,00    | 253      | 155      | 2              | •     |
| B00004002350 | 23,50    | 276      | 155      | 3              | •     |
| B00004002400 | 24,00    | 281      | 160      | 3              | •     |
| B00004002450 | 24,50    | 281      | 160      | 3              | •     |
| B00004002500 | 25,00    | 281      | 160      | 3              | •     |
| B00004002550 | 25,50    | 288      | 165      | 3              | •     |
| B00004002600 | 26,00    | 286      | 165      | 3              | •     |
| B00004002650 | 26,50    | 286      | 165      | 3              | •     |

| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Morse<br>Taper | Stock |
|--------------|----------|----------|----------|----------------|-------|
| B00004002700 | 27,00    | 291      | 170      | 3              | •     |
| B00004002750 | 27,50    | 291      | 170      | 3              | •     |
| B00004002800 | 28,00    | 291      | 170      | 3              | •     |
| B00004002850 | 28,50    | 296      | 175      | 3              | •     |
| B00004002900 | 29,00    | 296      | 175      | 3              | •     |
| B00004002950 | 29,50    | 296      | 175      | 3              | •     |
| B00004003000 | 30,00    | 296      | 175      | 3              | •     |
| B00004003050 | 30,50    | 301      | 180      | 3              | •     |
| B00004003100 | 31,00    | 301      | 180      | 3              | •     |
| B00004003150 | 31,50    | 301      | 180      | 3              | •     |
| B00004003200 | 32,00    | 334      | 185      | 4              | •     |
| B00004003250 | 32,50    | 334      | 185      | 4              | •     |
| B00004003300 | 33,00    | 334      | 185      | 4              | •     |
| B00004003350 | 33,50    | 334      | 185      | 4              | •     |
| B00004003400 | 34,00    | 339      | 190      | 4              | •     |
| B00004003450 | 34,50    | 339      | 190      | 4              | •     |
| B00004003500 | 35,00    | 339      | 190      | 4              | •     |
| B00004003550 | 35,50    | 339      | 190      | 4              | •     |
| B00004003600 | 36,00    | 344      | 195      | 4              | •     |
| B00004003650 | 36,50    | 344      | 195      | 4              | •     |
| B00004003700 | 37,00    | 344      | 195      | 4              | •     |
| B00004003750 | 37,50    | 344      | 195      | 4              | •     |
| B00004003800 | 38,00    | 349      | 200      | 4              | •     |
| B00004003850 | 38,50    | 349      | 200      | 4              | •     |
| B00004003900 | 39,00    | 349      | 200      | 4              | •     |
| B00004003950 | 39,50    | 349      | 200      | 4              | •     |
| B00004004000 | 40,00    | 349      | 200      | 4              | •     |
| B00004004100 | 41,00    | 354      | 205      | 4              | ○     |
| B00004004200 | 42,00    | 354      | 205      | 4              | ○     |
| B00004004300 | 43,00    | 359      | 210      | 4              | ○     |
| B00004004400 | 44,00    | 359      | 210      | 4              | ○     |
| B00004004500 | 45,00    | 359      | 210      | 4              | ○     |
| B00004004600 | 46,00    | 364      | 215      | 4              | ○     |
| B00004004700 | 47,00    | 364      | 215      | 4              | ○     |
| B00004004800 | 48,00    | 369      | 220      | 4              | ○     |
| B00004004900 | 49,00    | 369      | 220      | 4              | ○     |
| B00004005000 | 50,00    | 369      | 220      | 4              | ○     |

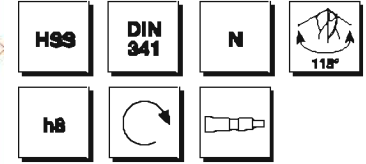
○ Ask Price and Deadline.

HSS-E (%5 Co) AVAILABLE UPON REQUEST



## Morse Taper Shank Twist Drills - LONG SERIES

**Application :** High performance drill, suitable for alloyed and non-alloyed steel, cast steel, gray cast, malleable and round cast, sintered iron, graphitic, bronze, Al and Aluminium alloys with resistance 900 N/mm<sup>2</sup>.



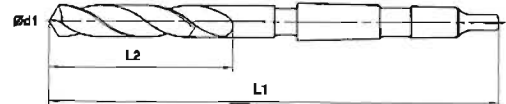
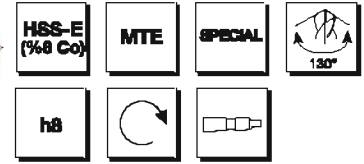
| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Morse<br>Taper | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Morse<br>Taper | Stock |
|--------------|----------|----------|----------|----------------|-------|--------------|----------|----------|----------|----------------|-------|
| B00007301200 | 12,0     | 215      | 134      | 1              | •     | B00004423000 | 30,0     | 351      | 230      | 3              | •     |
| B00007301250 | 12,5     | 215      | 134      | 1              | •     | B00004423100 | 31,0     | 360      | 239      | 3              | ◦     |
| B00007301300 | 13,0     | 215      | 134      | 1              | •     | B00004423200 | 32,0     | 367      | 248      | 4              | ◦     |
| B00007301350 | 13,5     | 223      | 142      | 1              | •     | B00004433300 | 33,0     | 397      | 248      | 4              | ◦     |
| B00007301400 | 14,0     | 223      | 142      | 1              | •     | B00004423400 | 34,0     | 406      | 257      | 4              | ◦     |
| B00007301450 | 14,5     | 245      | 147      | 2              | •     | B00004423500 | 35,0     | 406      | 257      | 4              | ◦     |
| B00007301500 | 15,0     | 245      | 147      | 2              | •     | B00004423600 | 36,0     | 416      | 267      | 4              | ◦     |
| B00007301600 | 16,0     | 251      | 153      | 2              | •     | B00004423700 | 37,0     | 416      | 267      | 4              | ◦     |
| B00007301700 | 17,0     | 257      | 159      | 2              | •     | B00004423800 | 38,0     | 426      | 277      | 4              | ◦     |
| B00007301800 | 18,0     | 263      | 165      | 2              | •     | B00004423900 | 39,0     | 426      | 277      | 4              | ◦     |
| B00007301900 | 19,0     | 269      | 171      | 2              | •     | B00004424000 | 40,0     | 426      | 277      | 4              | ◦     |
| B00007302000 | 20,0     | 275      | 177      | 2              | •     | B00004424100 | 41,0     | 436      | 287      | 4              | ◦     |
| B00004422100 | 21,0     | 282      | 184      | 2              | •     | B00004424200 | 42,0     | 436      | 287      | 4              | ◦     |
| B00004422200 | 22,0     | 289      | 191      | 2              | •     | B00004424300 | 43,0     | 447      | 298      | 4              | ◦     |
| B00004422300 | 23,0     | 296      | 198      | 2              | •     | B00004424400 | 44,0     | 447      | 298      | 4              | ◦     |
| B00004422400 | 24,0     | 327      | 206      | 3              | •     | B00004424500 | 45,0     | 447      | 298      | 4              | ◦     |
| B00004422500 | 25,0     | 327      | 206      | 3              | •     | B00004424600 | 46,0     | 459      | 310      | 4              | ◦     |
| B00004422600 | 26,0     | 335      | 214      | 3              | •     | B00004424700 | 47,0     | 459      | 310      | 4              | ◦     |
| B00004422700 | 27,0     | 343      | 222      | 3              | •     | B00004424800 | 48,0     | 470      | 321      | 4              | ◦     |
| B00004422800 | 28,0     | 343      | 222      | 3              | •     | B00004424900 | 49,0     | 470      | 321      | 4              | ◦     |
| B00004422900 | 29,0     | 351      | 230      | 3              | •     | B00004425000 | 50,0     | 470      | 321      | 4              | ◦     |

◦ Ask Price and Deadline.



## MTE Hardox Drilling Bits

**Application :** Suitable for Hardox 400-500 steel and similar hard materials, in producing blades for heavy construction machines.



| Product Code | d1 mm | L1 mm | L2 mm | Morse Taper | Stock | Product Code | d1 mm | L1 mm | L2 mm | Morse Taper | Stock |
|--------------|-------|-------|-------|-------------|-------|--------------|-------|-------|-------|-------------|-------|
| B00002531300 | 13,0  | 177   | 81    | 2           | •     | B00002532400 | 24,0  | 220   | 105   | 3           | •     |
| B00002531350 | 13,5  | 177   | 81    | 2           | •     | B00002532450 | 24,5  | 223   | 108   | 3           | •     |
| B00002531400 | 14,0  | 182   | 86    | 2           | •     | B00002532500 | 25,0  | 223   | 108   | 3           | •     |
| B00002531450 | 14,5  | 182   | 86    | 2           | •     | B00002532550 | 25,5  | 223   | 108   | 3           | •     |
| B00002531500 | 15,0  | 185   | 89    | 2           | •     | B00002532600 | 26,0  | 223   | 108   | 3           | •     |
| B00002531550 | 15,5  | 185   | 89    | 2           | •     | B00002532650 | 26,5  | 223   | 108   | 3           | •     |
| B00002531600 | 16,0  | 185   | 89    | 2           | •     | B00002532700 | 27,0  | 254   | 124   | 4           | •     |
| B00002531650 | 16,5  | 185   | 89    | 2           | •     | B00002532750 | 27,5  | 254   | 124   | 4           | •     |
| B00002531700 | 17,0  | 188   | 92    | 2           | •     | B00002532800 | 28,0  | 254   | 124   | 4           | •     |
| B00002531750 | 17,5  | 188   | 92    | 2           | •     | B00002532850 | 28,5  | 254   | 124   | 4           | •     |
| B00002531800 | 18,0  | 188   | 92    | 2           | •     | B00002532900 | 29,0  | 254   | 124   | 4           | •     |
| B00002531850 | 18,5  | 211   | 95    | 3           | •     | B00002532950 | 29,5  | 254   | 124   | 4           | •     |
| B00002531900 | 19,0  | 211   | 95    | 3           | •     | B00002533000 | 30,0  | 254   | 124   | 4           | •     |
| B00002531950 | 19,5  | 211   | 95    | 3           | •     | B00002533200 | 32,0  | 263   | 133   | 4           | •     |
| B00002532000 | 20,0  | 211   | 95    | 3           | •     | B00002533250 | 32,5  | 263   | 133   | 4           | •     |
| B00002532050 | 20,5  | 211   | 95    | 3           | •     | B00002533300 | 33,0  | 263   | 133   | 4           | •     |
| B00002532100 | 21,0  | 220   | 105   | 3           | •     | B00002533350 | 33,5  | 263   | 133   | 4           | •     |
| B00002532150 | 21,5  | 220   | 105   | 3           | •     | B00002533400 | 34,0  | 276   | 146   | 4           | •     |
| B00002532200 | 22,0  | 220   | 105   | 3           | •     | B00002533450 | 34,5  | 276   | 146   | 4           | •     |
| B00002532250 | 22,5  | 220   | 105   | 3           | •     | B00002533500 | 35,0  | 281   | 146   | 4           | •     |
| B00002532300 | 23,0  | 220   | 105   | 3           | •     | B00002533550 | 35,5  | 281   | 146   | 4           | •     |
| B00002532350 | 23,5  | 220   | 105   | 3           | •     | B00002533600 | 36,0  | 281   | 146   | 4           | •     |

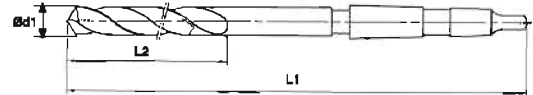
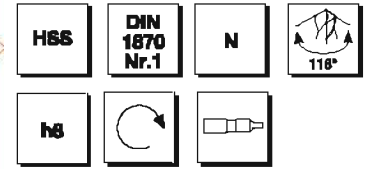
## Recommended Operating Values for Hardox HSS-E Special Twist Drills

| STEEL MATERIAL                      | DRILL BIT<br>TYPE | DRILL BIT<br>MATERIAL | POINT ANGLE | COOLING<br>AND<br>CUTTING<br>FLUID | CUTTING<br>SPEED m/min | * 1) REVOLUTION rev/min 2) FEED, (mm/rev) |                 |      |      |      |      |      |      |      |      |      |      |      |  |
|-------------------------------------|-------------------|-----------------------|-------------|------------------------------------|------------------------|-------------------------------------------|-----------------|------|------|------|------|------|------|------|------|------|------|------|--|
|                                     |                   |                       |             |                                    |                        | *                                         | DRILL DIAMETERS |      |      |      |      |      |      |      |      |      |      |      |  |
|                                     |                   |                       |             |                                    |                        |                                           | Ø5              | Ø8   | Ø10  | Ø12  | Ø14  | Ø16  | Ø20  | Ø25  | Ø30  | Ø40  | Ø50  | Ø63  |  |
| MANGANESE ALLOYED HARD STEEL        | SPECIAL           | HSS-E                 | 130°        | EMULSION                           | 3-5                    | 1                                         | 255             | 180  | 127  | 105  | 90   | 80   | 64   | 50   | 42   | 30   | 25   | 20   |  |
|                                     |                   |                       |             |                                    |                        | 2                                         | 0.05            | 0.08 | 0.10 | 0.12 | 0.12 | 0.14 | 0.18 | 0.18 | 0.20 | 0.23 | 0.25 | 0.27 |  |
| SPRING STEEL                        | SPECIAL           | HSS-E                 | 130°        | EMULSION                           | 5-10                   | 1                                         | 635             | 400  | 318  | 265  | 227  | 200  | 158  | 125  | 108  | 80   | 64   | 50   |  |
|                                     |                   |                       |             |                                    |                        | 2                                         | 0.05            | 0.08 | 0.10 | 0.12 | 0.12 | 0.14 | 0.18 | 0.18 | 0.20 | 0.23 | 0.25 | 0.27 |  |
| TITANIUM AND TITANIUM ALLOYED STEEL | SPECIAL           | HSS-E                 | 130°        | EMULSION                           | 3-6                    | 1                                         | 285             | 180  | 160  | 120  | 112  | 90   | 78   | 60   | 54   | 35   | 32   | 20   |  |
|                                     |                   |                       |             |                                    |                        | 2                                         | 0.05            | 0.08 | 0.10 | 0.12 | 0.12 | 0.14 | 0.18 | 0.18 | 0.20 | 0.23 | 0.25 | 0.27 |  |
| HARDOX 400 STEEL / HARDOX 500 STEEL | SPECIAL           | HSS-E                 | 130°        | EMULSION                           | 5-9                    | 1                                         | 445             | 280  | 222  | 180  | 180  | 148  | 112  | 89   | 75   | 58   | 44   | 38   |  |
|                                     |                   |                       |             |                                    |                        | 2                                         | 0.05            | 0.05 | 0.14 | 0.18 | 0.18 | 0.20 | 0.23 | 0.23 | 0.25 | 0.30 | 0.35 | 0.35 |  |



## Morse Taper Shank Twist Drills - EXTRA LONG SERIES

**Application :** Suitable for deep drilling in alloyed and non-alloyed steels, cast and similar materials.



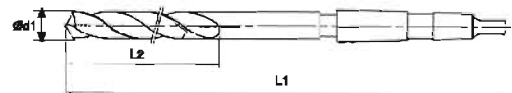
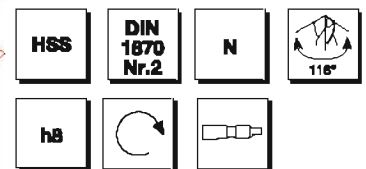
| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Morse<br>Taper | Stock |
|--------------|----------|----------|----------|----------------|-------|
| B00007701000 | 10,0     | 285      | 185      | 1              | ○     |
| B00007701100 | 11,0     | 300      | 195      | 1              | ○     |
| B00007701200 | 12,0     | 310      | 205      | 1              | ○     |
| B00007701300 | 13,0     | 310      | 205      | 1              | ○     |
| B00007701400 | 14,0     | 325      | 220      | 1              | ○     |
| B00007701500 | 15,0     | 340      | 220      | 2              | ○     |
| B00007701600 | 16,0     | 355      | 230      | 2              | ○     |
| B00007701700 | 17,0     | 355      | 230      | 2              | ○     |
| B00007701800 | 18,0     | 370      | 245      | 2              | ○     |
| B00007701900 | 19,0     | 370      | 245      | 2              | ○     |
| B00007702000 | 20,0     | 385      | 260      | 2              | ○     |
| B00004512100 | 21,0     | 385      | 260      | 2              | ○     |
| B00004512200 | 22,0     | 405      | 270      | 2              | ○     |
| B00004512300 | 23,0     | 405      | 270      | 2              | ○     |

| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Morse<br>Taper | Stock |
|--------------|----------|----------|----------|----------------|-------|
| B00004512400 | 24,0     | 440      | 290      | 3              | ○     |
| B00004512500 | 25,0     | 440      | 290      | 3              | ○     |
| B00004512600 | 26,0     | 440      | 290      | 3              | ○     |
| B00004512700 | 27,0     | 460      | 305      | 3              | ○     |
| B00004512800 | 28,0     | 460      | 305      | 3              | ○     |
| B00004512900 | 29,0     | 480      | 305      | 3              | ○     |
| B00004513000 | 30,0     | 480      | 305      | 3              | ○     |
| B00004513100 | 31,0     | 480      | 320      | 3              | ○     |
| B00004513200 | 32,0     | 505      | 320      | 4              | ○     |
| B00004513300 | 33,0     | 505      | 320      | 4              | ○     |
| B00004513400 | 34,0     | 530      | 340      | 4              | ○     |
| B00004513500 | 35,0     | 530      | 340      | 4              | ○     |
| B00004513600 | 36,0     | 530      | 340      | 4              | ○     |

○ Ask Price and Deadline.

## Morse Taper Shank Twist Drills - EXTRA LONG SERIES

**Application:** Suitable for deep drilling in alloyed and non-alloyed steels, cast and similar materials.



| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Morse<br>Taper | Stock |
|--------------|----------|----------|----------|----------------|-------|
| B00007731400 | 14,0     | 410      | 275      | 1              | ○     |
| B00007731500 | 15,0     | 425      | 275      | 2              | ○     |
| B00007731600 | 16,0     | 445      | 295      | 2              | ○     |
| B00007731700 | 17,0     | 445      | 295      | 2              | ○     |
| B00007731800 | 18,0     | 465      | 310      | 2              | ○     |
| B00007731900 | 19,0     | 485      | 310      | 2              | ○     |
| B00007732000 | 20,0     | 490      | 325      | 2              | ○     |
| B00004602100 | 21,0     | 490      | 325      | 2              | ○     |
| B00004602200 | 22,0     | 515      | 345      | 2              | ○     |

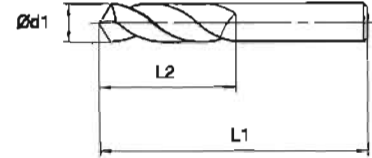
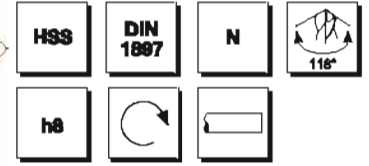
| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Morse<br>Taper | Stock |
|--------------|----------|----------|----------|----------------|-------|
| B00004602300 | 23,0     | 515      | 345      | 2              | ○     |
| B00004602400 | 24,0     | 555      | 365      | 3              | ○     |
| B00004602500 | 25,0     | 555      | 365      | 3              | ○     |
| B00004602600 | 26,0     | 555      | 365      | 3              | ○     |
| B00004602700 | 27,0     | 580      | 385      | 3              | ○     |
| B00004602800 | 28,0     | 580      | 385      | 3              | ○     |
| B00004602900 | 29,0     | 580      | 385      | 3              | ○     |
| B00004603000 | 30,0     | 580      | 385      | 3              | ○     |

○ Ask Price and Deadline.



## Straight Shank Twist Drills - SHORT SERIES

**Application:** The short length provides stability, which decreases the breaking risks. Due to this advantageous feature, suitable for batch production in drilling the sheets of alloyed and non-alloyed steel with hand devices or automatic machines.



| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock | Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|--------------|----------|----------|----------|-------|
| B00007800200 | 2,00     | 38       | 12       | •     | B00007800580 | 5,80     | 66       | 28       | •     |
| B00007800250 | 2,50     | 43       | 14       | •     | B00007800600 | 6,00     | 66       | 28       | •     |
| B00007800300 | 3,00     | 46       | 18       | •     | B00007800650 | 6,50     | 70       | 31       | •     |
| B00007800310 | 3,10     | 49       | 18       | •     | B00007800700 | 7,00     | 74       | 34       | •     |
| B00007800320 | 3,20     | 49       | 18       | •     | B00007800750 | 7,50     | 74       | 34       | •     |
| B00007800330 | 3,30     | 49       | 18       | •     | B00007800800 | 8,00     | 79       | 37       | •     |
| B00007800340 | 3,40     | 52       | 20       | •     | B00007800850 | 8,50     | 79       | 37       | ○     |
| B00007800350 | 3,50     | 52       | 20       | •     | B00007800900 | 9,00     | 84       | 40       | ○     |
| B00007800400 | 4,00     | 55       | 22       | •     | B00007800950 | 9,50     | 84       | 40       | ○     |
| B00007800410 | 4,10     | 55       | 22       | •     | B00007801000 | 10,00    | 89       | 43       | ○     |
| B00007800420 | 4,20     | 55       | 22       | •     | B00007801050 | 10,50    | 89       | 43       | ○     |
| B00007800450 | 4,50     | 58       | 24       | •     | B00007801100 | 11,00    | 95       | 47       | ○     |
| B00007800500 | 5,00     | 62       | 26       | •     | B00007801150 | 11,50    | 95       | 47       | ○     |
| B00007800510 | 5,10     | 62       | 28       | •     | B00007801200 | 12,00    | 102      | 51       | ○     |
| B00007800520 | 5,20     | 62       | 26       | •     | B00007801250 | 12,50    | 102      | 51       | ○     |
| B00007800550 | 5,50     | 66       | 28       | •     | B00007801300 | 13,00    | 102      | 51       | ○     |

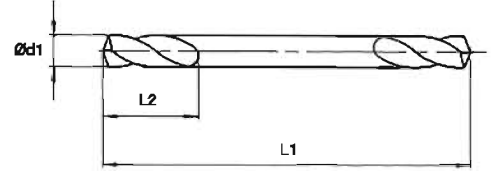
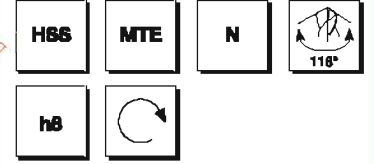
○ Ask Price and Deadline.

H - W TYPES AND LEFT HAND AVAILABLE UPON REQUEST.



## Double Ended Body Drills

**Application :** Economic tool, especially suitable for drilling sheets, making rivets and screw holes, using double ends. Used without centering for drilling thin materials like steel, brass, zinc, copper, aluminium and plastic sheets. The short helix flute and strong point geometry minimize the breaking risks.



| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|
| B00008770200 | 2,0      | 38       | 8        | •     |
| B00008770250 | 2,5      | 43       | 10       | •     |
| B00008770300 | 3,0      | 46       | 11       | •     |
| B00008770310 | 3,1      | 49       | 11       | •     |
| B00008770320 | 3,2      | 49       | 11       | •     |
| B00008770330 | 3,3      | 49       | 11       | •     |
| B00008770340 | 3,4      | 52       | 14       | •     |
| B00008770350 | 3,5      | 52       | 14       | •     |
| B00008770400 | 4,0      | 55       | 14       | •     |

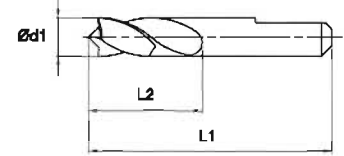
| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|
| B00008770410 | 4,1      | 55       | 14       | •     |
| B00008770420 | 4,2      | 55       | 14       | •     |
| B00008770450 | 4,5      | 58       | 17       | •     |
| B00008770500 | 5,0      | 62       | 17       | •     |
| B00008770510 | 5,1      | 62       | 17       | •     |
| B00008770520 | 5,2      | 62       | 17       | •     |
| B00008770550 | 5,5      | 66       | 19       | •     |
| B00008770580 | 5,8      | 66       | 19       | •     |
| B00008770800 | 6,0      | 66       | 19       | •     |



## Spot Weld Drills - SHORT (Spotle / Vario Drills)



**Application :** Suitable especially for drilling the sheets, for removing welding points and similar operations. The special geometry of center point enables easy centering and precise round drilling. Using for long-chip and short-chip steels, Al-Si alloys and sheet materials.

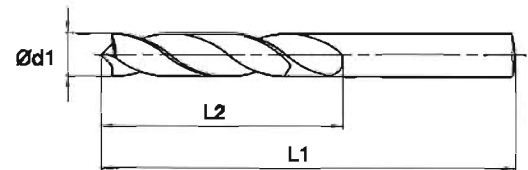


| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|
| B00005990344 | 8,0      | 40       | 18,5     | •     |
| B00005990301 | 8,0      | 44       | 18,5     | •     |

## Spot Weld Drills - LONG



**Application :** Suitable especially for drilling the sheets, for removing welding points and similar operations. The special geometry of center point enables easy centering and precise round drilling. Using for long-chip and short-chip steels, Al-Si alloys and sheet materials.

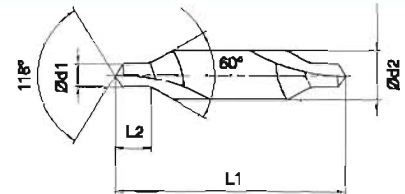
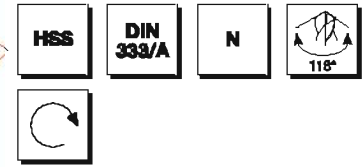


| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|-------|
| B00005990317 | 6,0      | 66       | 27       | •     |
| B00005990341 | 7,0      | 74       | 34       | •     |
| B00005990300 | 8,0      | 79       | 36       | •     |



## Center Drills - FORM A

**Application :** Suitable for making centre holes without protecting chamfer in alloyed and non-alloyed steel, cast, brass and all other metals.



| Product Code | d1<br>mm | d2<br>(h9)<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|------------------|----------|----------|-------|
| B00010010100 | 1,00     | 3,15             | 31,5     | 1,3      | •     |
| B00010010125 | 1,25     | 3,15             | 31,5     | 1,6      | •     |
| B00010010160 | 1,60     | 4,00             | 35,5     | 2,0      | •     |
| B00010010200 | 2,00     | 5,00             | 40,0     | 2,5      | •     |
| B00010010250 | 2,50     | 6,30             | 45,0     | 3,1      | •     |
| B00010010315 | 3,15     | 8,00             | 50,0     | 3,9      | •     |

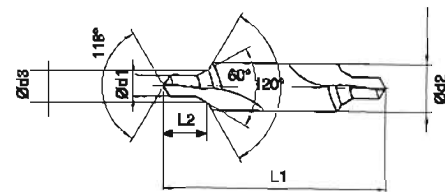
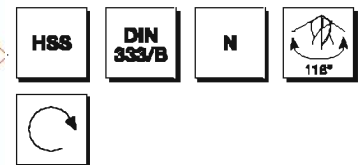
| Product Code | d1<br>mm | d2<br>(h9)<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|------------------|----------|----------|-------|
| B00010010400 | 4,00     | 10,00            | 56,0     | 5,0      | •     |
| B00010010500 | 5,00     | 12,50            | 63,0     | 6,3      | •     |
| B00010010630 | 6,30     | 16,00            | 71,0     | 8,0      | •     |
| B00010010800 | 8,00     | 20,00            | 80,0     | 10,1     | •     |
| B00010011000 | 10,00    | 25,00            | 100,0    | 12,8     | •     |
| B00010011200 | 12,00    | 31,50            | 125,0    | 16,5     | ○     |

◦ Ask Price and Deadline.

LEFT HAND AVAILABLE UPON REQUEST.

## Center Drills - FORM B

**Application:** Suitable for making centre holes without protecting chamfer in alloyed and non-alloyed steel, cast, brass and all other metals.



| Product Code | d1<br>mm | d2<br>(h9)<br>mm | d3<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|------------------|----------|----------|----------|-------|
| B00010000100 | 1,00     | 4,0              | 2,12     | 35,5     | 1,3      | ○     |
| B00010000125 | 1,25     | 5,0              | 2,65     | 40,0     | 1,6      | ○     |
| B00010000160 | 1,60     | 6,3              | 3,35     | 45,0     | 2,0      | ○     |
| B00010000200 | 2,00     | 8,0              | 4,25     | 50,0     | 2,5      | •     |
| B00010000250 | 2,50     | 10,0             | 5,30     | 56,0     | 3,1      | •     |
| B00010000315 | 3,15     | 11,2             | 6,70     | 60,0     | 3,9      | •     |

| Product Code | d1<br>mm | d2<br>(h9)<br>mm | d3<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|------------------|----------|----------|----------|-------|
| B00010000400 | 4,00     | 14,0             | 8,50     | 67,0     | 5,0      | •     |
| B00010000500 | 5,00     | 18,0             | 10,60    | 75,0     | 6,3      | •     |
| B00010000630 | 6,30     | 20,0             | 13,20    | 80,0     | 8,0      | •     |
| B00010000800 | 8,00     | 25,0             | 17,00    | 100,0    | 10,1     | •     |
| B00010001000 | 10,00    | 31,5             | 21,20    | 125,0    | 12,8     | ○     |

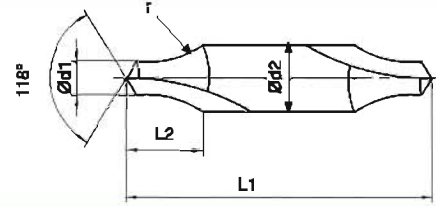
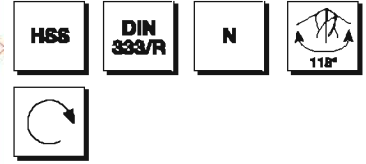
◦ Ask Price and Deadline.

LEFT HAND AVAILABLE UPON REQUEST.



## Center Drills - FORM R

**Application:** Special purpose drill for producing radiused centre holes. For centering and facing machines where the end face is required to be dressed and centered in the same operation.



| Product Code | d1<br>mm | d2<br>(h9)<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|------------------|----------|----------|-------|
| B00010020160 | 1,60     | 4,00             | 35,5     | 4,25     | ○     |
| B00010020200 | 2,00     | 5,00             | 40,0     | 5,30     | ○     |
| B00010020250 | 2,50     | 6,30             | 45,0     | 6,70     | ○     |
| B00010020315 | 3,15     | 8,00             | 50,0     | 8,50     | ○     |
| B00010020400 | 4,00     | 10,00            | 56,0     | 10,60    | ○     |

| Product Code | d1<br>mm | d2<br>(h9)<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|------------------|----------|----------|-------|
| B00010020500 | 5,00     | 12,50            | 63,0     | 13,20    | ○     |
| B00010020630 | 6,30     | 16,00            | 71,0     | 17,00    | ○     |
| B00010020800 | 8,00     | 20,00            | 80,0     | 21,20    | ○     |
| B00010021000 | 10,00    | 25,00            | 100,0    | 26,50    | ○     |

○ Ask Price and Deadline.

LEFT HAND AVAILABLE UPON REQUEST.



## Recommendations from Ali Usta

### Ali Usta says;

Depending on the operation to be performed, type work piece and required precision, Twist Drills are chosen from types N, H and W.

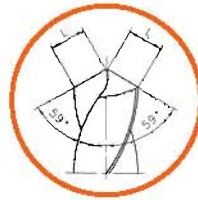
**N**  
Steel and steel types



**H**  
Brass



**W**  
Aluminium, Copper



The point angle of the twist drill must be chosen according to the type work piece.

### Ali Usta;

talks about Twist drill ,

- Too large point angle may cause a deviation from axis and enlarging the diameter of the hole.
- The choosing a too small point angle ensures good centering and size accuracy, but causes high friction around the hole, rapid abrasion and decreases tool life.
- 118° point angle provides optimum results and preferred for most of the materials.



### Ali Usta offers to you

some simple recommendations about point angles.

- 90° point angle for drilling hard plastic materials with high abrasion.
- For ductile materials and long chipping metals is preferred point angle 130° -140° in order to eliminate the chip accumulation.

## SOME IMPORTANT RECOMMENDATIONS FOR TWIST DRILLS

- 1) Keep your twist drills always available for use with sharpened point.
- 2) Don't use your twist drills until getting completely blunt, it's never economical to work with a drill in bad condition.
- 3) Don't keep your twist drills in chip-full flute condition.
- 4) Use appropriate cooling (cutting) fluid during drilling. Always make sure that the cutting fluid reaches the cutting edges.
- 5) The work piece must be bound always properly. The smallest horizontal movements may cause the drill bit break or accidents.
- 6) Correctly choose the type and quality of the twist drill and sharpen the drill bit appropriately according to the work you will perform. Pay particular attention not to allow the cutting point to burn and soften during sharpening..

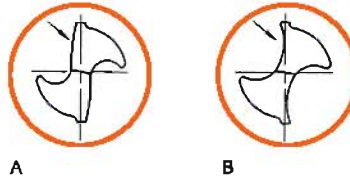
## Solutions of Ali Usta

Ali Usta presents the problems encountered during the drilling and their causes and solutions with figures.

### 1 Low cutting efficiency

A - If the point angle is lower than  $118^\circ$ , the cutting edges become convex and the cutting efficiency is reduced.

B - If the point angle is higher than  $118^\circ$ , the cutting edges become concave. The cutting efficiency is reduced because the corners at the end are weak.



### 2 - Hole size is found too large.

If the point angle is symmetric to the axis of the drill bit, one of the angles is greater than  $59^\circ$  and the other is smaller than  $59^\circ$ . On the side where the angle is greater than  $59^\circ$ , the cutting sides are short. The greater load of the cutting process is applied on this edge and therefore the drill bit is transmitted to the other side and the size of the hole is found larger than required.



### 3 - The twist drill overwears quickly

If the point angle is symmetric to the axis but one of the cutting edges is longer than the other, this means the transversal cutting edge is cam. In such case, since the cutting edge is subjected to improper tensions, the longer cutting edge wears quickly.

(The section shown with an arrow in the figure)

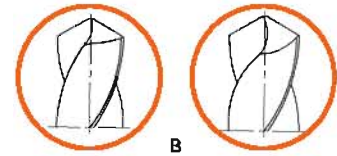
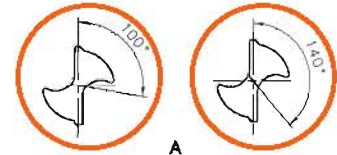
Please note that the chips coming out of one flute is more than the other during drilling.



### 4 - Cracking and breaking of the drill's web

A - When the clearance angle is too smaller, it results in friction instead of appropriate cutting and the Web of the drill can crack. The chisel edge angle is smaller than  $130^\circ$ .

B - When the clearance angle is too large, this reduces the resistance of the cutting edge. Breakings may occur on cutting edges in normal values of the drill. The chisel edge angle exceeds  $130^\circ$ , ( $140^\circ$ ), the chisel edge extends and prevents the drill from centering properly, thus the hole becomes too large and oval.



## FREQUENTLY ENCOUNTERED ISSUES IN USING TWIST DRILLS

| ERROR                                                 | CAUSE                                                                                                                                                                                                                                                                                                                                                                                   | SOLUTION                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The tang of Morse taper shank breaks or turns.</p> | <ol style="list-style-type: none"> <li>1) The Morse taper shank is not suitable for the bushing.</li> <li>2) No rotating force must exist on the chuck.</li> </ol>                                                                                                                                                                                                                      | <ol style="list-style-type: none"> <li>1) The bushing inside must be clean and smooth.</li> <li>2) Worn out bushing must be replaced.</li> </ol>                                                                                                                                         |
| <p>The Web of the drill is cracked</p>                | <ol style="list-style-type: none"> <li>1) Feed <math>s=(\text{mm/rev})</math> is chosen too much.</li> <li>2) Clearance angle is too small.</li> <li>3) Too much Web thinning.</li> <li>4) The drill is with damaged point before the work.</li> </ol>                                                                                                                                  | <ol style="list-style-type: none"> <li>1) Work must be performed by choosing appropriate values</li> <li>2) Clearance angle must be normalized</li> <li>3) Appropriate Web thinning must be performed</li> <li>4) Soft hammer must be used for fixing and removing processes.</li> </ol> |
| <p>Cutting edge breakage and easily wearing</p>       | <ol style="list-style-type: none"> <li>1) Clearance angle is too large, the margin width got thinned</li> <li>2) It works at too high cutting speeds</li> </ol>                                                                                                                                                                                                                         | <ol style="list-style-type: none"> <li>1) The drill must be sharpened with the appropriate clearance angle.</li> <li>2) Appropriate values must be chosen from the catalogue.</li> </ol>                                                                                                 |
| <p>The drill breaks on the channel end.</p>           | <ol style="list-style-type: none"> <li>1) The work piece is not fixed properly. It has moved during drilling.</li> <li>2) The face of the work piece is inclined, corrugated or with different hardness. Exact centering is not achieved at the beginning of the drilling and the bit has slipped on the work piece.</li> <li>3) Cylindrical shank drill turns in the chuck.</li> </ol> | <ol style="list-style-type: none"> <li>1) The work piece must be fixed properly in place.</li> <li>2) Drill centering wrench must be used and spot must be opened on the location to be drilled.</li> <li>3) The drill must be properly fixed to the chuck.</li> </ol>                   |



TAPS



MAKİNA TAKİM ENDÜSTRİSİ A.Ş.

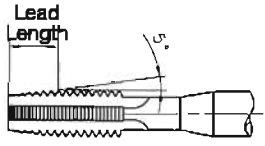
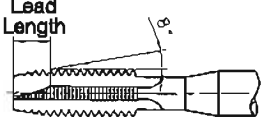
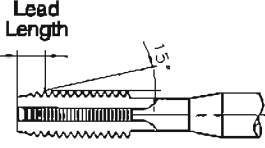
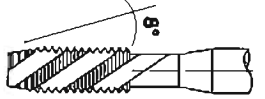
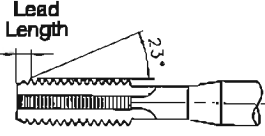




## TAPS

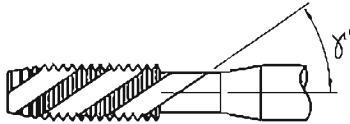
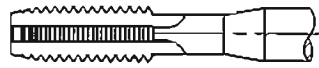
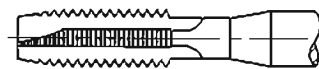
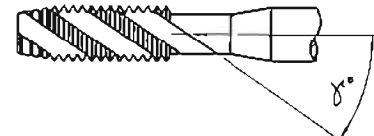
| TOOL TYPE                                                                    | QUALITY | STANDARD     | PAGE |
|------------------------------------------------------------------------------|---------|--------------|------|
| Hand Taps In Sets of Three for Metric Thread                                 | HSS     | DIN 352      | 31   |
| Hand Taps In Sets of Three for Metric Thread                                 | HSS - E | DIN 352      | 32   |
| Hand Taps In Sets of Three for Metric Thread - 1 Nr Pilot                    | HSS - E | DIN 352      | 33   |
| Hand Taps In Sets of Three for Whitworth Thread                              | HSS     | DIN 351      | 34   |
| Hand Taps In Sets of Three for UNC Thread                                    | HSS     | DIN 351      | 35   |
| Hand Taps In Sets of Two for Metric Fine Thread                              | HSS     | DIN 2181     | 36   |
| Hand Taps In Sets of Two for UNF Thread                                      | HSS     | DIN 2181     | 37   |
| Hand Taps In Sets of Two for Whitworth Pipe Thread                           | HSS     | DIN 5157     | 38   |
| Machine Taps for Metric Thread - Short Series                                | HSS     | DIN 352      | 39   |
| Machine Taps for Metric Thread - Short Series                                | HSS - E | DIN 352      | 39   |
| Machine Taps for Whitworth Thread - Short Series                             | HSS     | DIN 351      | 40   |
| Machine Taps for UNC Thread - Short Series                                   | HSS     | DIN 351      | 40   |
| Machine Taps for Metric Fine Thread - Short Series                           | HSS     | DIN 2181     | 41   |
| Machine Taps for UNF Thread - Short Series                                   | HSS     | DIN 2181     | 42   |
| Machine Taps for Whitworth Pipe Thread - Short Series                        | HSS - E | DIN 5157     | 42   |
| Machine Taps With Straight Flutes for Metric Thread                          | HSS - E | DIN 371/C    | 43   |
| Machine Taps With Straight Flutes for Metric Thread - TiN Coated             | HSS - E | DIN 371/C    | 43   |
| Machine Taps Straight Flute With Spiral Point for Metric Thread              | HSS - E | DIN 371/B    | 44   |
| Machine Taps Straight Flute With Spiral Point for Metric Thread - TiN Coated | HSS - E | DIN 371/B    | 44   |
| Machine Taps With Spiral Flutes for Metric Thread                            | HSS - E | DIN 371/C    | 45   |
| Machine Taps With Spiral Flutes for Metric Thread - TiN Coated               | HSS - E | DIN 371/C    | 45   |
| Machine Taps With Straight Flutes for Metric Thread                          | HSS - E | DIN 376/C    | 46   |
| Machine Taps With Straight Flutes for Metric Thread - TiN Coated             | HSS - E | DIN 376/C    | 47   |
| Machine Taps Straight Flute With Spiral Point for Metric Thread              | HSS - E | DIN 376/B    | 48   |
| Machine Taps With Spiral Flutes for Metric Thread                            | HSS - E | DIN 376/C    | 49   |
| Machine Taps With Spiral Flutes for Metric Thread - TiN Coated               | HSS - E | DIN 376/C    | 50   |
| Machine Taps With Straight Flutes for Metric Fine Thread                     | HSS - E | DIN 374/C    | 51   |
| Machine Taps With Straight Flutes for Metric Fine Thread - TiN Coated        | HSS - E | DIN 374/C    | 52   |
| Machine Taps Straight Flute With Spiral Point for Metric Fine Thread         | HSS - E | DIN 374/B    | 53   |
| Machine Taps With Spiral Flutes for Metric Fine Thread                       | HSS - E | DIN 374/C    | 54   |
| Machine Taps With Spiral Flutes for Metric Fine Thread - TiN Coated          | HSS - E | DIN 374/C    | 55   |
| Machine Taps Straight Flute With Spiral Point - Blue Series                  | HSS - E | DIN 371/B    | 60   |
| Machine Taps With Spiral Flutes - Blue Series                                | HSS - E | DIN 371/C    | 60   |
| Machine Taps With Interrupted Teeth -Blue Series                             | HSS - E | DIN 371/C    | 61   |
| Flutless Taps - Blue Series                                                  | HSS - E | DIN 371/C    | 61   |
| Machine Taps With Straight Flute - Blue Series                               | HSS - E | DIN 376/C    | 62   |
| Machine Taps With Straight Flute - White Series                              | HSS - E | DIN 371/C    | 62   |
| Machine Taps With Spiral Flutes - White Series                               | HSS - E | DIN 371/C    | 63   |
| Machine Taps Straight Flute With Spiral Point - Yellow Series                | HSS - E | DIN 371/B    | 63   |
| Machine Taps With Spiral Flutes -Yellow Series                               | HSS - E | DIN 371/C    | 64   |
| Machine Taps Straight Flute With Spiral Point - Green Series                 | HSS - E | DIN 371/B    | 64   |
| Machine Taps With Spiral Flutes - Green Series                               | HSS - E | DIN 371/C    | 65   |
| Machine Taps With Spiral Flutes - Green Series                               | HSS - E | DIN 371/C    | 65   |
| Machine Taps Straight Flute With Spiral Point - Red Series                   | HSS - E | DIN 371/B    | 66   |
| Machine Taps Straight Flute With Spiral Point - Red Series                   | HSS - E | DIN 376/B    | 66   |
| Machine Taps With Spiral Flutes - Red Series                                 | HSS - E | DIN 371/C    | 67   |
| Machine Taps With Straight Flutes for UNC Thread                             | HSS - E | DIN 2183/C   | 67   |
| Machine Taps With Spiral Flutes for UNC Thread                               | HSS - E | DIN 2183/C   | 68   |
| Machine Taps With Straight Flutes for UNF Thread                             | HSS - E | DIN 2183/C   | 68   |
| Machine Taps With Spiral Flutes for UNF Thread                               | HSS - E | DIN 2183/C   | 69   |
| Machine Taps Straight Flute With Spiral Point for Whitworth Thread           | HSS - E | DIN 2183/B   | 69   |
| Machine Taps With Straight Flutes for Whitworth Thread                       | HSS - E | DIN 2183/C   | 70   |
| Machine Taps With Spiral Flutes for Whitworth Thread                         | HSS - E | DIN 2183/C   | 70   |
| Machine Taps Straight Flute With Spiral Point for Whitworth Pipe Thread      | HSS - E | DIN 5156/B   | 71   |
| Machine Taps With Straight Flutes for Whitworth Pipe Thread                  | HSS - E | DIN 5156/C   | 71   |
| Machine Taps With Spiral Flutes for Whitworth Pipe Thread                    | HSS - E | DIN 5156/C   | 72   |
| Drilling - Tapping Combined Tools                                            | HSS - E | MTE Standard | 72   |
| Machine Taps for NPT - Thread - Taper 1/16                                   | HSS     | MTE Standard | 73   |
| Machine Nut Taps for Metric Thread                                           | HSS     | DIN 357      | 73   |
| Machine Nut Taps for Metric Thread                                           | HSS     | MTE Standard | 74   |
| Machine Nut Taps for Metric Fine Thread                                      | HSS     | MTE Standard | 74   |

## Taps Chamfer Forms and Application

| TAP FORM |                                                                                     | LEAD LENGTH   | LEAD ANGLE | RECOMMENDED APPLICATION                                      |
|----------|-------------------------------------------------------------------------------------|---------------|------------|--------------------------------------------------------------|
| A        |    | 6-8 Pitch     | 5°         | for through holes in materials forming short chips           |
| B        |   | 3.5-5.5 Pitch | 8°         | for through holes in materials forming long chips            |
| C        |  | 2-3 Pitch     | 15°        | for blind and through holes in materials forming short chips |
| D        |  | 3.5-5.5 Pitch | 8°         | for through holes in materials forming long chips            |
| E        |  | 1.5-2 Pitch   | 23°        | for blind holes with extremely short lead.                   |

Avoid chamfer form E if possible

## Helix Directions and Helix Angles

| SYMBOL |                                  | HELIX ANGLE                  |                              | HELIX DIRECTION             |                                                                                      | APPLICATION<br>TAP<br>FORM |
|--------|----------------------------------|------------------------------|------------------------------|-----------------------------|--------------------------------------------------------------------------------------|----------------------------|
| LEFT   | RIGHT                            | MIN.                         | MAX.                         |                             |                                                                                      |                            |
| L 15°  | -                                | -10°                         | -20°                         | LEFT HELIX                  |    | D                          |
| -      | -                                | -                            | -                            | STRAIGHT FLUTE              |  | A,C,D,E                    |
| -      | -                                | -                            | -                            | STRAIGHT FLUTE SPIRAL POINT |  | B                          |
| -      | R 15°<br>R 25°<br>R 35°<br>R 45° | +10°<br>+20°<br>+30°<br>+40° | +20°<br>+30°<br>+40°<br>+50° | RIGHT HELIX                 |  | C,E                        |

FOR TAP WITH STRAIGHT FLUTE IS RECOMENDED SPIRAL POINT "FORM B"



## Required Drill Size for Thread Forming

| METRIC ISO THREADS<br>DIN 13 |                           | UNC-NC THREAD                 |                           | METRIC FINE ISO<br>THREADS DIN 13 |                           | METRIC ISO TRAPEZODIAL<br>THREAD DIN 103 |                               |                           | WHITWORTH THREAD<br>DIN 11     |                           |
|------------------------------|---------------------------|-------------------------------|---------------------------|-----------------------------------|---------------------------|------------------------------------------|-------------------------------|---------------------------|--------------------------------|---------------------------|
| Nominal<br>Diameter<br>(mm)  | Drill<br>Diameter<br>(mm) | Nominal<br>Diameter<br>(inch) | Drill<br>Diameter<br>(mm) | Nominal<br>Diameter<br>(mm)       | Drill<br>Diameter<br>(mm) | Nominal<br>Diameter<br>(inch)            | Pitch<br>(mm)                 | Drill<br>Diameter<br>(mm) | Nominal<br>Diameter<br>(inch)  | Drill<br>Diameter<br>(mm) |
| M 1x0,25                     | 0,75                      | Nr. 1                         | 1,55                      | M 4x0.35                          | 3,60                      | Tr 8                                     | 1.5                           | 6,60                      | 1/16"                          | 1,15                      |
| M 1,1x0,25                   | 0,85                      | Nr. 2                         | 1,85                      | M 4x0.5                           | 3,50                      | Tr 10                                    | 1.5                           | 8,60                      | 1/8"                           | 2,55                      |
| M 1,2x0,25                   | 0,95                      | Nr. 3                         | 2,10                      | M 5x0.5                           | 4,50                      | Tr 10                                    | 2                             | 8,20                      | 3/16"                          | 3,70                      |
| M 1,4x0,3                    | 1,10                      | Nr. 4                         | 2,35                      | M 6x0.5                           | 5,50                      | Tr 10                                    | 3                             | 7,50                      | 1/4"                           | 5,10                      |
| M 1,6x0,35                   | 1,25                      | Nr. 5                         | 2,65                      | M 6x0.75                          | 5,25                      | Tr 12                                    | 2                             | 10,20                     | 5/16"                          | 6,50                      |
| M 1,7x0,35                   | 1,30                      | Nr. 6                         | 2,85                      | M 7x0.75                          | 6,25                      | Tr 12                                    | 3                             | 9,25                      | 3/8"                           | 7,90                      |
| M 1,8x0,35                   | 1,45                      | Nr. 8                         | 3,45                      | M 8x0.5                           | 7,50                      | Tr 14                                    | 2                             | 12,20                     | 7/16"                          | 9,30                      |
| M 2x0,4                      | 1,60                      | Nr.10                         | 3,90                      | M 8x0.75                          | 7,25                      | Tr 14                                    | 3                             | 11,25                     | 1/2"                           | 10,50                     |
| M 2,2x0,45                   | 1,75                      | Nr.12                         | 4,50                      | M 8x1                             | 7,00                      | Tr 14                                    | 4                             | 12,25                     | 9/16"                          | 12,10                     |
| M 2,3x0,4                    | 1,90                      | 1/4"                          | 5,20                      | M 9x1                             | 8,00                      | Tr 16                                    | 4                             | 12,25                     | 5/8"                           | 13,50                     |
| M 2,5x0,45                   | 2,05                      | 5/16"                         | 6,60                      | M 10x0.75                         | 9,25                      | Tr 18                                    | 4                             | 14,25                     | 11/16"                         | 15,00                     |
| M 2,6x0,45                   | 2,10                      | 3/8"                          | 8,00                      | M 10X1                            | 9,00                      | Tr 20                                    | 4                             | 16,25                     | 3/4"                           | 16,25                     |
| M 3x0,5                      | 2,50                      | 7/16"                         | 9,40                      | M 10x1.25                         | 8,80                      | Tr 22                                    | 5                             | 17,25                     | 13/16"                         | 18,00                     |
| M 3,5x0,6                    | 2,90                      | 1/2"                          | 10,80                     | M 11x1                            | 10,00                     | Tr 24                                    | 5                             | 19,25                     | 7/8"                           | 19,25                     |
| M 4x0,7                      | 3,30                      | 9/16"                         | 12,20                     | M 12x0.75                         | 11,25                     | Tr 26                                    | 5                             | 21,25                     | 15/16"                         | 21,00                     |
| M 4,5x0,75                   | 3,70                      | 5/8"                          | 13,50                     | M 12x1                            | 11,00                     | Tr 28                                    | 5                             | 23,25                     | 1"                             | 22,00                     |
| M 5x0,8                      | 4,20                      | 3/4"                          | 16,50                     | M 12x1.5                          | 10,50                     | Tr 30                                    | 6                             | 24,25                     | 1 1/8"                         | 24,75                     |
| M 5,5x0,9                    | 4,60                      | 7/8"                          | 19,50                     | M 13x1                            | 12,00                     | Tr 32                                    | 6                             | 26,25                     | 1 1/4"                         | 28,00                     |
| M 6x1                        | 5,00                      | 1"                            | 22,25                     | M 14x1                            | 13,00                     | Tr 36                                    | 6                             | 30,25                     | 1 3/8"                         | 30,00                     |
| M 7x1                        | 6,00                      | 1 1/8"                        | 25,00                     | M 14x1.25                         | 12,80                     | Tr 38                                    | 7                             | 31,50                     | 1 1/2"                         | 33,50                     |
| M 8x1,25                     | 6,80                      | 1 1/4"                        | 28,00                     | M 14x1.5                          | 12,50                     | Tr 40                                    | 7                             | 33,50                     | 1 5/8"                         | 35,50                     |
| M 9x1,25                     | 7,80                      | 1 1/2"                        | 34,00                     | M 16x1                            | 15,00                     | Tr 44                                    | 7                             | 37,50                     | 1 3/4"                         | 39,00                     |
| M 10x1,5                     | 8,50                      | UNF-NF FINE THREAD            |                           | M 16x1.5                          | 14,50                     | Tr 48                                    | 8                             | 40,50                     | 1 7/8"                         | 41,50                     |
| M 11x1,5                     | 9,50                      |                               |                           | M 18x1                            | 17,00                     | Tr 50                                    | 8                             | 42,50                     | 2"                             | 44,50                     |
| M 12x1,75                    | 10,20                     | Nominal<br>Diameter<br>(inch) | Drill<br>Diameter<br>(mm) | M 18x2                            | 16,00                     | PG THREAD DIN 40430                      | Nominal<br>Diameter<br>(inch) | Drill<br>Diameter<br>(mm) | WHITWORTH PIPE<br>THREAD DIN11 |                           |
| M 14x2                       | 12,00                     |                               |                           | M 20x1                            | 19,00                     |                                          |                               |                           |                                |                           |
| M 16x2                       | 14,00                     |                               |                           | M 20x1.5                          | 18,50                     |                                          |                               |                           |                                |                           |
| M 18x2,5                     | 15,50                     | Nr. 0                         | 1,25                      | M 20x2                            | 18,00                     |                                          |                               |                           | G 1/8"                         | 8,80                      |
| M 20x2,5                     | 17,50                     | Nr. 1                         | 1,55                      | M 22x1                            | 21,00                     |                                          |                               |                           | G1/4"                          | 11,80                     |
| M 22x2,5                     | 19,50                     | Nr. 2                         | 1,90                      | M 22x1.5                          | 20,50                     |                                          |                               |                           | G 3/8"                         | 15,25                     |
| M 24x3                       | 21,00                     | Nr. 3                         | 2,15                      | M 22x2                            | 20,00                     | Pg 7.0                                   | 11,40                         |                           | G 1/2"                         | 19,00                     |
| M 27x3                       | 24,00                     | Nr. 4                         | 2,40                      | M 24x1.5                          | 22,50                     | Pg 9.0                                   | 14,00                         |                           | G 5/8"                         | 21,00                     |
| M 30x3,5                     | 26,50                     | Nr. 5                         | 2,70                      | M 24x2                            | 22,00                     | Pg 11.0                                  | 17,30                         |                           | G 3/4"                         | 24,50                     |
| M 33x3,5                     | 29,50                     | Nr. 6                         | 2,95                      | M 25x1.5                          | 23,50                     | Pg 13.5                                  | 19,00                         |                           | G 7/8"                         | 28,25                     |
| M 36x4                       | 32,00                     | Nr. 8                         | 3,50                      | M 26x1.5                          | 24,50                     | Pg 16.0                                  | 21,30                         |                           | G 1"                           | 30,75                     |
| M 39x4                       | 35,00                     | Nr.10                         | 4,10                      | M 27x1.5                          | 25,50                     | Pg 21.0                                  | 26,90                         |                           | G 1 1/8"                       | 35,50                     |
| M 42x4,5                     | 37,50                     | Nr.12                         | 4,70                      | M 27x2                            | 25,00                     | Pg 29.0                                  | 35,50                         |                           | G 1 1/4"                       | 39,00                     |
| M 45x4,5                     | 40,50                     | 1/4"                          | 5,50                      | M 28x1.5                          | 26,50                     | Pg 36.0                                  | 45,50                         |                           | G 1 3/8"                       | 42,50                     |
| M 48x5                       | 43,00                     | 5/16"                         | 6,90                      | M 30x1.5                          | 28,50                     | Pg 42.0                                  | 52,50                         |                           | G 1 1/2"                       | 45,50                     |
| M 52x5                       | 47,00                     | 3/8"                          | 8,50                      | M 30x2                            | 28,00                     | Pg 48.0                                  | 57,80                         |                           | G 1 3/4"                       | 51,00                     |
| M 56x5,5                     | 50,50                     | 7/16"                         | 9,90                      | M 30x3                            | 27,00                     |                                          |                               |                           | G 2"                           | 57,00                     |
| M 60x5,5                     | 54,50                     | 1/2"                          | 11,50                     | M 32x1.5                          | 30,50                     |                                          |                               |                           | G 2 1/4"                       | 63,00                     |
| M 64x6                       | 58,00                     | 9/16"                         | 12,90                     | M 32x2                            | 30,00                     |                                          |                               |                           | G 2 1/2"                       | 72,50                     |
| M 68x6                       | 62,00                     | 5/8"                          | 14,50                     | M 33x1.5                          | 31,50                     |                                          |                               |                           | G 2 3/4"                       | 79,00                     |
|                              |                           | 3/4"                          | 17,50                     | M 33x2                            | 31,00                     |                                          |                               |                           | G 3"                           | 85,50                     |
|                              |                           | 7/8"                          | 20,50                     | M 33X3                            | 30,00                     |                                          |                               |                           | G 3 1/4"                       | 91,50                     |
|                              |                           | 1"                            | 23,25                     | M 35X1.5                          | 33,50                     |                                          |                               |                           | G 3 1/2"                       | 98,00                     |
|                              |                           | 1 1/8"                        | 26,50                     | M 36X1.5                          | 34,50                     |                                          |                               |                           | G 3 3/4"                       | 104,00                    |
|                              |                           | 1 1/4"                        | 29,50                     |                                   |                           |                                          |                               |                           | G 4"                           | 110,50                    |
|                              |                           | 1 1/2"                        | 36,00                     |                                   |                           |                                          |                               |                           |                                |                           |

## Required Drill Diameters for Fluteless Taps

[illegible]



## Recommended Operating Conditions for Taps

| Material Groups                                  |                                                                                                                    | Sample Materials                                                                                 | Cutting Angle      | Cutting speed (m/min.) | Cutting Fluid      |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------|------------------------|--------------------|
| Unalloyed and low alloyed steels and steel casts | ≤ 400 N/mm <sup>2</sup>                                                                                            | St33-1/St37-3<br>C 10/9 S 20                                                                     | 13° - 18°          | 6 - 20                 | SE                 |
|                                                  | 400 - 800 N/mm <sup>2</sup>                                                                                        | St42-1/St70-2/GS-38<br>C 10/Ck 15/C 45/GS-70<br>9 SMn28/45 S20                                   | 11° - 14°          | 6 - 15                 | SE                 |
| Tool steels (Structural steels)                  | 800 - 1200 N/mm <sup>2</sup>                                                                                       | 14 NiCr 10/15 CrNi 6<br>38 CrNiMo 4<br>C 55/C 60                                                 | 8° - 12°           | 4 - 8                  | SE<br>SO<br>P      |
| Toughened steels                                 | 1200 - 1400 N/mm <sup>2</sup>                                                                                      | 17 CrNiMo 6/20 CrMo 5<br>30 CrNiMo 8<br>21 NiCrMo 2                                              | 4° - 7°            | 2 - 4                  | P                  |
| Cold pressed steels, deep drawn sheets           | ≤ 600 N/mm <sup>2</sup>                                                                                            | Cq 15/Cq 35<br>15 CrNi 6                                                                         | 11° - 14°          | 10 - 15                | SE<br>H            |
| INOX                                             | Alloyed tool steels, Stainless and acid resistant steels                                                           | 14 NiCr 18<br>X 10 Cr 13/X 12 CrNiS 18 8<br>X 12 CrNi 25 4<br>G-X 20 Cr 14<br>G-X 40 CrSi 13     | 8° - 12°           | 1 - 4                  | SE<br>SO<br>P      |
| Cast Iron                                        | Gray Cast ≤ 220 HB                                                                                                 | GG 15/GG 40                                                                                      | 3° - 6°            | 6 - 20                 | M<br>BY<br>K       |
|                                                  | Malleable Cast ≤ 290 HB                                                                                            | GTW-35-04/GTW-60<br>GTS-35-10/GTS-70-02                                                          | 8° - 11°           | 6 - 12                 | SE<br>SO           |
|                                                  | Brittle Cast ≤ 200 HB                                                                                              | GGG 40/GGG 70                                                                                    | 6° - 9°            | 3 - 12                 | SE<br>H            |
| Densified aluminium                              | Pure aluminium, hardenable alloyed                                                                                 | Al 99,0/Al 99,5<br>AlMgSi 1<br>AlMgSiPb                                                          | 20° - 24°          | 15 - 40                | M<br>SO            |
| Alloyed cast aluminium                           | G - AISiMg Alloyed                                                                                                 | G-AISI 5 Mg                                                                                      | 13° - 16°          | 10 - 40                | M<br>SO            |
|                                                  |                                                                                                                    | G-AISI 12 Mg                                                                                     | 13° - 16°          | 8 - 20                 | M, SO              |
|                                                  |                                                                                                                    | G-AISI 5 Mg/G-AISI 12 Mg                                                                         | 13° - 16°          | 10 - 40                | M<br>SO            |
|                                                  | G - AlMg Alloyed ( % 3-10 Mg)<br>Piston Matedial<br>Cylinder block (Authentic top alloyed)<br>Highly Hard G-Al-Leg | G-AlMg 3/G-AlMg 5                                                                                | 13° - 16°          | 4 - 8                  | M<br>SO            |
|                                                  |                                                                                                                    | G-AlMg 3 Si/G-AlMg 5 Si                                                                          | 13° - 16°          | 10 - 40                | M<br>SO            |
|                                                  |                                                                                                                    | G-AISI 12 CuNiMg<br>G-AISI 17 Cu 4 Mg                                                            | 13° - 16°          | 10 - 40                | M, SO              |
| Copper                                           |                                                                                                                    | G-ALCu 4 Ti/G-ALCu 4 TiMg<br>Cu/E 2-Cu 58/F-Cu<br>ÖE-Cu/SW-Cu/SF-Cu                              | 20° - 25°          | 14 - 17                | SE<br>SO           |
| Copper - Zinc alloy (Brass)                      | Short Chip                                                                                                         | CuZn 44 Pb 2 (Ms 56)<br>CuZn 39 Pb 2 (Ms 58)<br>GK-CuZn 37 Pb (GK-Ms 60)                         | 2° - 5°            | 15 - 30                | H<br>M             |
|                                                  |                                                                                                                    | CuZn 40(Ms 60)/CuZn 37(Ms 63)<br>CuZn 40 Mn 2/CuZn 31 Si 1<br>G-CuZn 40 Fe                       | 8° - 12°           | 10 - 20                | H<br>M             |
|                                                  | Long Chip                                                                                                          | CuZn 33 (Ms 67)/CuZn 5 (Ms 95)<br>CuZn 28 Sn 1 (SoMs 71)<br>CuZn 20 Al 2 (SoMs 76)<br>CuNiZn-Leg | 10° - 14°          | 10 - 20                | H<br>M             |
|                                                  |                                                                                                                    |                                                                                                  |                    |                        |                    |
| Bronze                                           | Short Chip<br>≤ %6 Sn                                                                                              | CuAl 8<br>G-CuSn 7 ZnPb (Rg 7)                                                                   | 8° - 12°           | 2 - 8                  | SE<br>SO,P         |
|                                                  | Long Chip<br>> %6 Sn                                                                                               | G-CuSn 10 Zn (Rg 10)<br>eksik                                                                    | 6° - 9°            | 6 - 15                 | H<br>SE            |
| Zinc and zinc alloys                             | DIN 1706                                                                                                           | GD-ZnAl 4<br>GK-ZnAl 6 Cu 1                                                                      | 8° - 12°           | 8 - 15                 | SE<br>SO           |
| Magnesium and magnesium alloys                   | DIN 1729<br>DIN 17800                                                                                              | G-AMgAl 8 Zn 1<br>GK-MgAl 8 Zn 1<br>H-Mg 99,95                                                   | 3° - 5°            | 10 - 20                | M<br>SE            |
| Nickel and nickel alloys                         |                                                                                                                    | Ni, Hastelloy, Nimonic<br>Monel, Invar, Inconel                                                  | 3° - 5°            | < 4                    | SO                 |
| Titanium and titanium alloys                     |                                                                                                                    | Ti, Ferro Tic<br>Amoco Bronze with Q 18<br>Amoco Bronze over Q 18                                | 4° - 6°<br>0° - 2° | <4<br><4               | SO<br>P<br>SO<br>P |
|                                                  |                                                                                                                    |                                                                                                  |                    |                        |                    |
| Plastic materials                                | Termoplastic                                                                                                       |                                                                                                  | 18° - 22°          | 10 - 40                | K,E<br>BY          |
|                                                  | Duroplastic                                                                                                        |                                                                                                  | 3° - 5°            | <15                    | M                  |
| Graphite - Ceramic Materials                     |                                                                                                                    | Stellit                                                                                          | 2° - 6°            | 5 - 10                 | K,H<br>BY          |
| Sintered and pulverized materials                |                                                                                                                    |                                                                                                  | 7° - 9°            | 6 - 15                 | K,H<br>BY          |

E = Emulsion  
SE = Special Emulsion  
O = Coolant  
D = Dry

SO = Special Cutting Oil  
P = Cutting Paste  
VO = Vegetable Oil  
A = Air

for TiN coated tools, the above specified cutting speeds must be doubled as minimum.

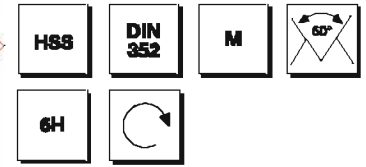
In the above given low cutting speed option, it is recommended to use a fluent cooling fluid and paste for cast steels.

for optimum cutting speeds, cutting conditions and manufacturing techniques shall be taken into consideration.



## Hand Taps In Sets of Three for Metric Thread

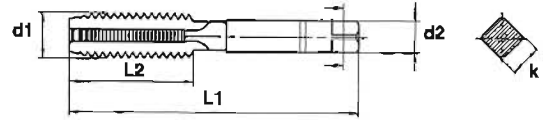
**Application:** Used for tapping through and blind holes. Recommended for threading in unalloyed and low alloyed steels, cast, NE-metals, zinc, magnesium alloys, and thermoplastic metals.



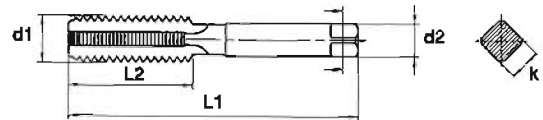
First



Middle



Bottoming



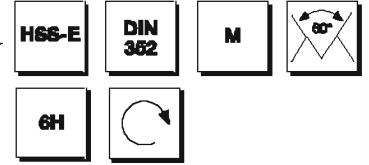
| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00100040200 | M2       | 0,4        | 40       | 8        | 2,8      | 2,1              | •     |
| B00100040250 | M2,5     | 0,45       | 40       | 9        | 2,8      | 2,1              | •     |
| B00100040300 | M3       | 0,5        | 40       | 11       | 3,5      | 2,7              | •     |
| B00100040350 | M3,5     | 0,6        | 45       | 13       | 4,0      | 3,0              | •     |
| B00100040400 | M4       | 0,7        | 45       | 13       | 4,5      | 3,4              | •     |
| B00100040450 | M4,5     | 0,75       | 50       | 16       | 6,0      | 4,9              | •     |
| B00100040500 | M5       | 0,8        | 50       | 16       | 6,0      | 4,9              | •     |
| B00100040600 | M6       | 1          | 50       | 19       | 8,0      | 4,9              | •     |
| B00100040700 | M7       | 1          | 50       | 19       | 6,0      | 4,9              | •     |
| B00100040800 | M8       | 1,25       | 56       | 22       | 6,0      | 4,9              | •     |
| B00100040900 | M9       | 1,25       | 63       | 22       | 7,0      | 5,5              | •     |
| B00100041000 | M10      | 1,5        | 70       | 24       | 7,0      | 5,5              | •     |
| B00100041100 | M11      | 1,5        | 70       | 24       | 8,0      | 6,2              | •     |
| B00100041200 | M12      | 1,75       | 75       | 29       | 9,0      | 7,0              | •     |
| B00100041400 | M14      | 2          | 80       | 30       | 11,0     | 9,0              | •     |
| B00100041600 | M16      | 2          | 80       | 32       | 12,0     | 9,0              | •     |
| B00100041800 | M18      | 2,5        | 95       | 40       | 14,0     | 11,0             | •     |
| B00100042000 | M20      | 2,5        | 95       | 40       | 16,0     | 12,0             | •     |
| B00100042200 | M22      | 2,5        | 100      | 40       | 18,0     | 14,5             | •     |
| B00100042400 | M24      | 3          | 110      | 50       | 18,0     | 14,5             | •     |
| B00100042700 | M27      | 3          | 110      | 50       | 20,0     | 16,0             | •     |
| B00100043000 | M30      | 3,5        | 125      | 56       | 22,0     | 18,0             | •     |
| B00100043300 | M33      | 3,5        | 125      | 56       | 25,0     | 20,0             | •     |
| B00100043600 | M36      | 4          | 150      | 63       | 28,0     | 22,0             | •     |
| B00100043900 | M39      | 4          | 150      | 63       | 32,0     | 24,0             | ○     |
| B00100044200 | M42      | 4,5        | 150      | 63       | 32,0     | 24,0             | ○     |
| B00100044500 | M45      | 4,5        | 160      | 70       | 36,0     | 28,0             | □     |
| B00100044800 | M48      | 5          | 180      | 75       | 36,0     | 29,0             | ○     |
| B00100045200 | M52      | 5          | 180      | 75       | 36,0     | 29,0             | ○     |
| B00100045600 | M56      | 5,5        | 200      | 85       | 45,0     | 35,0             | ○     |
| B00100046000 | M60      | 5,5        | 200      | 85       | 45,0     | 35,0             | ○     |

○ Ask Price and Deadline.

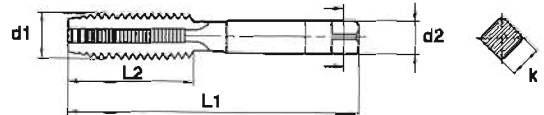


## Hand Taps In Sets of Three for Metric Thread

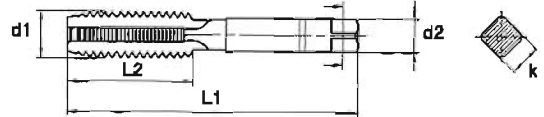
**Application:** Used for tapping through and blind holes. Recommended for threading in unalloyed and low alloyed steels, cast, NE-metals, zinc, magnesium alloys, and thermoplastic metals.



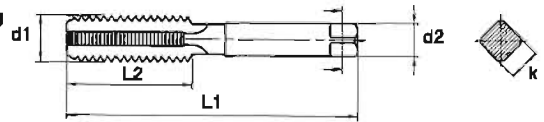
**First**



**Middle**



**Bottoming**

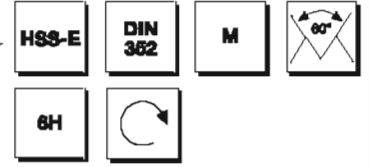


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00109130300 | M3       | 0,5        | 40       | 11       | 3,5      | 2,7              | •     |
| B00109130400 | M4       | 0,7        | 45       | 13       | 4,5      | 3,4              | •     |
| B00109130500 | M5       | 0,8        | 50       | 16       | 6,0      | 4,9              | •     |
| B00109130600 | M6       | 1          | 50       | 19       | 6,0      | 4,9              | •     |
| B00109130800 | M8       | 1,25       | 56       | 22       | 6,0      | 4,9              | •     |
| B00109131000 | M10      | 1,5        | 70       | 24       | 7,0      | 5,5              | •     |
| B00109131200 | M12      | 1,75       | 75       | 29       | 9,0      | 7,0              | •     |
| B00109131400 | M14      | 2          | 80       | 30       | 11,0     | 9,0              | •     |
| B00109131600 | M16      | 2          | 80       | 32       | 12,0     | 9,0              | •     |



## Hand Taps In Sets of Three for Metric Thread (1 Nr Pilot)

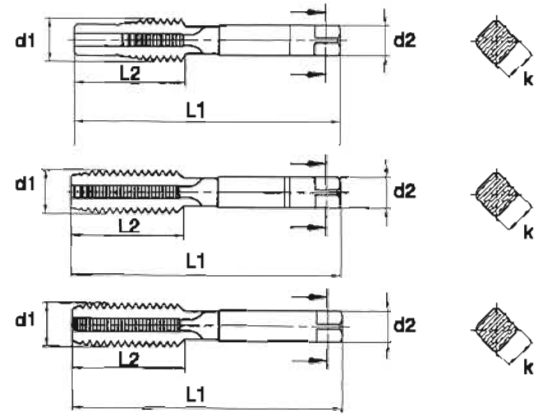
**Application:** Due to front tap 1 Nr. pilot provided high penetration in high alloyed steels, structural steel and general usage places.



First

Middle

Bottoming

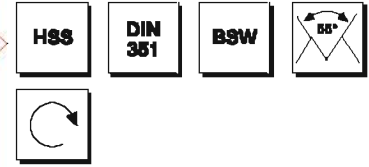


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00109490300 | M3       | 0,5        | 40       | 11       | 3,5      | 2,7              | •     |
| B00109490400 | M4       | 0,7        | 45       | 13       | 4,5      | 3,4              | •     |
| B00109490500 | M5       | 0,8        | 50       | 16       | 6,0      | 4,9              | •     |
| B00109490600 | M6       | 1          | 50       | 19       | 6,0      | 4,9              | •     |
| B00109490700 | M7       | 1          | 50       | 19       | 6,0      | 4,9              | •     |
| B00109490800 | M8       | 1,25       | 56       | 22       | 6,0      | 4,9              | •     |
| B00109490900 | M9       | 1,25       | 63       | 22       | 7,0      | 5,5              | •     |
| B00109491000 | M10      | 1,5        | 70       | 24       | 7,0      | 5,5              | •     |
| B00109491100 | M11      | 1,5        | 70       | 24       | 8,0      | 6,2              | •     |
| B00109491200 | M12      | 1,75       | 75       | 29       | 9,0      | 7,0              | •     |
| B00109491400 | M14      | 2          | 80       | 30       | 11,0     | 9,0              | •     |
| B00109491600 | M16      | 2          | 80       | 32       | 12,0     | 9,0              | •     |
| B00109491800 | M18      | 2,5        | 95       | 40       | 14,0     | 11,0             | •     |
| B00109492000 | M20      | 2,5        | 95       | 40       | 16,0     | 12,0             | •     |



## Hand Taps In Sets of Three for Whitworth Thread

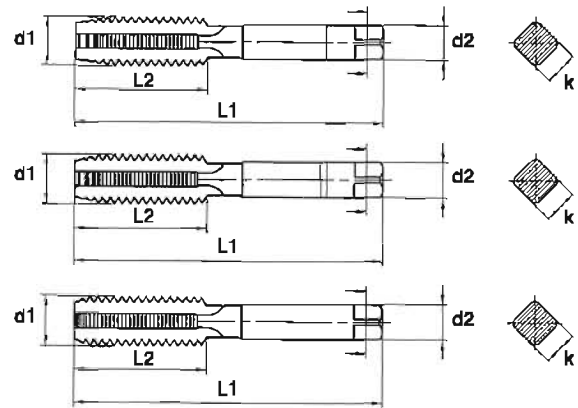
**Application:** Used for tapping through and blind holes. Suitable for unalloyed and low-alloyed steels with resistance 900 N/mm<sup>2</sup>, mould iron, cast, NE-metals, zinc, magnesium alloys and thermoplastic metals.



First

Middle

Bottoming



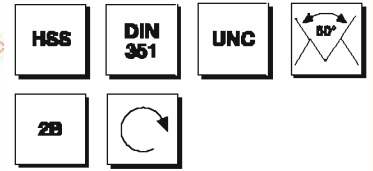
| Product Code | d1<br>BSW | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00100100317 | W 1/8"    | 40                   | 40       | 11       | 3,5      | 2,7              | •     |
| B00100100397 | W 5/32"   | 32                   | 45       | 13       | 4,5      | 3,4              | •     |
| B00100100476 | W 3/16"   | 24                   | 50       | 16       | 6,0      | 4,9              | •     |
| B00100100556 | W 7/32"   | 24                   | 50       | 16       | 8,0      | 4,9              | •     |
| B00100100635 | W 1/4"    | 20                   | 50       | 19       | 8,0      | 4,9              | •     |
| B00100100794 | W 5/16"   | 18                   | 56       | 22       | 6,0      | 4,9              | •     |
| B00100100852 | W 3/8"    | 16                   | 70       | 24       | 7,0      | 5,5              | •     |
| B00100101111 | W 7/16"   | 14                   | 70       | 24       | 8,0      | 6,2              | •     |
| B00100101270 | W 1/2"    | 12                   | 75       | 29       | 9,0      | 7,0              | •     |
| B00100101429 | W 9/16"   | 12                   | 80       | 30       | 11,0     | 9,0              | •     |
| B00100101587 | W 5/8"    | 11                   | 80       | 32       | 12,0     | 9,0              | •     |
| B00100101746 | W 11/16"  | 11                   | 95       | 40       | 14,0     | 11,0             | ○     |
| B00100101905 | W 3/4"    | 10                   | 95       | 40       | 14,0     | 11,0             | •     |
| B00100102064 | W 13/16"  | 10                   | 95       | 40       | 18,0     | 12,0             | ○     |
| B00100102222 | W 7/8"    | 9                    | 100      | 40       | 18,0     | 14,5             | •     |
| B00100102381 | W 15/16"  | 9                    | 110      | 50       | 18,0     | 14,5             | ○     |
| B00100102540 | W 1"      | 8                    | 110      | 50       | 20,0     | 16,0             | •     |
| B00100102857 | W 1 1/8"  | 7                    | 125      | 56       | 22,0     | 18,0             | ○     |
| B00100103175 | W 1 1/4"  | 7                    | 125      | 56       | 25,0     | 20,0             | ○     |
| B00100103492 | W 1 3/8"  | 6                    | 150      | 63       | 28,0     | 22,0             | ○     |
| B00100103810 | W 1 1/2"  | 6                    | 150      | 63       | 32,0     | 24,0             | ○     |
| B00100104445 | W 1 3/4"  | 5                    | 160      | 70       | 36,0     | 29,0             | ○     |
| B00100105080 | W 2"      | 4 1/2                | 180      | 75       | 40,0     | 32,0             | ○     |

○ Ask Price and Deadline.

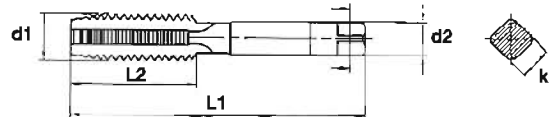


## Hand Taps In Sets of Three for UNC Thread

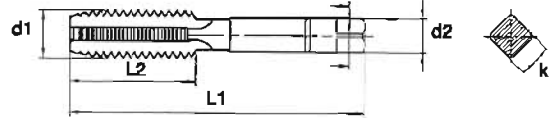
**Application:** Used for tapping through and blind holes. Recommended for threading in mould steels, unalloyed and low alloyed steels, mould iron, cast, NE-metals, zinc, magnesium alloys, and thermoplastic metals.



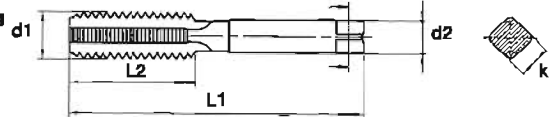
First



Middle



Bottoming



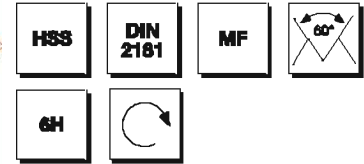
| Product Code | d1<br>UNC | P<br>pitch<br>G/Inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h127<br>mm) | Stock |
|--------------|-----------|----------------------|----------|----------|----------|-------------------|-------|
| B00100140284 | Nr. 4     | 40                   | 40       | 11       | 3,5      | 2,7               | ○     |
| B00100140317 | Nr. 5     | 40                   | 40       | 11       | 3,5      | 2,7               | ○     |
| B00100140350 | Nr. 6     | 32                   | 45       | 13       | 4,0      | 3,0               | ●     |
| B00100140417 | Nr. 8     | 32                   | 45       | 13       | 4,5      | 3,4               | ●     |
| B00100140483 | Nr.10     | 24                   | 50       | 16       | 6,0      | 4,9               | ●     |
| B00100140549 | Nr.12     | 24                   | 50       | 16       | 6,0      | 4,9               | ○     |
| B00100140794 | 5/16"     | 18                   | 56       | 22       | 6,0      | 4,9               | ●     |
| B00100140952 | 3/8"      | 16                   | 70       | 24       | 7,0      | 5,5               | ●     |
| B00100141111 | 7/16"     | 14                   | 70       | 24       | 8,0      | 6,2               | ●     |
| B00100141270 | 1/2"      | 13                   | 75       | 29       | 9,0      | 7,0               | ●     |
| B00100141429 | 9/16"     | 12                   | 80       | 30       | 11,0     | 9,0               | ●     |
| B00100141587 | 5/8"      | 11                   | 80       | 32       | 12,0     | 9,0               | ●     |
| B00100141905 | 3/4"      | 10                   | 95       | 40       | 14,0     | 11,0              | ●     |
| B00100142222 | 7/8"      | 9                    | 100      | 40       | 18,0     | 14,5              | ●     |
| B00100142540 | 1"        | 8                    | 110      | 50       | 20,0     | 16,0              | ●     |
| B00100142857 | 1 1/8"    | 7                    | 125      | 58       | 22,0     | 18,0              | ○     |
| B00100143175 | 1 1/4"    | 7                    | 125      | 56       | 25,0     | 20,0              | ○     |
| B00100143492 | 1 3/8"    | 6                    | 150      | 63       | 28,0     | 22,0              | ○     |
| B00100143810 | 1 1/2"    | 6                    | 150      | 63       | 32,0     | 24,0              | ○     |
| B00100144445 | 1 3/4"    | 5                    | 160      | 70       | 36,0     | 29,0              | ○     |
| B00100145080 | 2"        | 4 1/2                | 180      | 75       | 40,0     | 32,0              | ○     |

○ Ask Price and Deadline.

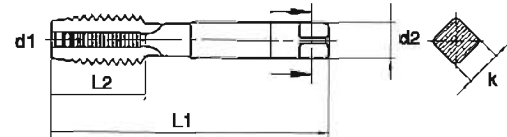


## Hand Taps In Sets of Two for Metric Fine Thread

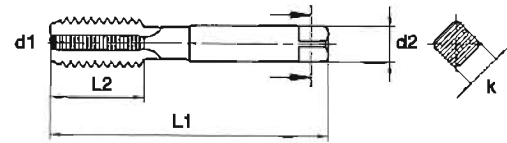
**Application:** Used for tapping through and blind holes. Suitable for threading in unalloyed and low-alloyed steels, cast, NE-metals, zinc, magnesium alloys and thermoplastic metals.



First



Bottoming

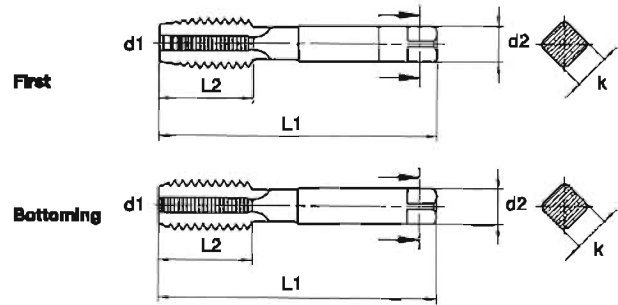
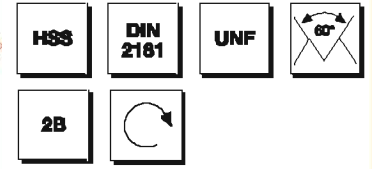


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00102030302 | M3       | 0,35       | 40       | 9        | 3,5      | 2,7              | ○     |
| B00102030352 | M3,5     | 0,35       | 45       | 10       | 4,0      | 3,0              | ○     |
| B00102030402 | M4       | 0,35       | 45       | 10       | 4,5      | 3,4              | ○     |
| B00102030403 | M4       | 0,5        | 45       | 10       | 4,5      | 3,4              | ○     |
| B00102030503 | M5       | 0,5        | 50       | 12       | 6,0      | 4,9              | ○     |
| B00102030603 | M6       | 0,5        | 50       | 14       | 6,0      | 4,9              | ○     |
| B00102030604 | M6       | 0,75       | 50       | 14       | 6,0      | 4,9              | ●     |
| B00102030704 | M7       | 0,75       | 50       | 14       | 6,0      | 4,9              | ○     |
| B00102030803 | M8       | 0,5        | 50       | 19       | 6,0      | 4,9              | ○     |
| B00102030804 | M8       | 0,75       | 50       | 19       | 6,0      | 4,9              | ●     |
| B00102030805 | M8       | 1          | 56       | 22       | 6,0      | 4,9              | ●     |
| B00102030905 | M9       | 1          | 63       | 22       | 7,0      | 5,5              | ○     |
| B00102031003 | M10      | 0,5        | 63       | 20       | 7,0      | 5,5              | ○     |
| B00102031005 | M10      | 1          | 63       | 20       | 7,0      | 5,5              | ●     |
| B00102031000 | M10      | 1,25       | 70       | 24       | 7,0      | 5,5              | ●     |
| B00102031100 | M11      | 1          | 63       | 20       | 8,0      | 6,2              | ○     |
| B00102031205 | M12      | 1          | 70       | 22       | 9,0      | 7,0              | ●     |
| B00102031200 | M12      | 1,25       | 70       | 22       | 9,0      | 7,0              | ●     |
| B00102031206 | M12      | 1,5        | 70       | 22       | 9,0      | 7,0              | ●     |
| B00102031405 | M14      | 1          | 70       | 22       | 11,0     | 9,0              | ●     |
| B00102031400 | M14      | 1,25       | 70       | 22       | 11,0     | 9,0              | ●     |
| B00102031406 | M14      | 1,5        | 70       | 22       | 11,0     | 9,0              | ●     |
| B00102031605 | M16      | 1          | 70       | 22       | 12,0     | 9,0              | ●     |
| B00102031606 | M16      | 1,5        | 70       | 22       | 12,0     | 9,0              | ●     |
| B00102031805 | M18      | 1          | 80       | 22       | 14,0     | 11,0             | ○     |
| B00102031806 | M18      | 1,5        | 80       | 22       | 14,0     | 11,0             | ●     |
| B00102032005 | M20      | 1          | 80       | 22       | 16,0     | 12,0             | ○     |
| B00102032006 | M20      | 1,5        | 80       | 22       | 16,0     | 12,0             | ●     |
| B00102032008 | M20      | 2          | 80       | 22       | 16,0     | 12,0             | ●     |
| B00102032205 | M22      | 1          | 80       | 22       | 18,0     | 14,5             | ○     |
| B00102032206 | M22      | 1,5        | 80       | 22       | 18,0     | 14,5             | ●     |
| B00102032208 | M22      | 2          | 80       | 22       | 18,0     | 14,5             | ○     |
| B00102032405 | M24      | 1          | 90       | 22       | 18,0     | 14,5             | ○     |
| B00102032406 | M24      | 1,5        | 90       | 22       | 18,0     | 14,5             | ●     |
| B00102032408 | M24      | 2          | 90       | 22       | 18,0     | 14,5             | ○     |
| B00102032606 | M26      | 1,5        | 90       | 22       | 18,0     | 14,5             | ○     |
| B00102032608 | M26      | 2          | 90       | 22       | 18,0     | 14,5             | ○     |
| B00102032706 | M27      | 1,5        | 90       | 22       | 20,0     | 16,0             | ○     |
| B00102032708 | M27      | 2          | 90       | 22       | 20,0     | 16,0             | ○     |
| B00102032806 | M28      | 1,5        | 90       | 22       | 20,0     | 16,0             | ○     |
| B00102032808 | M28      | 2          | 90       | 22       | 20,0     | 16,0             | ○     |
| B00102033006 | M30      | 1,5        | 90       | 22       | 22,0     | 18,0             | ●     |
| B00102033008 | M30      | 2          | 90       | 22       | 22,0     | 18,0             | ○     |



## Hand Taps In Sets of Two for UNF Thread

**Application:** Used for tapping through and blind holes. Suitable for unalloyed and low-alloyed steels with resistance 900 N/mm<sup>2</sup>, cast, NE-metals, zinc, magnesium alloys and thermoplastic metals.



| Product Code | d1<br>UNF | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00102060284 | Nr.4      | 48                   | 40       | 10       | 3,5      | 2,7              | ○     |
| B00102060317 | Nr.5      | 44                   | 45       | 10       | 4,0      | 3,0              | ○     |
| B00102060350 | Nr.6      | 40                   | 45       | 12       | 4,0      | 3,0              | ○     |
| B00102060417 | Nr.8      | 36                   | 50       | 12       | 6,0      | 4,9              | ○     |
| B00102060483 | Nr.10     | 32                   | 50       | 12       | 6,0      | 4,9              | ○     |
| B00102060549 | Nr.12     | 28                   | 50       | 14       | 6,0      | 4,9              | ○     |
| B00102060635 | 1/4"      | 28                   | 50       | 16       | 6,0      | 4,9              | ●     |
| B00102060794 | 5/16"     | 24                   | 56       | 22       | 6,0      | 4,9              | ●     |
| B00102060952 | 3/8"      | 24                   | 63       | 20       | 7,0      | 5,5              | ●     |
| B00102061111 | 7/16"     | 20                   | 63       | 20       | 8,0      | 6,2              | ●     |
| B00102061270 | 1/2"      | 20                   | 70       | 22       | 9,0      | 7,0              | ●     |
| B00102061429 | 9/16"     | 18                   | 70       | 22       | 11,0     | 9,0              | ●     |
| B00102061587 | 5/8"      | 18                   | 70       | 22       | 12,0     | 9,0              | ●     |
| B00102061905 | 3/4"      | 16                   | 80       | 22       | 14,0     | 11,0             | ●     |
| B00102062222 | 7/8"      | 14                   | 80       | 22       | 18,0     | 14,5             | ●     |
| B00102062540 | 1"        | 12                   | 90       | 22       | 18,0     | 14,5             | ●     |
| B00102062857 | 1 1/8"    | 12                   | 90       | 22       | 22,0     | 18,0             | ○     |
| B00102063175 | 1 1/4"    | 12                   | 90       | 22       | 22,0     | 18,0             | ○     |
| B00102063492 | 1 3/8"    | 12                   | 110      | 32       | 32,0     | 24,0             | ○     |
| B00102063810 | 1 1/2"    | 12                   | 110      | 32       | 32,0     | 24,0             | ○     |

○ Ask Price and Deadline.

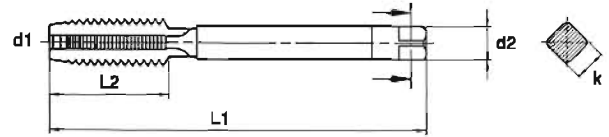


## Hand Taps In Sets of Two for Whitworth Pipe Thread

**Application:** Used for tapping through and blind holes. Recommended for threading in mould steels, unalloyed and low alloyed steels, cast, NE-metals, zinc, magnesium alloys, and thermoplastic metals.



**First**



**Bottoming**



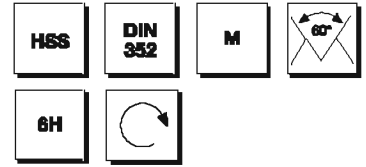
| Product Code | d1<br>BSP | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00102300973 | G 1/8"    | 28                   | 63       | 18       | 7        | 5,5              | •     |
| B00102301316 | G 1/4"    | 19                   | 63       | 20       | 11       | 9,0              | •     |
| B00102301666 | G 3/8"    | 19                   | 70       | 20       | 12       | 9,0              | •     |
| B00102302095 | G 1/2"    | 14                   | 80       | 22       | 16       | 12,0             | •     |
| B00102302291 | G 5/8"    | 14                   | 90       | 25       | 18       | 14,5             | ○     |
| B00102302644 | G 3/4"    | 14                   | 100      | 28       | 20       | 16,0             | •     |
| B00102303020 | G 7/8"    | 14                   | 100      | 28       | 20       | 16,0             | ○     |
| B00102303325 | G 1"      | 11                   | 110      | 32       | 25       | 20,0             | •     |
| B00102303790 | G 1 1/8"  | 11                   | 125      | 32       | 25       | 20,0             | ○     |
| B00102304191 | G 1 1/4"  | 11                   | 125      | 32       | 32       | 24,0             | ○     |
| B00102304780 | G 1 1/2"  | 11                   | 140      | 32       | 36       | 29,0             | ○     |
| B00102305375 | G 1 3/4"  | 11                   | 160      | 36       | 36       | 29,0             | ○     |
| B00102305961 | G 2"      | 11                   | 160      | 36       | 36       | 29,0             | ○     |

○ **Ask Price and Deadline.**



## Machine Taps for Metric Thread - SHORT SERIES

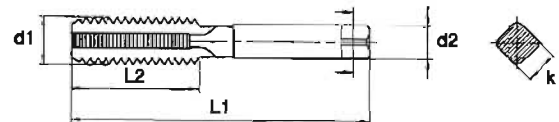
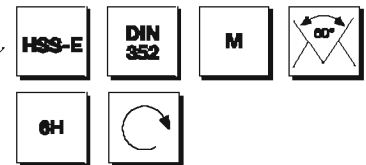
**Application:** Used for tapping through and blind holes. Suitable for threading in unalloyed and low-alloyed steels, cast, NE- metals, zinc, magnesium alloys and thermoplastic metals.



| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00104040250 | M 2,5    | 0,45       | 40       | 9        | 2,8      | 2,1              | •     |
| B00104040300 | M 3      | 0,5        | 40       | 11       | 3,5      | 2,7              | •     |
| B00104040350 | M 3,5    | 0,6        | 45       | 13       | 4,0      | 3,0              | •     |
| B00104040400 | M 4      | 0,7        | 45       | 13       | 4,5      | 3,4              | •     |
| B00104040500 | M 5      | 0,8        | 50       | 18       | 6,0      | 4,9              | •     |
| B00104040600 | M 6      | 1          | 50       | 19       | 6,0      | 4,9              | •     |
| B00104040700 | M 7      | 1          | 50       | 19       | 6,0      | 4,9              | •     |
| B00104040800 | M 8      | 1,25       | 58       | 22       | 6,0      | 4,9              | •     |
| B00104041000 | M 10     | 1,5        | 70       | 24       | 7,0      | 5,5              | •     |
| B00104041200 | M 12     | 1,75       | 75       | 29       | 9,0      | 7,0              | •     |
| B00104041400 | M 14     | 2          | 80       | 30       | 11,0     | 9,0              | •     |
| B00104041600 | M 16     | 2          | 80       | 32       | 12,0     | 9,0              | •     |
| B00104041800 | M 18     | 2,5        | 95       | 40       | 14,0     | 11,0             | •     |
| B00104042000 | M 20     | 2,5        | 95       | 40       | 16,0     | 12,0             | •     |

## Machine Taps for Metric Thread - SHORT SERIES

**Application:** Used for tapping through and blind holes. Suitable for threading in unalloyed and low-alloyed steels, cast, NE- metals, zinc, magnesium alloys and thermoplastic metals.

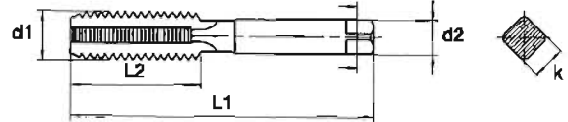
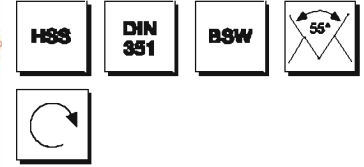


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00109160300 | M 3      | 0,5        | 40       | 11       | 3,5      | 2,7              | •     |
| B00109160400 | M 4      | 0,7        | 45       | 13       | 4,5      | 3,4              | •     |
| B00109160500 | M 5      | 0,8        | 50       | 16       | 6,0      | 4,9              | •     |
| B00109160600 | M 6      | 1          | 50       | 19       | 6,0      | 4,9              | •     |
| B00109160800 | M 8      | 1,25       | 58       | 22       | 6,0      | 4,9              | •     |
| B00109161000 | M 10     | 1,5        | 70       | 24       | 7,0      | 5,5              | •     |
| B00109161200 | M 12     | 1,75       | 75       | 29       | 9,0      | 7,0              | •     |
| B00109161400 | M 14     | 2          | 80       | 30       | 11,0     | 9,0              | •     |
| B00109161600 | M 16     | 2          | 80       | 32       | 12,0     | 9,0              | •     |



## Machine Taps for Whitworth Thread SHORT SERIES

**Application:** Used for tapping through and blind holes. Recommended for threading in mould steels, unalloyed and low alloyed steels, mould iron, cast, NE- metals, zinc, magnesium alloys, and thermoplastic metals.

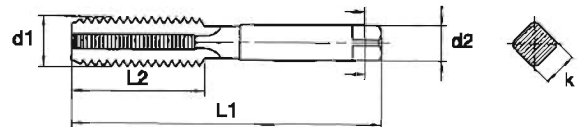
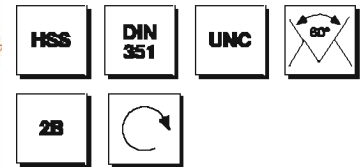


| Product Code | d1<br>BSW | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00104280635 | W 1/4"    | 20                   | 50       | 19       | 6        | 4,9              | ○     |
| B00104280794 | W 5/16"   | 18                   | 56       | 22       | 6        | 4,9              | ○     |
| B00104280852 | W 3/8"    | 16                   | 70       | 24       | 7        | 5,5              | ○     |
| B00104281111 | W 7/16"   | 14                   | 70       | 24       | 8        | 6,2              | ○     |
| B00104281270 | W 1/2"    | 12                   | 75       | 29       | 9        | 7,0              | ○     |

○ Ask Price and Deadline.

## Machine Taps for UNC Thread - SHORT SERIES

**Application:** Used for tapping through and blind holes. Recommended for threading in mould steels, unalloyed and low alloyed steels, mould iron, cast, NE- metals, zinc, magnesium alloys, and thermoplastic metals.

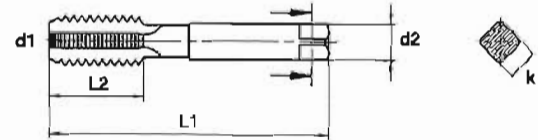
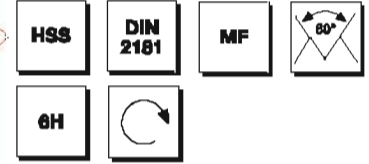


| Product Code | d1<br>UNC | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00104240635 | 1/4"      | 20                   | 50       | 19       | 6        | 4,9              | ●     |
| B00104240794 | 5/16"     | 18                   | 56       | 22       | 6        | 4,9              | ●     |
| B00104240952 | 3/8"      | 16                   | 70       | 24       | 7        | 5,5              | ●     |
| B00104241111 | 7/16"     | 14                   | 70       | 24       | 8        | 6,2              | ●     |
| B00104241270 | 1/2"      | 13                   | 75       | 29       | 9        | 7,0              | ●     |



## Machine Taps for Metric Fine Thread - SHORT SERIES

**Application:** Used for tapping through and blind holes. Suitable for threading in unalloyed and low-alloyed steels, cast, NE-metals, zinc, magnesium alloys and thermoplastic metals.

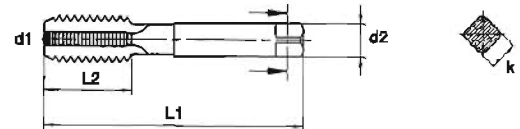
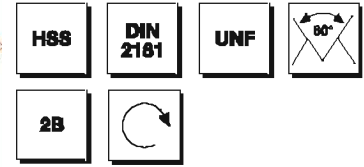


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00104120604 | M 6      | 0,75       | 50       | 14       | 6        | 4,9              | •     |
| B00104120804 | M 8      | 0,75       | 50       | 19       | 8        | 4,9              | •     |
| B00104120805 | M 8      | 1          | 56       | 22       | 6        | 4,9              | •     |
| B00104121005 | M 10     | 1          | 63       | 20       | 7        | 5,5              | •     |
| B00104121000 | M 10     | 1,25       | 63       | 20       | 7        | 5,5              | •     |
| B00104121205 | M 12     | 1          | 70       | 22       | 9        | 7,0              | •     |
| B00104121200 | M 12     | 1,25       | 70       | 22       | 9        | 7,0              | •     |
| B00104121206 | M 12     | 1,5        | 70       | 22       | 9        | 7,0              | •     |
| B00104121405 | M 14     | 1          | 70       | 22       | 11       | 9,0              | •     |
| B00104121400 | M 14     | 1,25       | 70       | 22       | 11       | 9,0              | •     |
| B00104121406 | M 14     | 1,5        | 70       | 22       | 11       | 9,0              | •     |
| B00104121605 | M 16     | 1          | 70       | 22       | 12       | 9,0              | •     |
| B00104121606 | M 16     | 1,5        | 70       | 22       | 12       | 9,0              | •     |
| B00104121806 | M 18     | 1,5        | 80       | 22       | 14       | 11,0             | •     |
| B00104122006 | M 20     | 1,5        | 80       | 22       | 16       | 12,0             | •     |
| B00104122008 | M 20     | 2          | 80       | 22       | 16       | 12,0             | •     |
| B00104122206 | M 22     | 1,5        | 80       | 22       | 18       | 14,5             | •     |
| B00104122406 | M 24     | 1,5        | 90       | 22       | 18       | 14,5             | •     |
| B00104123006 | M 30     | 1,5        | 90       | 22       | 22       | 18,0             | •     |



## Machine Taps for UNF Thread - SHORT SERIES

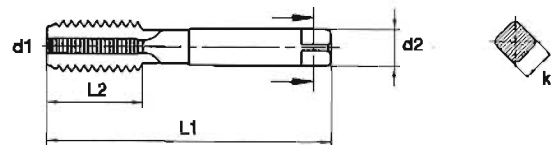
**Application:** Used for tapping through and blind holes. Suitable for unalloyed and low-alloyed steels with resistance 900 N/mm<sup>2</sup>, cast, NE-metals, zinc, magnesium alloys and thermoplastic metals.



| Product Code | d1<br>UNF | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00104140635 | 1/4"      | 28                   | 50       | 16       | 6,0      | 4,9              | •     |
| B00104140794 | 5/16"     | 24                   | 56       | 22       | 6,0      | 4,9              | •     |
| B00104140952 | 3/8"      | 24                   | 63       | 20       | 7,0      | 5,5              | •     |
| B00104141111 | 7/16"     | 20                   | 63       | 20       | 8,0      | 6,2              | •     |
| B00104141270 | 1/2"      | 20                   | 70       | 22       | 9,0      | 7,0              | •     |
| B00104141429 | 9/16"     | 18                   | 70       | 22       | 11,0     | 9,0              | •     |
| B00104141587 | 5/8"      | 18                   | 70       | 22       | 12,0     | 9,0              | •     |
| B00104141905 | 3/4"      | 16                   | 80       | 22       | 14,0     | 11,0             | •     |
| B00104142222 | 7/8"      | 14                   | 80       | 22       | 18,0     | 14,5             | •     |
| B00104142540 | 1"        | 12                   | 90       | 22       | 18,0     | 14,5             | •     |

## Machine Taps for Whitworth Pipe Thread SHORT SERIES

**Application:** Used for tapping through and blind holes. Recommended for threading in mould steels, unalloyed and low alloyed steels, cast, NE- metals, zinc, magnesium alloys, and thermoplastic metals.

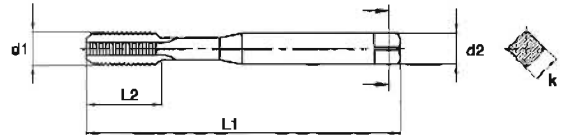
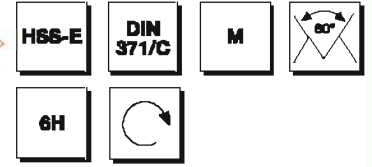


| Product Code | d1<br>BSP | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00109450973 | G 1/8"    | 28                   | 63       | 18       | 7        | 5,5              | •     |
| B00109451316 | G 1/4"    | 19                   | 63       | 20       | 11       | 9,0              | •     |
| B00109451666 | G 3/8"    | 19                   | 70       | 20       | 12       | 9,0              | •     |
| B00109452095 | G 1/2"    | 14                   | 80       | 22       | 16       | 12,0             | •     |
| B00109452644 | G 3/4"    | 14                   | 100      | 28       | 20       | 16,0             | •     |
| B00109453325 | G 1"      | 11                   | 110      | 32       | 25       | 20,0             | •     |



## Machine Taps With Straight Flutes for Metric Thread

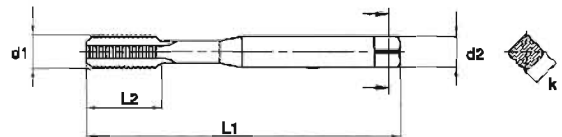
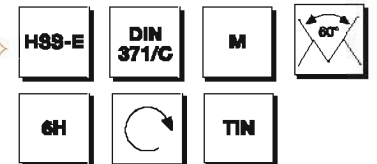
**Application:** Used for short screw -in length in through and blind hole. Suitable for threading in low-alloyed steels, cast, nodular cast iron, tempered, cast and the other metals.



| Product Code | d1 mm | P pitch | L1 mm | L2 mm | d2 mm | k (h12) mm | Stock |
|--------------|-------|---------|-------|-------|-------|------------|-------|
| B00105720300 | M3    | 0,5     | 56    | 10    | 3,5   | 2,7        | •     |
| B00105720350 | M3,5  | 0,6     | 56    | 12    | 4,0   | 3,0        | •     |
| B00105720400 | M4    | 0,7     | 63    | 12    | 4,5   | 3,4        | •     |
| B00105720500 | M5    | 0,8     | 70    | 14    | 6,0   | 4,9        | •     |
| B00105720600 | M6    | 1       | 80    | 16    | 6,0   | 4,9        | •     |
| B00105720800 | M8    | 1,25    | 90    | 18    | 8,0   | 6,2        | •     |
| B00105721000 | M10   | 1,5     | 100   | 20    | 10,0  | 8,0        | •     |
| B00105721200 | M12   | 1,75    | 110   | 24    | 12,0  | 9,0        | •     |

## Machine Taps With Straight Flutes for Metric Thread - TiN Coated

**Application:** Used for short screw -in length in through and blind hole. Suitable for threading in low-alloyed steels, cast, nodular cast iron, tempered, cast and the other metals. Long tool life and tensile strength.

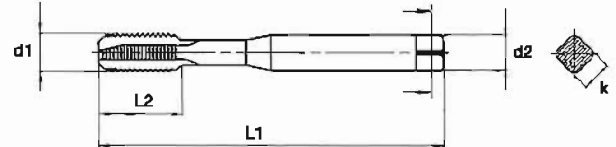
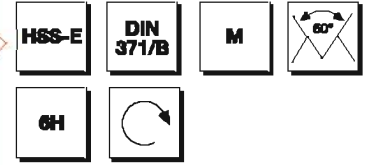


| Product Code    | d1 mm | P pitch | L1 mm | L2 mm | d2 mm | k (h12) mm | Stock |
|-----------------|-------|---------|-------|-------|-------|------------|-------|
| B00105720300TIN | M3    | 0,5     | 56    | 10    | 3,5   | 2,7        | •     |
| B00105720400TIN | M4    | 0,7     | 63    | 12    | 4,5   | 3,4        | •     |
| B00105720500TIN | M5    | 0,8     | 70    | 14    | 6,0   | 4,9        | •     |
| B00105720600TIN | M6    | 1       | 80    | 16    | 6,0   | 4,9        | •     |
| B00105720800TIN | M8    | 1,25    | 90    | 18    | 8,0   | 6,2        | •     |
| B00105721000TIN | M10   | 1,5     | 100   | 20    | 10,0  | 8,0        | •     |
| B00105721200TIN | M12   | 1,75    | 110   | 24    | 12,0  | 9,0        | •     |



## Machine Taps Straight Flute With Spiral Point for Metric Thread

**Application :** The spiral point causes better chip removal in feed direction. Suitable for tapping in steel, stainless steel, heat resisting steel and forging steels with resistance 1200 N/mm<sup>2</sup>.

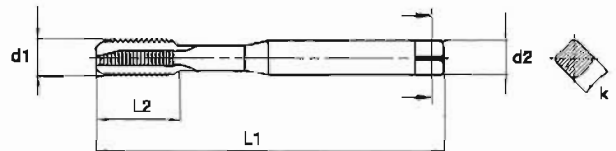
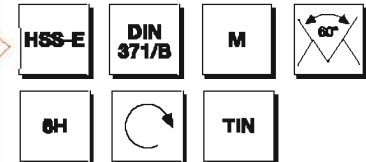


| Product Code | d1 mm | P pitch | L1 mm | L2 mm | d2 mm | k (h12) mm | Stock |
|--------------|-------|---------|-------|-------|-------|------------|-------|
| B00105710300 | M3    | 0,5     | 58    | 10    | 3,5   | 2,7        | ○     |
| B00105710400 | M4    | 0,7     | 63    | 12    | 4,5   | 3,4        | ●     |
| B00105710500 | M5    | 0,8     | 70    | 14    | 6,0   | 4,9        | ●     |
| B00105710600 | M6    | 1       | 80    | 16    | 6,0   | 4,9        | ●     |
| B00105710800 | M8    | 1,25    | 90    | 18    | 8,0   | 6,2        | ●     |
| B00105711000 | M10   | 1,5     | 100   | 20    | 10,0  | 8,0        | ●     |
| B00105712000 | M12   | 1,75    | 110   | 24    | 12,0  | 9,0        | ○     |

○ Ask Price and Deadline.

## Machine Taps Straight Flute With Spiral Point for Metric Thread - TiN COATED

**Application :** The spiral point causes better chip removal in feed direction. Suitable for tapping in steel, stainless steel, heat resisting steel and forging steels with resistance 1200 N/mm<sup>2</sup>. Long tool life and tensile strength.



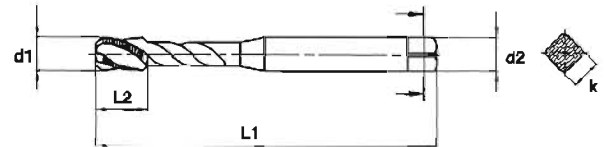
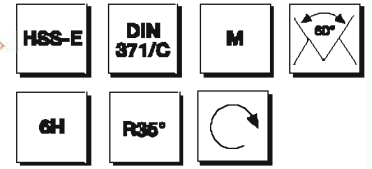
| Product Code    | d1 mm | P pitch | L1 mm | L2 mm | d2 mm | k (h12) mm | Stock |
|-----------------|-------|---------|-------|-------|-------|------------|-------|
| B00105710300TiN | M3    | 0,5     | 58    | 10    | 3,5   | 2,7        | ○     |
| B00105710400TiN | M4    | 0,7     | 63    | 12    | 4,5   | 3,4        | ●     |
| B00105710500TiN | M5    | 0,8     | 70    | 14    | 6,0   | 4,9        | ●     |
| B00105710600TiN | M6    | 1       | 80    | 16    | 6,0   | 4,9        | ●     |
| B00105710800TiN | M8    | 1,25    | 90    | 18    | 8,0   | 6,2        | ●     |
| B00105711000TiN | M10   | 1,5     | 100   | 20    | 10,0  | 8,0        | ●     |
| B00105711200TiN | M12   | 1,75    | 110   | 24    | 12,0  | 9,0        | ○     |

○ Ask Price and Deadline.



## Machine Taps With Spiral Flutes for Metric Thread

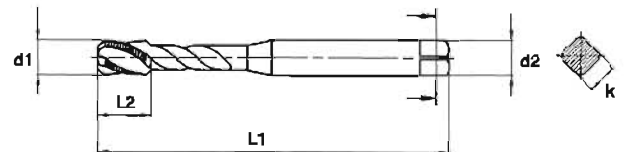
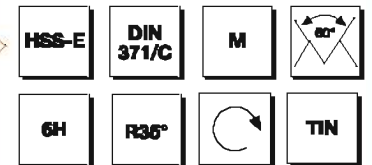
**Application:** Used for blind holes. The spiral flutes provide good chip removal from the blind hole. Recommended for use to ductile steel, bronze, copper, structural steel, stainless steels and thermoplastic materials.



| Product Code | d1 mm | P pitch | L1 mm | L2 mm | d2 mm | k (h12) mm | Stock |
|--------------|-------|---------|-------|-------|-------|------------|-------|
| B00105790133 | M3    | 0,5     | 56    | 6     | 3,5   | 2,7        | •     |
| B00105790134 | M4    | 0,7     | 63    | 7     | 4,5   | 3,4        | •     |
| B00105790135 | M5    | 0,8     | 70    | 8     | 6,0   | 4,9        | •     |
| B00105790136 | M6    | 1       | 80    | 10    | 6,0   | 4,9        | •     |
| B00105790137 | M8    | 1,25    | 90    | 12    | 8,0   | 6,2        | •     |
| B00105790138 | M10   | 1,5     | 100   | 14    | 10,0  | 8,0        | •     |
| B00105790139 | M12   | 1,75    | 110   | 16    | 12,0  | 9,0        | •     |

## Machine Taps With Spiral Flutes for Metric Thread - TiN COATED

**Application:** The spiral flutes provide good chip removal from the blind hole. Recommended for use to ductile steel, bronze, copper, structural steel, stainless steels and thermoplastic materials. Long tool life and tensile strength.

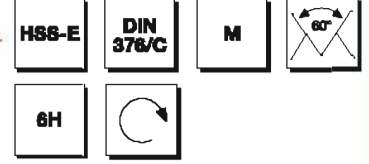


| Product Code    | d1 mm | P pitch | L1 mm | L2 mm | d2 mm | k (h12) mm | Stock |
|-----------------|-------|---------|-------|-------|-------|------------|-------|
| B00105790133TiN | M3    | 0,5     | 56    | 6     | 3,5   | 2,7        | •     |
| B00105790134TiN | M4    | 0,7     | 63    | 7     | 4,5   | 3,4        | •     |
| B00105790135TiN | M5    | 0,8     | 70    | 8     | 6,0   | 4,9        | •     |
| B00105790136TiN | M6    | 1       | 80    | 10    | 6,0   | 4,9        | •     |
| B00105790137TiN | M8    | 1,25    | 90    | 12    | 8,0   | 6,2        | •     |
| B00105790138TiN | M10   | 1,5     | 100   | 14    | 10,0  | 8,0        | •     |
| B00105790139TiN | M12   | 1,75    | 110   | 16    | 12,0  | 9,0        | •     |



## Machine Taps With Straight Flutes for Metric Thread

**Application:** Used for short screw -in length in a through and blind hole. Recommended for threading in low-alloyed steels, cast, nodular cast iron, tempered, cast and the other metals.

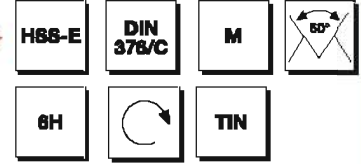


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00105780300 | M3       | 0,5        | 56       | 10       | 2,2      | -                | •     |
| B00105780400 | M4       | 0,7        | 63       | 12       | 2,8      | 2,1              | •     |
| B00105780500 | M5       | 0,8        | 70       | 14       | 3,5      | 2,7              | •     |
| B00105780600 | M6       | 1          | 80       | 16       | 4,5      | 3,4              | •     |
| B00105780800 | M8       | 1,25       | 90       | 18       | 6,0      | 4,9              | •     |
| B00105780900 | M9       | 1,25       | 90       | 18       | 7,0      | 5,5              | •     |
| B00105781000 | M10      | 1,5        | 100      | 20       | 7,0      | 5,5              | •     |
| B00105781100 | M11      | 1,5        | 100      | 20       | 8,0      | 6,2              | •     |
| B00105781200 | M12      | 1,75       | 110      | 24       | 9,0      | 7,0              | •     |
| B00105781400 | M14      | 2          | 110      | 26       | 11,0     | 9,0              | •     |
| B00105781600 | M16      | 2          | 110      | 28       | 12,0     | 9,0              | •     |
| B00105781800 | M18      | 2,5        | 125      | 30       | 14,0     | 11,0             | •     |
| B00105782000 | M20      | 2,5        | 140      | 32       | 16,0     | 12,0             | •     |
| B00105782200 | M22      | 2,5        | 140      | 32       | 18,0     | 14,5             | •     |
| B00105782400 | M24      | 3          | 160      | 34       | 18,0     | 14,5             | •     |
| B00105782700 | M27      | 3          | 160      | 38       | 20,0     | 16,0             | •     |
| B00105783000 | M30      | 3,5        | 180      | 45       | 22,0     | 18,0             | •     |



## Machine Taps With Straight Flutes for Metric Thread - TIN COATED

**Application:** Used for short screw -in length in a through and blind hole. Suitable for threading in low-alloyed steels, cast, nodular cast iron, tempered, cast and the other metals. Recommended to use coating to prevent material adhesion and extend tool life.



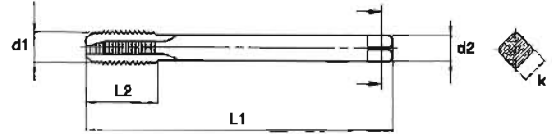
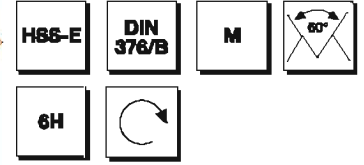
| Product Code    | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|-----------------|----------|------------|----------|----------|----------|------------------|-------|
| B00105780300TIN | M3       | 0,5        | 58       | 10       | 2,2      | -                | ○     |
| B00105780400TIN | M4       | 0,7        | 63       | 12       | 2,8      | 2,1              | ○     |
| B00105780500TIN | M5       | 0,8        | 70       | 14       | 3,5      | 2,7              | ○     |
| B00105780600TIN | M6       | 1          | 80       | 16       | 4,5      | 3,4              | ○     |
| B00105780800TIN | M8       | 1,25       | 90       | 18       | 6,0      | 4,9              | ○     |
| B00105781000TIN | M10      | 1,5        | 100      | 20       | 7,0      | 5,5              | ○     |
| B00105781200TIN | M12      | 1,75       | 110      | 24       | 9,0      | 7,0              | ●     |
| B00105781400TIN | M14      | 2          | 110      | 26       | 11,0     | 9,0              | ●     |
| B00105781600TIN | M16      | 2          | 110      | 26       | 12,0     | 9,0              | ●     |
| B00105781800TIN | M18      | 2,5        | 125      | 30       | 14,0     | 11,0             | ●     |
| B00105782000TIN | M20      | 2,5        | 140      | 32       | 16,0     | 12,0             | ●     |
| B00105782200TIN | M22      | 2,5        | 140      | 32       | 18,0     | 14,5             | ○     |
| B00105782400TIN | M24      | 3          | 160      | 34       | 18,0     | 14,5             | ●     |
| B00105782700TIN | M27      | 3          | 180      | 38       | 20,0     | 16,0             | ●     |
| B00105783000TIN | M30      | 3,5        | 180      | 45       | 22,0     | 18,0             | ●     |

○ Ask Price and Deadline.



## Machine Taps Straight Flute With Spiral Point for Metric Thread

**Application :** The spiral point causes better chip removal in feed direction. Suitable for steel, stainless steel, heat resisting steel and forging steels with resistance 1200 N/mm<sup>2</sup>.



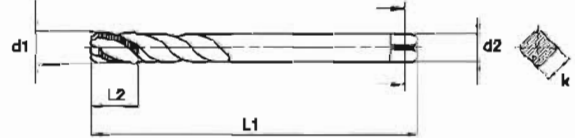
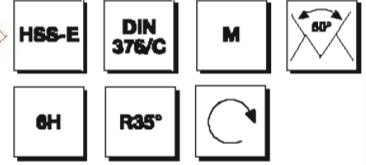
| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00105770300 | M3       | 0,5        | 58       | 10       | 2,2      | -                | ○     |
| B00105770400 | M4       | 0,7        | 63       | 12       | 2,8      | 2,1              | ○     |
| B00105770500 | M5       | 0,8        | 70       | 14       | 3,5      | 2,7              | ○     |
| B00105770600 | M6       | 1          | 80       | 16       | 4,5      | 3,4              | ●     |
| B00105770800 | M8       | 1,25       | 90       | 18       | 6,0      | 4,9              | ●     |
| B00105771000 | M10      | 1,5        | 100      | 20       | 7,0      | 5,5              | ●     |
| B00105771200 | M12      | 1,75       | 110      | 24       | 9,0      | 7,0              | ●     |
| B00105771400 | M14      | 2          | 110      | 28       | 11,0     | 9,0              | ●     |
| B00105771600 | M16      | 2          | 110      | 28       | 12,0     | 9,0              | ●     |
| B00105771800 | M18      | 2,5        | 125      | 30       | 14,0     | 11,0             | ●     |
| B00105772000 | M20      | 2,5        | 140      | 32       | 16,0     | 12,0             | ●     |
| B00105772200 | M22      | 2,5        | 140      | 32       | 18,0     | 14,5             | ○     |
| B00105772400 | M24      | 3          | 160      | 34       | 18,0     | 14,5             | ●     |
| B00105772700 | M27      | 3          | 180      | 38       | 20,0     | 16,0             | ○     |
| B00105773000 | M30      | 3,5        | 180      | 45       | 22,0     | 18,0             | ○     |

○ **Ask Price and Deadline.**



## Machine Taps With Spiral Flutes for Metric Thread

**Application:** Used for tapping blind holes. The helix flutes provide better chip evacuation towards the shank. Recommended for ductile steel, bronze, copper, structural steel, stainless steels and thermoplastic materials.

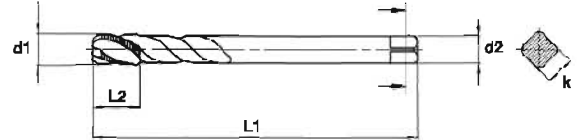
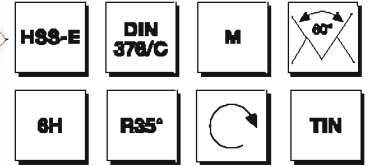


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00105790249 | M3       | 0,5        | 58       | 6        | 2,2      | -                | •     |
| B00105790251 | M4       | 0,7        | 63       | 7        | 2,8      | 2,1              | •     |
| B00105790252 | M5       | 0,8        | 70       | 8        | 3,5      | 2,7              | •     |
| B00105790253 | M6       | 1          | 80       | 10       | 4,5      | 3,4              | •     |
| B00105790255 | M8       | 1,25       | 90       | 12       | 6,0      | 4,9              | •     |
| B00105790257 | M10      | 1,5        | 100      | 14       | 7,0      | 5,5              | •     |
| B00105790259 | M12      | 1,75       | 110      | 16       | 9,0      | 7,0              | •     |
| B00105790280 | M14      | 2          | 110      | 18       | 11,0     | 9,0              | •     |
| B00105790261 | M16      | 2          | 110      | 20       | 12,0     | 9,0              | •     |
| B00105790262 | M18      | 2,5        | 125      | 22       | 14,0     | 11,0             | •     |
| B00105790263 | M20      | 2,5        | 140      | 22       | 16,0     | 12,0             | •     |
| B00105790264 | M22      | 2,5        | 140      | 24       | 18,0     | 14,5             | •     |
| B00105790285 | M24      | 3          | 160      | 28       | 18,0     | 14,5             | •     |
| B00105790407 | M27      | 3          | 180      | 30       | 20,0     | 18,0             | •     |
| B00105790267 | M30      | 3,5        | 180      | 35       | 22,0     | 18,0             | •     |



## Machine Taps With Spiral Flutes for Metric Thread - TiN COATED

**Application:** Used for tapping blind holes. The helix flutes provide better chip evacuation towards the shank. Recommended for ductile steel, bronze, copper, structural steel, stainless steels and thermoplastic materials. Recommended coated using, to prevent material adhesion and extend tool life.



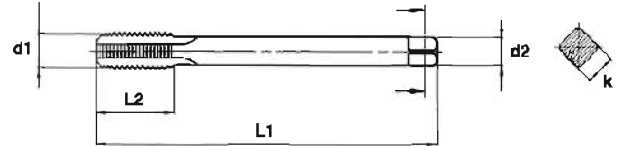
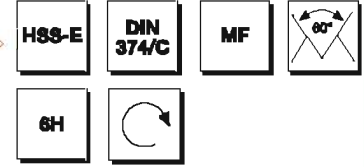
| Product Code    | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|-----------------|----------|------------|----------|----------|----------|------------------|-------|
| B00105790249TiN | M3       | 0,5        | 56       | 6        | 2,2      | -                | ○     |
| B00105790251TiN | M4       | 0,7        | 63       | 7        | 2,8      | 2,1              | ○     |
| B00105790252TiN | M5       | 0,8        | 70       | 8        | 3,5      | 2,7              | ○     |
| B00105790253TiN | M6       | 1          | 80       | 10       | 4,5      | 3,4              | ○     |
| B00105790255TiN | M8       | 1,25       | 90       | 12       | 6,0      | 4,9              | ○     |
| B00105790257TiN | M10      | 1,5        | 100      | 14       | 7,0      | 5,5              | ○     |
| B00105790259TiN | M12      | 1,75       | 110      | 16       | 9,0      | 7,0              | ●     |
| B00105790260TiN | M14      | 2          | 110      | 18       | 11,0     | 9,0              | ●     |
| B00105790261TiN | M16      | 2          | 110      | 20       | 12,0     | 9,0              | ●     |
| B00105790262TiN | M18      | 2,5        | 125      | 22       | 14,0     | 11,0             | ●     |
| B00105790263TiN | M20      | 2,5        | 140      | 22       | 16,0     | 12,0             | ●     |
| B00105790264TiN | M22      | 2,5        | 140      | 24       | 18,0     | 14,5             | ●     |
| B00105790265TiN | M24      | 3          | 160      | 28       | 18,0     | 14,5             | ●     |
| B00105790407TiN | M27      | 3          | 160      | 30       | 20,0     | 16,0             | ○     |
| B00105790267TiN | M30      | 3,5        | 180      | 35       | 22,0     | 18,0             | ○     |

○ **Ask Price and Deadline.**



## Machine Taps With Straight Flutes for Metric Fine Thread

**Application:** Used for short screw -in length in a through and blind hole. Recommended for threading in low-alloyed steels, cast, nodular cast iron, tempered, cast and the other metals.



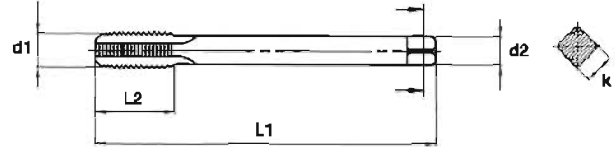
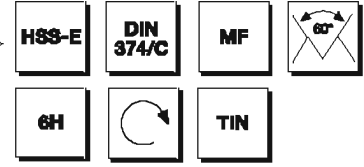
| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00105750603 | M6       | 0,5        | 80       | 14       | 4,5      | 3,4              | ○     |
| B00105750604 | M6       | 0,75       | 80       | 14       | 4,5      | 3,4              | ●     |
| B00105750803 | M8       | 0,5        | 80       | 16       | 6,0      | 4,9              | ○     |
| B00105750805 | M8       | 1          | 90       | 16       | 6,0      | 4,9              | ●     |
| B00105751004 | M10      | 0,75       | 90       | 20       | 7,0      | 5,5              | ○     |
| B00105751005 | M10      | 1          | 90       | 20       | 7,0      | 5,5              | ●     |
| B00105751000 | M10      | 1,25       | 90       | 20       | 7,0      | 5,5              | ●     |
| B00105751205 | M12      | 1          | 100      | 22       | 9,0      | 7,0              | ●     |
| B00105751200 | M12      | 1,25       | 100      | 22       | 9,0      | 7,0              | ●     |
| B00105751206 | M12      | 1,5        | 100      | 22       | 9,0      | 7,0              | ●     |
| B00105751405 | M14      | 1          | 100      | 22       | 11,0     | 9,0              | ●     |
| B00105751400 | M14      | 1,25       | 100      | 22       | 11,0     | 9,0              | ●     |
| B00105751406 | M14      | 1,5        | 100      | 22       | 11,0     | 9,0              | ●     |
| B00105751605 | M16      | 1          | 100      | 22       | 12,0     | 9,0              | ○     |
| B00105751606 | M16      | 1,5        | 100      | 22       | 12,0     | 9,0              | ●     |
| B00105751805 | M18      | 1          | 110      | 25       | 14,0     | 11,0             | ○     |
| B00105751806 | M18      | 1,5        | 110      | 25       | 14,0     | 11,0             | ●     |
| B00105752005 | M20      | 1          | 125      | 25       | 16,0     | 12,0             | ○     |
| B00105752006 | M20      | 1,5        | 125      | 25       | 16,0     | 12,0             | ●     |
| B00105752206 | M22      | 1,5        | 125      | 25       | 18,0     | 14,5             | ●     |
| B00105752406 | M24      | 1,5        | 140      | 28       | 18,0     | 14,5             | ●     |
| B00105752806 | M28      | 1,5        | 140      | 28       | 20,0     | 16,0             | ○     |
| B00105753006 | M30      | 1,5        | 150      | 28       | 22,0     | 18,0             | ○     |

○ Ask Price and Deadline.



## Machine Taps With Straight Flutes for Metric Fine Thread - TiN Coated

**Application:** Used for short screw -in length in a through and blind hole. Recommended for threading in low-alloyed steels, cast, nodular cast iron, tempered, cast and the other metals. Recommended coated using to prevent material adhesion and extend tool life



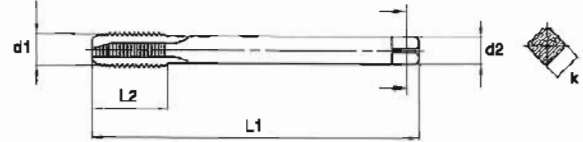
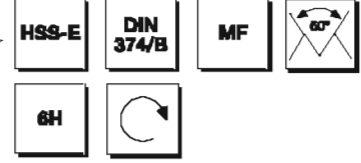
| Product Code    | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|-----------------|----------|------------|----------|----------|----------|------------------|-------|
| B00105750603TIN | M6       | 0,5        | 80       | 14       | 4,5      | 3,4              | ○     |
| B00105750804TIN | M6       | 0,75       | 80       | 14       | 4,5      | 3,4              | ●     |
| B00105750803TIN | M8       | 0,5        | 80       | 16       | 6,0      | 4,9              | ○     |
| B00105750805TIN | M8       | 1          | 90       | 16       | 6,0      | 4,9              | ●     |
| B00105751004TIN | M10      | 0,75       | 90       | 20       | 7,0      | 5,5              | ○     |
| B00105751005TIN | M10      | 1          | 90       | 20       | 7,0      | 5,5              | ●     |
| B00105751000TIN | M10      | 1,25       | 90       | 20       | 7,0      | 5,5              | ●     |
| B00105751205TIN | M12      | 1          | 100      | 22       | 9,0      | 7,0              | ●     |
| B00105751208TIN | M12      | 1,25       | 100      | 22       | 9,0      | 7,0              | ●     |
| B00105751400TIN | M12      | 1,5        | 100      | 22       | 9,0      | 7,0              | ●     |
| B00105751405TIN | M14      | 1          | 100      | 22       | 11,0     | 9,0              | ●     |
| B00105751400TIN | M14      | 1,25       | 100      | 22       | 11,0     | 9,0              | ●     |
| B00105751408TIN | M14      | 1,5        | 100      | 22       | 11,0     | 9,0              | ●     |
| B00105751605TIN | M16      | 1          | 100      | 22       | 12,0     | 9,0              | ○     |
| B00105751608TIN | M16      | 1,5        | 100      | 22       | 12,0     | 9,0              | ●     |
| B00105751805TIN | M18      | 1          | 110      | 25       | 14,0     | 11,0             | ○     |
| B00105751806TIN | M18      | 1,5        | 110      | 25       | 14,0     | 11,0             | ●     |
| B00105752005TIN | M20      | 1          | 125      | 25       | 16,0     | 12,0             | ○     |
| B00105752008TIN | M20      | 1,5        | 125      | 25       | 16,0     | 12,0             | ●     |
| B00105752206TIN | M22      | 1,5        | 125      | 25       | 18,0     | 14,5             | ●     |
| B00105752406TIN | M24      | 1,5        | 140      | 28       | 18,0     | 14,5             | ●     |
| B00105752806TIN | M28      | 1,5        | 140      | 28       | 20,0     | 16,0             | ○     |
| B00105753008TIN | M30      | 1,5        | 150      | 28       | 22,0     | 18,0             | ○     |

○ Ask Price and Deadline.



## Machine Taps Straight Flute With Spiral Point for Metric Fine Thread

**Application :** The spiral point provides better chip removal in feed direction. Suitable for tapping to steel, stainless steel, heat resisting steel and forging steels with resistance 1200 N/mm<sup>2</sup>.



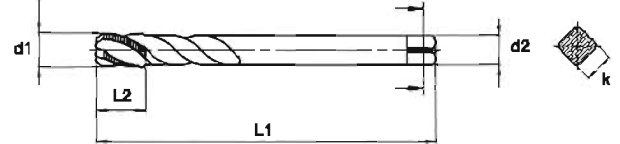
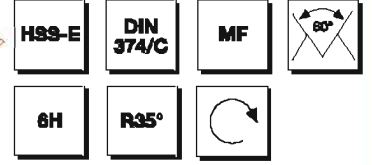
| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00105740603 | M6       | 0,5        | 80       | 14       | 4,5      | 3,4              | ○     |
| B00105740604 | M6       | 0,75       | 80       | 14       | 4,5      | 3,4              | ●     |
| B00105740805 | M8       | 1          | 90       | 16       | 6,0      | 4,9              | ●     |
| B00105741004 | M10      | 0,75       | 90       | 20       | 7,0      | 5,5              | ○     |
| B00105741005 | M10      | 1          | 90       | 20       | 7,0      | 5,5              | ●     |
| B00105741000 | M10      | 1,25       | 90       | 20       | 7,0      | 5,5              | ●     |
| B00105741205 | M12      | 1          | 100      | 22       | 9,0      | 7,0              | ●     |
| B00105741200 | M12      | 1,25       | 100      | 22       | 9,0      | 7,0              | ●     |
| B00105741206 | M12      | 1,5        | 100      | 22       | 9,0      | 7,0              | ●     |
| B00105741405 | M14      | 1          | 100      | 22       | 11,0     | 9,0              | ●     |
| B00105741400 | M14      | 1,25       | 100      | 22       | 11,0     | 9,0              | ●     |
| B00105741406 | M14      | 1,5        | 100      | 22       | 11,0     | 9,0              | ○     |
| B00105741605 | M16      | 1          | 100      | 22       | 12,0     | 9,0              | ○     |
| B00105741606 | M16      | 1,5        | 100      | 22       | 12,0     | 9,0              | ●     |
| B00105741805 | M18      | 1          | 110      | 25       | 14,0     | 11,0             | ○     |
| B00105741806 | M18      | 1,5        | 110      | 25       | 14,0     | 11,0             | ●     |
| B00105742005 | M20      | 1          | 125      | 25       | 16,0     | 12,0             | ○     |
| B00105742006 | M20      | 1,5        | 125      | 25       | 16,0     | 12,0             | ●     |
| B00105742206 | M22      | 1,5        | 125      | 25       | 18,0     | 14,5             | ●     |
| B00105742406 | M24      | 1,5        | 140      | 28       | 18,0     | 14,5             | ●     |
| B00105742806 | M28      | 1,5        | 140      | 28       | 20,0     | 16,0             | ○     |
| B00105743006 | M30      | 1,5        | 150      | 28       | 22,0     | 18,0             | ○     |

○ Ask Price and Deadline.



## Machine Taps With Spiral Flutes for Metric Fine Thread

**Application:** Used for tapping blind holes. The helix flutes provides a better chip evacuation towards the shank. Recommended to use in ductile steel, bronze, copper, structural steel, stainless steels and thermoplastic materials.



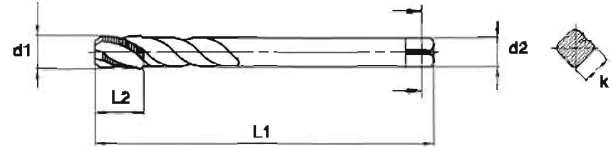
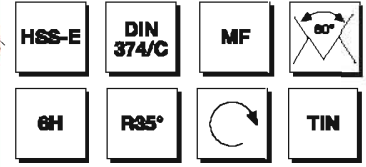
| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00105790565 | M6       | 0,75       | 80       | 8        | 4,5      | 3,4              | •     |
| B00105790681 | M8       | 0,5        | 80       | 10       | 6,0      | 4,8              | ○     |
| B00105790490 | M8       | 1          | 90       | 10       | 6,0      | 4,8              | •     |
| B00105790336 | M10      | 1          | 90       | 12       | 7,0      | 5,5              | •     |
| B00105790390 | M10      | 1,25       | 90       | 12       | 7,0      | 5,5              | •     |
| B00105790391 | M12      | 1          | 100      | 14       | 9,0      | 7,0              | •     |
| B00105790392 | M12      | 1,25       | 100      | 14       | 9,0      | 7,0              | •     |
| B00105790006 | M12      | 1,5        | 100      | 14       | 9,0      | 7,0              | •     |
| B00105790393 | M14      | 1          | 100      | 16       | 11,0     | 9,0              | •     |
| B00105790394 | M14      | 1,25       | 100      | 16       | 11,0     | 9,0              | •     |
| B00105790292 | M14      | 1,5        | 100      | 16       | 11,0     | 9,0              | •     |
| B00105790680 | M16      | 1          | 100      | 18       | 12,0     | 9,0              | ○     |
| B00105790338 | M16      | 1,5        | 100      | 18       | 12,0     | 9,0              | •     |
| B00105790287 | M18      | 1,5        | 110      | 20       | 14,0     | 11,0             | •     |
| B00105790591 | M20      | 1          | 125      | 22       | 16,0     | 12,0             | ○     |
| B00105790340 | M20      | 1,5        | 125      | 22       | 16,0     | 12,0             | •     |
| B00105790186 | M22      | 1,5        | 125      | 25       | 18,0     | 14,5             | •     |
| B00105790551 | M24      | 1,5        | 140      | 25       | 18,0     | 14,5             | •     |
| B00105790552 | M28      | 1,5        | 140      | 25       | 20,0     | 16,0             | ○     |
| B00105790553 | M30      | 1,5        | 150      | 25       | 22,0     | 18,0             | ○     |

○ Ask Price and Deadline.



## Machine Taps With Spiral Flutes for Metric Fine Thread - TiN Coated

**Application:** Used for tapping blind holes. The helix flutes provides a better chip evacuation towards the shank. Recommended to use in ductile steel, bronze, copper, structural steel, stainless steels and thermoplastic materials. Recommended to use coating to prevent material adhesion and extend tool life.



| Product Code    | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|-----------------|----------|------------|----------|----------|----------|------------------|-------|
| B00105790490TIN | M8       | 1          | 90       | 10       | 8,0      | 4,9              | ●     |
| B00105790336TIN | M10      | 1          | 90       | 12       | 7,0      | 5,5              | ●     |
| B00105790390TIN | M10      | 1,25       | 90       | 12       | 7,0      | 5,5              | ○     |
| B00105790391TIN | M12      | 1          | 100      | 14       | 9,0      | 7,0              | ○     |
| B00105790392TIN | M12      | 1,25       | 100      | 14       | 9,0      | 7,0              | ○     |
| B00105790006TIN | M12      | 1,5        | 100      | 14       | 9,0      | 7,0              | ●     |
| B00105790393TIN | M14      | 1          | 100      | 16       | 11,0     | 9,0              | ○     |
| B00105790394TIN | M14      | 1,25       | 100      | 16       | 11,0     | 9,0              | ○     |
| B00105790292TIN | M14      | 1,5        | 100      | 16       | 11,0     | 9,0              | ●     |
| B00105790880TIN | M18      | 1          | 100      | 18       | 12,0     | 9,0              | ○     |
| B00105790338TIN | M18      | 1,5        | 100      | 18       | 12,0     | 9,0              | ●     |
| B00105790287TIN | M18      | 1,5        | 110      | 20       | 14,0     | 11,0             | ○     |
| B00105790591TIN | M20      | 1          | 125      | 22       | 16,0     | 12,0             | ○     |
| B00105790340TIN | M20      | 1,5        | 125      | 22       | 16,0     | 12,0             | ●     |
| B00105790186TIN | M22      | 1,5        | 125      | 25       | 18,0     | 14,5             | ○     |
| B00105790551TIN | M24      | 1,5        | 140      | 25       | 18,0     | 14,5             | ●     |
| B00105790552TIN | M28      | 1,5        | 140      | 25       | 20,0     | 16,0             | ○     |
| B00105790553TIN | M30      | 1,5        | 150      | 25       | 22,0     | 18,0             | ○     |

○ Ask Price and Deadline.

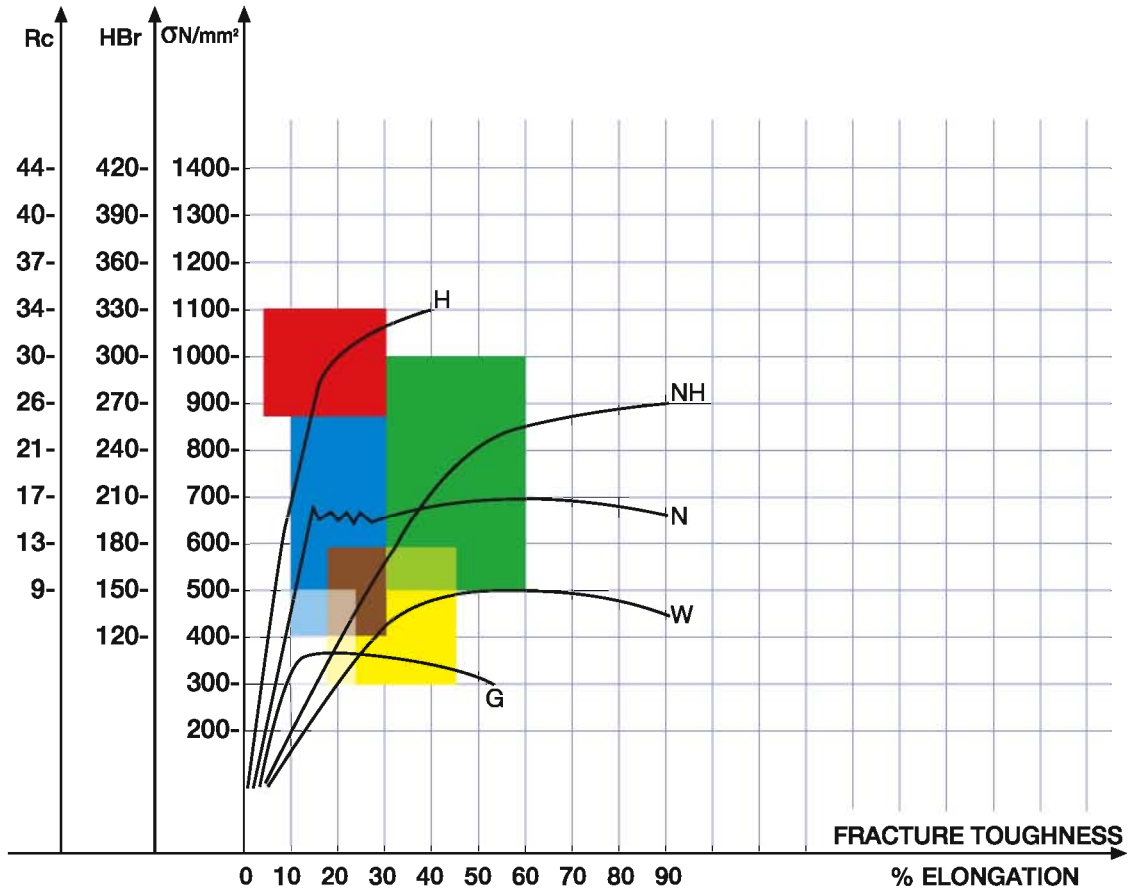


## Colored Taps

Various materials are processed using machining method. for maximum productivity, it is essential the tool to have suitable cutting parameters for the mechanical properties of the work piece. Makina Takım Endüstrisi A.S. gathered the processed materials in five main groups taking into account the conditions in Turkey and developed taps with necessary cutting geometries for them. Have been produced blue color taps semi hard materials, white color taps for brittle materials, yellow color taps for soft materials, green color taps for ductile materials and red color taps for hard materials. Now you can choose the most suitable and economic Makina Takım Endüstrisi A.S. taps for materials you can conveniently process.

|                                |               |
|--------------------------------|---------------|
| <b>for semi hard materials</b> | <b>BLUE</b>   |
| <b>for brittle materials</b>   | <b>WHITE</b>  |
| <b>for soft materials</b>      | <b>YELLOW</b> |
| <b>for ductile materials</b>   | <b>GREEN</b>  |
| <b>for hard materials</b>      | <b>RED</b>    |

## Hardness and Tensile Strength



**N**  
400 <  $\sigma$  < 850 N/mm<sup>2</sup>  
Semi Hard Materials



**G**  
 $\sigma$  < 500 N/mm<sup>2</sup>  
Brittle Materials



**W**  
300 <  $\sigma$  < 600 N/mm<sup>2</sup>  
Soft Materials

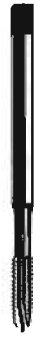


**NH**  
500 <  $\sigma$  < 1000 N/mm<sup>2</sup>  
Ductile Materials



**H**  
850 <  $\sigma$  < 1100 N/mm<sup>2</sup>  
Hard Materials



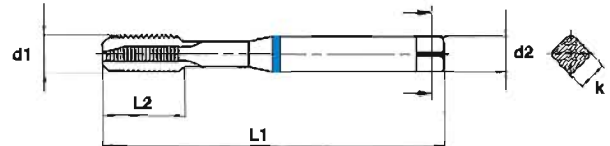
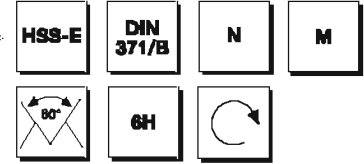
| TYPE                            | N                                                                                                                 |                                                                                     |                                                                                                                                                                                                    |                                                                                     |                                                                                                                                                                                        |                                                                                      |                                                                                                                                              |                                                                                       |                                                                                                                                            |                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Application Field               | <ul style="list-style-type: none"> <li>o Steel</li> <li>o Aluminium</li> <li>o Materials such as brass</li> </ul> |                                                                                     | <ul style="list-style-type: none"> <li>o Construction Steel</li> <li>o Cementation Steel</li> <li>o Stainless Steel (elongating less than 30%)</li> <li>o Spheroidal Graphite Cast Iron</li> </ul> |                                                                                     | <ul style="list-style-type: none"> <li>o Automate Steel</li> <li>o &lt;SI %8, Aluminium Alloys</li> <li>o &gt;SI %8, Aluminium Alloys, TIN coated</li> <li>o &lt;MS58 Brass</li> </ul> |                                                                                      | <ul style="list-style-type: none"> <li>o Steel up to 900 N/mm<sup>2</sup></li> <li>o Reinforced Fiberglass</li> <li>o Steel Casts</li> </ul> |                                                                                       | <ul style="list-style-type: none"> <li>o Steels</li> <li>o Aluminium</li> <li>o Stainless Steel (elongation with less than 30%)</li> </ul> |                                                                                       |
| Chip Type of Processed Material | Long Chip                                                                                                         |                                                                                     | Long and Bonding Chip                                                                                                                                                                              |                                                                                     | Short Chip                                                                                                                                                                             |                                                                                      | Long Chip, Bonding and Abrasive                                                                                                              |                                                                                       | Long Chip, Normal, Soft or Hard Materials                                                                                                  |                                                                                       |
| Surface Process                 | Bright                                                                                                            |                                                                                     | Steam Tempered                                                                                                                                                                                     |                                                                                     | Bright                                                                                                                                                                                 |                                                                                      | TIN Coated                                                                                                                                   |                                                                                       | Bright                                                                                                                                     |                                                                                       |
| Type of the Tap                 |                                                                                                                   |                                                                                     |                                                                                                                                                                                                    |                                                                                     |                                                                                                                                                                                        |                                                                                      |                                                                                                                                              |                                                                                       | Interrupted Teeth                                                                                                                          |                                                                                       |
|                                 | Spiral Point form B form C (Straight Flute)                                                                       | Right Hand Helix 35° form C                                                         | Spiral Point form B form C (Straight Flute)                                                                                                                                                        | Right Hand Helix 35° form C                                                         | Spiral Point form B form C (Straight Flute)                                                                                                                                            | Right Hand Helix 35° form C                                                          | Spiral Point form B form C (Straight Flute)                                                                                                  | Right Hand Helix 35° form C                                                           | Spiral Point form B form C (Straight Flute)                                                                                                | Right Hand Helix 35° form C                                                           |
| HSS-E Machine Taps              |                                |  |                                                                                                                 |  |                                                                                                     |   |                                                         |  |                                                       |  |
| Hole Type                       |                                |  |                                                                                                                 |  |                                                                                                     |  |                                                         |  |                                                       |  |
| DIN 371 (M3-M12)                | N                                                                                                                 | N                                                                                   | N                                                                                                                                                                                                  | N                                                                                   | N                                                                                                                                                                                      | N                                                                                    | N                                                                                                                                            | N                                                                                     | N                                                                                                                                          | N                                                                                     |
| DIN 376 (M8-M18)                | N                                                                                                                 | N                                                                                   | N                                                                                                                                                                                                  | N                                                                                   | N                                                                                                                                                                                      | N                                                                                    | N                                                                                                                                            | N                                                                                     | N                                                                                                                                          | N                                                                                     |
| Operating Conditions            | Vc= 10-20 m/min<br>Cutting oil or Emulsion                                                                        |                                                                                     | Vc= 5-10 m/min<br>Cutting Oil                                                                                                                                                                      |                                                                                     | Vc= 6-15 m/min<br>Cutting Oil with additive or Emulsion                                                                                                                                |                                                                                      | Vc= 6-15 m/min<br>Cutting Oil                                                                                                                |                                                                                       | Vc= 5-15 m/min<br>Cutting Oil                                                                                                              |                                                                                       |



|                                                                                          |                                                                                     |                                                                                     | G                                                                                                                                                                                                                        |                                                                                     | W                                                                                                                                                                                                      |                                                                                     | NH                                                                                                                                                                                                        |                                                                                       |                                                                                       | H                                                                                                                                                                                           |                                                                                       |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Soft Materials</li> <li>Malleable Iron</li> </ul> |                                                                                     |                                                                                     | <ul style="list-style-type: none"> <li>Cast Iron</li> <li>GG10...GG25</li> <li>GG30...GG45</li> <li>Spheroidal Graphite, Tempered Cast Iron</li> <li>GT555.GGG50</li> <li>GTS70.GGG70</li> <li>Ms58.Ms58.Ms60</li> </ul> |                                                                                     | <ul style="list-style-type: none"> <li>Al-Al Alloys</li> <li>Magnesium Alloys</li> <li>Cu (low) Alloys</li> <li>Cast Al Alloys</li> <li>Al Si Alloys (&lt;10 Si)</li> <li>Low Carbon Steels</li> </ul> |                                                                                     | <ul style="list-style-type: none"> <li>Ni-Ni Alloys</li> <li>Stainless - Heat Resistant Steel</li> <li>Alloyed- Steel Casting</li> <li>Bronze (long chipping)</li> <li>White Tempered Castings</li> </ul> |                                                                                       |                                                                                       | <ul style="list-style-type: none"> <li>Alloyed Construction Steel</li> <li>Alloyed Tempered Steel</li> <li>Nitration Steels</li> <li>Tool Steels</li> <li>HSS</li> <li>Ti Alloys</li> </ul> |                                                                                       |
| Various Materials with Elongation>100%                                                   |                                                                                     |                                                                                     | Cast                                                                                                                                                                                                                     |                                                                                     | Long Chipping Soft Materials                                                                                                                                                                           |                                                                                     | Long Chip, Bonding and Abrasive                                                                                                                                                                           |                                                                                       |                                                                                       | Very hard Materials (Extremely difficult-to-machine materials)                                                                                                                              |                                                                                       |
| Bright Nitrated TiN Coated                                                               |                                                                                     |                                                                                     | Bright TiN Coated                                                                                                                                                                                                        |                                                                                     | Bright                                                                                                                                                                                                 |                                                                                     | Bright                                                                                                                                                                                                    |                                                                                       |                                                                                       | Bright                                                                                                                                                                                      |                                                                                       |
| Fluteless form B                                                                         | Fluteless form C                                                                    | Fluteless form C                                                                    | Straight Fluted form C                                                                                                                                                                                                   | Right Hand Helix 15° form C                                                         | Spiral Point form B                                                                                                                                                                                    | Right Hand Helix 45° form C                                                         | Spiral Point form B                                                                                                                                                                                       | Right Hand Helix 15° form C                                                           | Right Hand Helix 35° form C                                                           | Spiral Point form B                                                                                                                                                                         | Right Hand Helix 25° form C                                                           |
|       |  |  |                                                                                                                                       |  |                                                                                                                     |  |                                                                                                                        |  |  |                                                                                                        |  |
|       |  |  |                                                                                                                                       |  |                                                                                                                     |  |                                                                                                                       |  |  |                                                                                                        |  |
| N                                                                                        | N                                                                                   | N                                                                                   | G                                                                                                                                                                                                                        | G                                                                                   | W                                                                                                                                                                                                      | W                                                                                   | NH                                                                                                                                                                                                        | NH                                                                                    | NH                                                                                    | H                                                                                                                                                                                           | H                                                                                     |
| N                                                                                        | N                                                                                   | N                                                                                   | G                                                                                                                                                                                                                        | G                                                                                   | W                                                                                                                                                                                                      | W                                                                                   | NH                                                                                                                                                                                                        | NH                                                                                    | NH                                                                                    | H                                                                                                                                                                                           | H                                                                                     |
| Vc= 10-20 m/min<br>Coolant or Emulsion                                                   |                                                                                     |                                                                                     | Vc= 6-12 m/min<br>Coolant or Emulsion                                                                                                                                                                                    |                                                                                     | Vc= 15-25 m/min<br>Cutting Oil with Additive or Emulsion                                                                                                                                               |                                                                                     | Vc= 3-6 m/min<br>Cutting Oil with Additive                                                                                                                                                                |                                                                                       |                                                                                       | Vc= 2-5 m/min<br>Coolant                                                                                                                                                                    |                                                                                       |



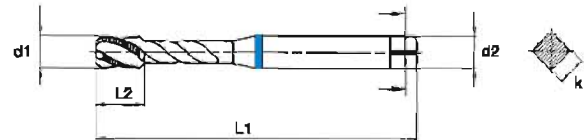
## Machine Taps Straight Flute With Spiral Point BLUE SERIES



| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103010300 | M3       | 0,5        | 56       | 10       | 3,5      | 2,7              | •     |
| B00103010400 | M4       | 0,7        | 63       | 12       | 4,5      | 3,4              | •     |
| B00103010500 | M5       | 0,8        | 70       | 14       | 6,0      | 4,9              | •     |
| B00103010600 | M6       | 1          | 80       | 16       | 6,0      | 4,9              | •     |
| B00103010800 | M8       | 1,25       | 90       | 18       | 8,0      | 6,2              | •     |
| B00103011000 | M10      | 1,5        | 100      | 20       | 10,0     | 8,0              | •     |
| B00103011200 | M12      | 1,75       | 110      | 24       | 12,0     | 9,0              | ○     |

◦ Ask Price and Deadline.

## Machine Taps With Spiral Flutes BLUE SERIES

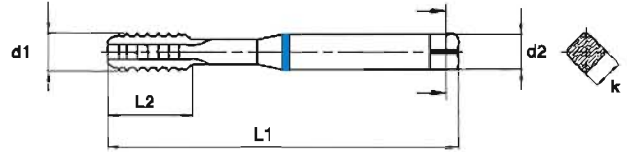
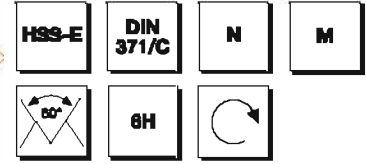


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103030300 | M3       | 0,5        | 58       | 8        | 3,5      | 2,7              | ○     |
| B00103030400 | M4       | 0,7        | 63       | 7        | 4,5      | 3,4              | •     |
| B00103030500 | M5       | 0,8        | 70       | 8        | 6,0      | 4,9              | •     |
| B00103030800 | M6       | 1          | 80       | 10       | 6,0      | 4,9              | •     |
| B00103030800 | M8       | 1,25       | 90       | 12       | 8,0      | 6,2              | •     |
| B00103031000 | M10      | 1,5        | 100      | 14       | 10,0     | 8,0              | •     |
| B00103031200 | M12      | 1,75       | 110      | 16       | 12,0     | 9,0              | ○     |

◦ Ask Price and Deadline.



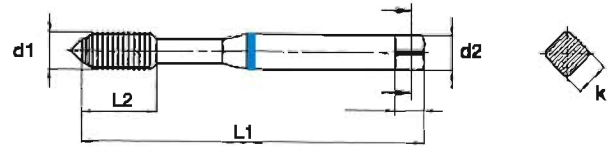
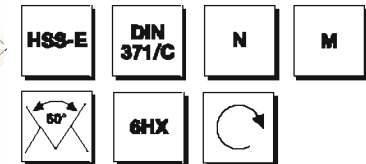
## Machine Taps With Interrupted Teeth BLUE SERIES



| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103130300 | M3       | 0,5        | 58       | 10       | 3,5      | 2,7              | ○     |
| B00103130400 | M4       | 0,7        | 63       | 12       | 4,5      | 3,4              | ○     |
| B00103130500 | M5       | 0,8        | 70       | 14       | 6,0      | 4,9              | ○     |
| B00103130600 | M6       | 1          | 80       | 16       | 6,0      | 4,9              | ○     |
| B00103130800 | M8       | 1,25       | 90       | 18       | 8,0      | 6,2              | ○     |
| B00103131000 | M10      | 1,5        | 100      | 20       | 10,0     | 8,0              | ○     |
| B00103131200 | M12      | 1,75       | 110      | 24       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.

## Flutless Taps - BLUE SERIES

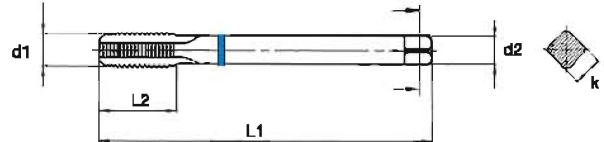
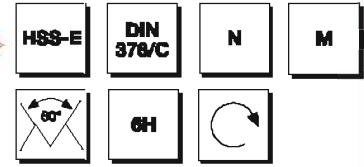


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103180300 | M3       | 0,5        | 58       | 10       | 3,5      | 2,7              | ●     |
| B00103180400 | M4       | 0,7        | 63       | 12       | 4,5      | 3,4              | ●     |
| B00103180500 | M5       | 0,8        | 70       | 14       | 6,0      | 4,9              | ●     |
| B00103180600 | M6       | 1          | 80       | 16       | 6,0      | 4,9              | ●     |
| B00103180800 | M8       | 1,25       | 90       | 18       | 8,0      | 6,2              | ●     |
| B00103181000 | M10      | 1,5        | 100      | 20       | 10,0     | 8,0              | ●     |
| B00103181200 | M12      | 1,75       | 110      | 24       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.

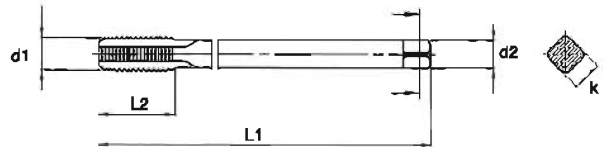
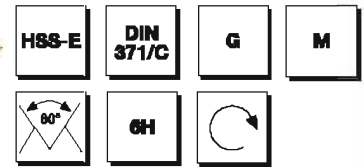


## Machine Taps With Straight Flutes BLUE SERIES



| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103610800 | M8       | 1,25       | 90       | 18       | 6,0      | 4,9              | •     |
| B00103611000 | M10      | 1,5        | 100      | 20       | 7,0      | 5,5              | •     |
| B00103611200 | M12      | 1,75       | 110      | 24       | 9,0      | 7,0              | •     |
| B00103611400 | M14      | 2          | 110      | 28       | 11,0     | 9,0              | •     |
| B00103611600 | M16      | 2          | 110      | 28       | 12,0     | 9,0              | •     |

## Machine Taps With Straight Flutes WHITE SERIES

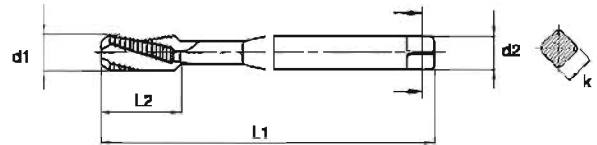
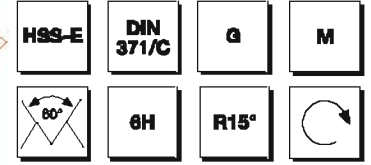


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103210300 | M3       | 0,5        | 56       | 10       | 3,5      | 2,7              | •     |
| B00103210400 | M4       | 0,7        | 63       | 12       | 4,5      | 3,4              | •     |
| B00103210500 | M5       | 0,8        | 70       | 14       | 6,0      | 4,9              | •     |
| B00103210600 | M6       | 1          | 80       | 16       | 6,0      | 4,9              | •     |
| B00103210800 | M8       | 1,25       | 90       | 18       | 8,0      | 6,2              | •     |
| B00103211000 | M10      | 1,5        | 100      | 20       | 10,0     | 8,0              | •     |
| B00103211200 | M12      | 1,75       | 110      | 24       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.



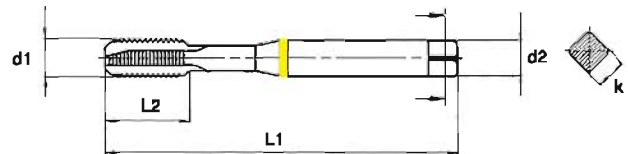
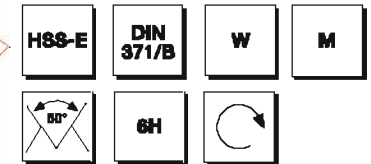
## Machine Taps With Spiral Flutes WHITE SERIES



| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103200300 | M3       | 0,5        | 58       | 10       | 3,5      | 2,7              | ○     |
| B00103200400 | M4       | 0,7        | 63       | 12       | 4,5      | 3,4              | ●     |
| B00103200500 | M5       | 0,8        | 70       | 14       | 6,0      | 4,9              | ●     |
| B00103200600 | M6       | 1          | 80       | 16       | 6,0      | 4,9              | ●     |
| B00103200800 | M8       | 1,25       | 90       | 18       | 8,0      | 6,2              | ●     |
| B00103201000 | M10      | 1,5        | 100      | 20       | 10,0     | 8,0              | ●     |
| B00103201200 | M12      | 1,75       | 110      | 24       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.

## Machine Taps Straight Flute With Spiral Point YELLOW SERIES

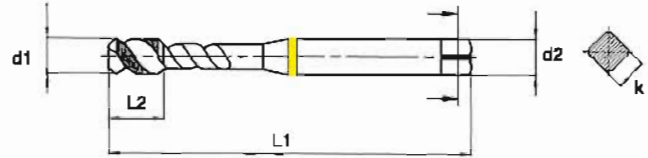
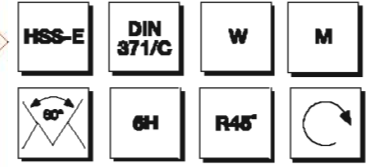


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103270300 | M3       | 0,5        | 58       | 10       | 3,5      | 2,7              | ●     |
| B00103270400 | M4       | 0,7        | 63       | 12       | 4,5      | 3,4              | ●     |
| B00103270500 | M5       | 0,8        | 70       | 14       | 6,0      | 4,9              | ●     |
| B00103270600 | M6       | 1          | 80       | 16       | 6,0      | 4,9              | ●     |
| B00103270800 | M8       | 1,25       | 90       | 18       | 8,0      | 6,2              | ●     |
| B00103271000 | M10      | 1,5        | 100      | 20       | 10,0     | 8,0              | ●     |
| B00103271200 | M12      | 1,75       | 110      | 24       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.



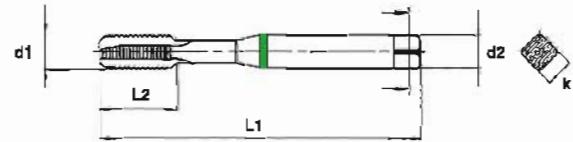
## Machine Taps With Spiral Flutes YELLOW SERIES



| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103280300 | M3       | 0,5        | 56       | 6        | 3,5      | 2,7              | ○     |
| B00103280400 | M4       | 0,7        | 63       | 7        | 4,5      | 3,4              | ●     |
| B00103280500 | M5       | 0,8        | 70       | 8        | 6,0      | 4,9              | ●     |
| B00103280600 | M6       | 1          | 80       | 10       | 6,0      | 4,9              | ●     |
| B00103280800 | M8       | 1,25       | 90       | 18       | 8,0      | 6,2              | ●     |
| B00103281000 | M10      | 1,5        | 100      | 20       | 10,0     | 8,0              | ●     |
| B00103281200 | M12      | 1,75       | 110      | 16       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.

## Machine Taps Straight Flute With Spiral Point GREEN SERIES

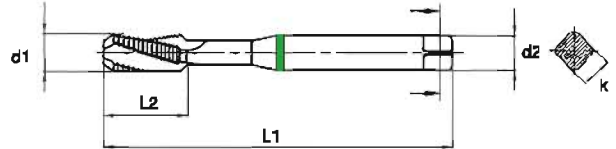
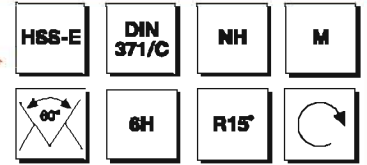


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103300300 | M3       | 0,5        | 56       | 10       | 3,5      | 2,7              | ●     |
| B00103300400 | M4       | 0,7        | 63       | 12       | 4,5      | 3,4              | ●     |
| B00103300500 | M5       | 0,8        | 70       | 14       | 6,0      | 4,9              | ●     |
| B00103300600 | M6       | 1          | 80       | 16       | 6,0      | 4,9              | ●     |
| B00103300800 | M8       | 1,25       | 90       | 18       | 8,0      | 6,2              | ●     |
| B00103301000 | M10      | 1,5        | 100      | 20       | 10,0     | 8,0              | ●     |
| B00103301200 | M12      | 1,75       | 110      | 24       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.



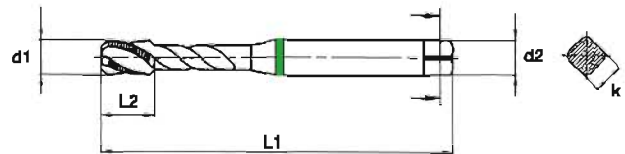
## Machine Taps With Spiral Flutes GREEN SERIES



| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103310300 | M3       | 0,5        | 58       | 10       | 3,5      | 2,7              | ○     |
| B00103310400 | M4       | 0,7        | 63       | 12       | 4,5      | 3,4              | ●     |
| B00103310500 | M5       | 0,8        | 70       | 14       | 6,0      | 4,9              | ●     |
| B00103310600 | M6       | 1          | 80       | 16       | 6,0      | 4,9              | ●     |
| B00103310800 | M8       | 1,25       | 90       | 18       | 8,0      | 6,2              | ●     |
| B00103311000 | M10      | 1,5        | 100      | 20       | 10,0     | 8,0              | ●     |
| B00103312000 | M12      | 1,75       | 110      | 24       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.

## Machine Taps With Spiral Flutes GREEN SERIES

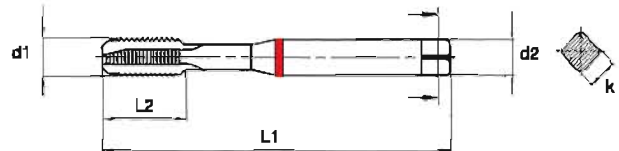
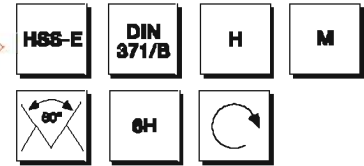


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103320300 | M3       | 0,5        | 58       | 8        | 3,5      | 2,7              | ○     |
| B00103320400 | M4       | 0,7        | 63       | 7        | 4,5      | 3,4              | ●     |
| B00103320500 | M5       | 0,8        | 70       | 8        | 6,0      | 4,9              | ●     |
| B00103320600 | M6       | 1          | 80       | 10       | 6,0      | 4,9              | ●     |
| B00103320800 | M8       | 1,25       | 90       | 12       | 8,0      | 6,2              | ●     |
| B00103321000 | M10      | 1,5        | 100      | 14       | 10,0     | 8,0              | ●     |
| B00103321200 | M12      | 1,75       | 110      | 16       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.



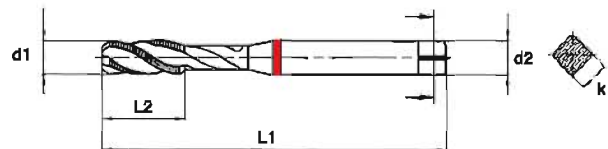
## Machine Taps Straight Flute With Spiral Point RED SERIES



| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103340300 | M3       | 0,5        | 56       | 10       | 3,5      | 2,7              | •     |
| B00103340400 | M4       | 0,7        | 63       | 12       | 4,5      | 3,4              | •     |
| B00103340500 | M5       | 0,8        | 70       | 14       | 6,0      | 4,9              | •     |
| B00103340800 | M6       | 1          | 80       | 18       | 8,0      | 4,9              | •     |
| B00103340800 | M8       | 1,25       | 90       | 18       | 8,0      | 6,2              | •     |
| B00103341000 | M10      | 1,5        | 100      | 20       | 10,0     | 8,0              | •     |
| B00103341200 | M12      | 1,75       | 110      | 24       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.

## Machine Taps With Spiral Flutes RED SERIES

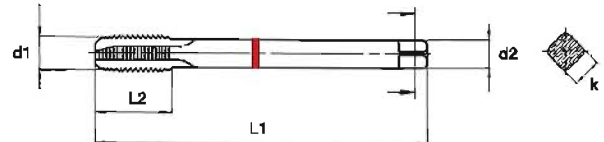
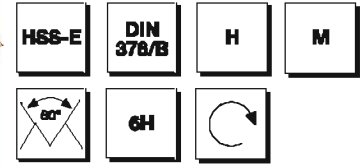


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103350300 | M3       | 0,5        | 56       | 10       | 3,5      | 2,7              | ○     |
| B00103350400 | M4       | 0,7        | 63       | 12       | 4,5      | 3,4              | •     |
| B00103350500 | M5       | 0,8        | 70       | 14       | 6,0      | 4,9              | •     |
| B00103350600 | M6       | 1          | 80       | 16       | 6,0      | 4,9              | •     |
| B00103350800 | M8       | 1,25       | 90       | 18       | 8,0      | 6,2              | •     |
| B00103351000 | M10      | 1,5        | 100      | 20       | 10,0     | 8,0              | •     |
| B00103351200 | M12      | 1,75       | 110      | 24       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.



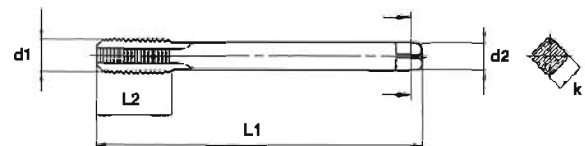
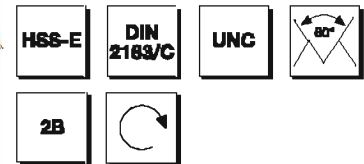
## Machine Taps Straight Flute With Spiral Point RED SERIES



| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00103890800 | M8       | 1,25       | 90       | 18       | 6,0      | 4,9              | •     |
| B00103891000 | M10      | 1,5        | 100      | 20       | 7,0      | 5,5              | •     |
| B00103891200 | M12      | 1,75       | 110      | 24       | 9,0      | 7,0              | •     |
| B00103891400 | M14      | 2          | 110      | 26       | 11,0     | 9,0              | •     |
| B00103891600 | M16      | 2          | 110      | 28       | 12,0     | 9,0              | •     |

## Machine Taps With Straight Flutes for UNC Thread

**Application:** Used for short screw-in length in through and blind holes. Recommended for threading in low-alloyed steels, cast, nodular cast iron, tempered, cast and the other metals.



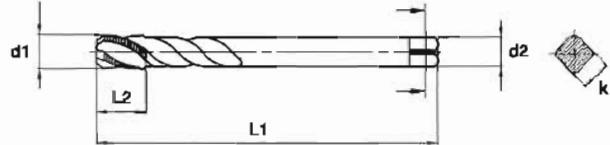
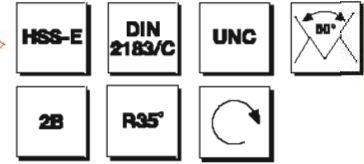
| Product Code | d1<br>UNC | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>h12<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|----------------|-------|
| B00105950635 | 1/4"      | 20                   | 80       | 19       | 4,5      | 3,4            | •     |
| B00105950794 | 5/16"     | 18                   | 90       | 22       | 6,0      | 4,9            | •     |
| B00105950952 | 3/8"      | 16                   | 100      | 24       | 7,0      | 5,5            | •     |
| B00105951111 | 7/16"     | 14                   | 100      | 24       | 8,0      | 6,2            | •     |
| B00105951270 | 1/2"      | 13                   | 110      | 29       | 9,0      | 7,0            | •     |
| B00105951429 | 9/16"     | 12                   | 110      | 30       | 11,0     | 9,0            | •     |
| B00105951587 | 5/8"      | 11                   | 110      | 32       | 12,0     | 9,0            | •     |
| B00105951905 | 3/4"      | 10                   | 125      | 34       | 14,0     | 11,0           | •     |
| B00105952222 | 7/8"      | 9                    | 140      | 34       | 18,0     | 14,5           | □     |

◦ Ask Price and Deadline.



## Machine Taps With Spiral Flutes for UNC Thread

**Application:** Used for tapping blind holes. The helix flutes provide in a better chip removal towards the shank. Recommended for ductile steel, bronze, copper, structural steel, stainless steels and thermoplastic materials.

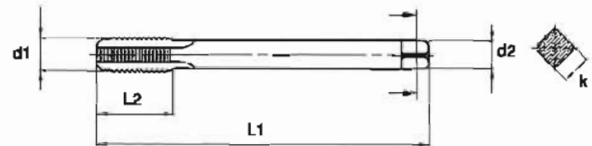
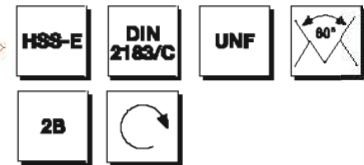


| Product Code | d1<br>UNC | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00105990037 | 1/4"      | 20                   | 80       | 12       | 4,5      | 3,4              | •     |
| B00105990009 | 5/16"     | 18                   | 90       | 14       | 6,0      | 4,9              | •     |
| B00105990008 | 3/8"      | 16                   | 100      | 16       | 7,0      | 5,5              | •     |
| B00105990003 | 7/16"     | 14                   | 100      | 16       | 8,0      | 6,2              | •     |
| B00105990006 | 1/2"      | 13                   | 110      | 20       | 9,0      | 7,0              | •     |
| B00105990021 | 9/16"     | 12                   | 110      | 22       | 11,0     | 9,0              | •     |
| B00105990022 | 5/8"      | 11                   | 110      | 22       | 12,0     | 9,0              | •     |
| B00105990031 | 3/4"      | 10                   | 125      | 28       | 14,0     | 11,0             | •     |
| B00105990065 | 7/8"      | 9                    | 140      | 34       | 18,0     | 14,5             | ○     |

○ Ask Price and Deadline.

## Machine Taps With Straight Flutes for UNF Thread

**Application:** Used for short screw-in length in through and blind holes. Recommended for threading in low-alloyed steels, cast, nodular cast iron, tempered and the other metals.



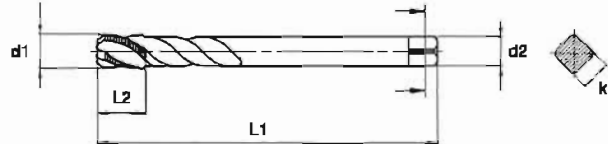
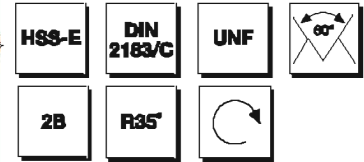
| Product Code | d1<br>UNF | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00105980635 | 1/4"      | 28                   | 80       | 19       | 4,5      | 3,4              | •     |
| B00105980794 | 5/16"     | 24                   | 90       | 22       | 6,0      | 4,9              | •     |
| B00105980952 | 3/8"      | 24                   | 100      | 24       | 7,0      | 5,5              | •     |
| B00105981111 | 7/16"     | 20                   | 100      | 24       | 8,0      | 6,2              | •     |
| B00105981270 | 1/2"      | 20                   | 110      | 29       | 9,0      | 7,0              | •     |
| B00105981429 | 9/16"     | 18                   | 110      | 30       | 11,0     | 9,0              | •     |
| B00105981587 | 5/8"      | 18                   | 110      | 32       | 12,0     | 9,0              | •     |
| B00105981905 | 3/4"      | 18                   | 125      | 34       | 14,0     | 11,0             | •     |
| B00105982222 | 7/8"      | 14                   | 140      | 34       | 18,0     | 14,5             | ○     |

○ Ask Price and Deadline.



## Machine Taps With Spiral Flutes for UNF Thread

**Application:** Used for tapping blind holes. The helix flutes provide better chip removal towards the shank. Recommended for ductile steel, bronze, copper, structural steel, stainless steels and thermoplastic materials.

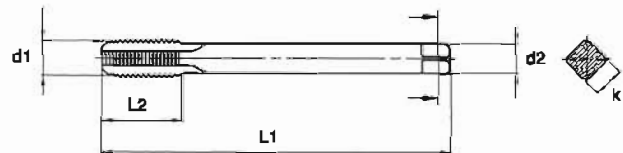


| Product Code | d1<br>UNF | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00105990014 | 1/4"      | 28                   | 80       | 12       | 4,5      | 3,4              | •     |
| B00105990038 | 5/16"     | 24                   | 90       | 14       | 6,0      | 4,9              | •     |
| B00105990015 | 3/8"      | 24                   | 100      | 16       | 7,0      | 5,5              | •     |
| B00105990023 | 7/16"     | 20                   | 100      | 16       | 8,0      | 6,2              | •     |
| B00105990024 | 1/2"      | 20                   | 110      | 20       | 9,0      | 7,0              | •     |
| B00105990025 | 9/16"     | 18                   | 110      | 22       | 11,0     | 9,0              | •     |
| B00105990026 | 5/8"      | 18                   | 110      | 22       | 12,0     | 9,0              | •     |
| B00105990032 | 3/4"      | 16                   | 125      | 28       | 14,0     | 11,0             | •     |
| B00105990051 | 7/8"      | 14                   | 140      | 28       | 18,0     | 14,5             | ○     |

○ Ask Price and Deadline.

## Machine Taps Straight Flute With Spiral Point for Whitworth Thread

**Application :** The spiral point provides better chip removal in feed direction. Used for low-alloyed steels, cast etc. in all metals.



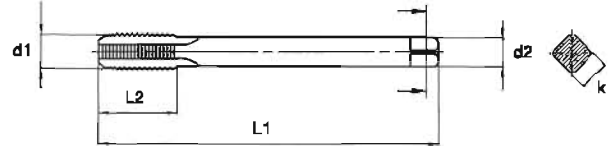
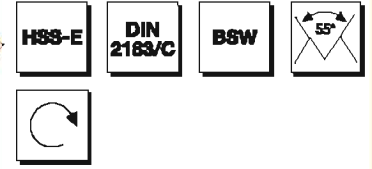
| Product Code | d1<br>BSW | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00105910317 | W 1/8"    | 40                   | 58       | 11       | 3,5      | 2,7              | ○     |
| B00105910397 | W 5/32"   | 32                   | 63       | 13       | 4,5      | 3,4              | ○     |
| B00105910476 | W 3/16"   | 24                   | 70       | 16       | 6,0      | 4,9              | ○     |
| B00105910558 | W 7/32"   | 24                   | 70       | 16       | 6,0      | 4,9              | ○     |
| B00105910635 | W 1/4"    | 20                   | 80       | 19       | 6,0      | 4,9              | ○     |
| B00105910794 | W 5/16"   | 18                   | 90       | 22       | 6,0      | 6,2              | ○     |
| B00105910952 | W 3/8"    | 18                   | 100      | 24       | 10,0     | 8,0              | ○     |
| B00105911111 | W 7/16"   | 14                   | 100      | 26       | 11,0     | 9,0              | ○     |
| B00105911270 | W 1/2"    | 12                   | 110      | 28       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.



## Machine Taps With Straight Flutes for Whitworth Thread

**Application:** Used for short screw-in length in through and blind holes. Recommended for threading in low-alloyed steels, cast, nodular cast iron, tempered, cast and the other metals.

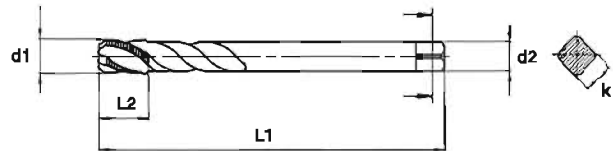
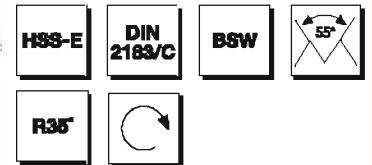


| Product Code | d1<br>BSW | P<br>pitch<br>G/Inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00105920317 | W 1/8"    | 40                   | 58       | 11       | 3,5      | 2,7              | ○     |
| B00105920397 | W 5/32"   | 32                   | 63       | 13       | 4,5      | 3,4              | ○     |
| B00105920476 | W 3/16"   | 24                   | 70       | 16       | 6,0      | 4,9              | ○     |
| B00105920556 | W 7/32"   | 24                   | 70       | 16       | 6,0      | 4,9              | ○     |
| B00105920635 | W 1/4"    | 20                   | 80       | 19       | 6,0      | 4,9              | ○     |
| B00105920794 | W 5/16"   | 18                   | 90       | 22       | 6,0      | 6,2              | ○     |
| B00105920952 | W 3/8"    | 16                   | 100      | 24       | 10,0     | 8,0              | ○     |
| B00105921111 | W 7/16"   | 14                   | 100      | 26       | 11,0     | 9,0              | ○     |
| B00105921270 | W 1/2"    | 12                   | 110      | 28       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.

## Machine Taps With Spiral Flutes for Whitworth Thread

**Application:** Used for tapping to blind holes. The helix flutes provide better chip removal towards the shank. Recommended for ductile steel, bronze, copper, structural steel, stainless steels and thermoplastic materials.



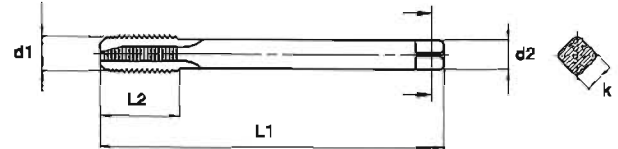
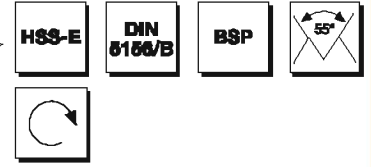
| Product Code | d1<br>BSW | P<br>pitch<br>G/Inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00105990074 | W 1/8"    | 40                   | 58       | 6        | 3,5      | 2,7              | ○     |
| B00105990075 | W 5/32"   | 32                   | 63       | 7        | 4,5      | 3,4              | ○     |
| B00105990076 | W 3/16"   | 24                   | 70       | 10       | 6,0      | 4,9              | ○     |
| B00105990077 | W 7/32"   | 24                   | 70       | 10       | 6,0      | 4,9              | ○     |
| B00105990047 | W 1/4"    | 20                   | 80       | 12       | 6,0      | 4,9              | ○     |
| B00105990069 | W 5/16"   | 18                   | 90       | 14       | 6,0      | 6,2              | ○     |
| B00105990049 | W 3/8"    | 16                   | 100      | 16       | 10,0     | 8,0              | ○     |
| B00105990027 | W 7/16"   | 14                   | 100      | 18       | 11,0     | 9,0              | ○     |
| B00105990028 | W 1/2"    | 12                   | 110      | 20       | 12,0     | 9,0              | ○     |

○ Ask Price and Deadline.



## Machine Taps Straight Flute With Spiral Point for Whitworth Pipe Thread

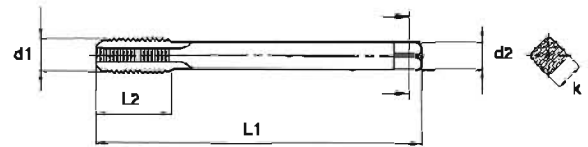
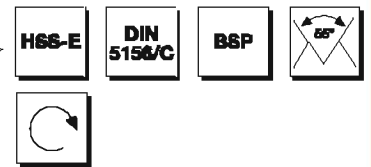
**Application :** The spiral point provides better chip removal in feed direction. Suitable for steel, stainless steel, heat resisting steel and forging steels with resistance 1200 N/mm<sup>2</sup>.



| Product Code | d1<br>BSP | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00109570973 | G 1/8"    | 28                   | 90       | 20       | 7,0      | 5,5              | •     |
| B00109571316 | G 1/4"    | 19                   | 100      | 22       | 11,0     | 9,0              | •     |
| B00109571666 | G 3/8"    | 19                   | 100      | 22       | 12,0     | 9,0              | •     |
| B00109572095 | G 1/2"    | 14                   | 125      | 25       | 16,0     | 12,0             | •     |
| B00109572644 | G 3/4"    | 14                   | 140      | 28       | 20,0     | 16,0             | •     |

## Machine Taps With Straight Flutes for Whitworth Pipe Thread

**Application:** Suitable for tapping through and blind holes. Used for threading in mould steels, unalloyed and low-alloyed steels, cast, NE-metals, zinc, magnesium alloys and thermoplastic materials.

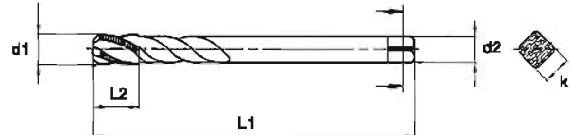
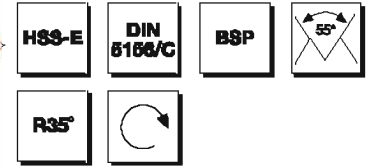


| Product Code | d1<br>BSW | P<br>pitch<br>G/inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00109580973 | G 1/8"    | 28                   | 90       | 20       | 7,0      | 5,5              | •     |
| B00109581316 | G 1/4"    | 19                   | 100      | 22       | 11,0     | 9,0              | •     |
| B00109581666 | G 3/8"    | 19                   | 100      | 22       | 12,0     | 9,0              | •     |
| B00109582095 | G 1/2"    | 14                   | 125      | 25       | 16,0     | 12,0             | •     |
| B00109582644 | G 3/4"    | 14                   | 140      | 28       | 20,0     | 16,0             | •     |



## Machine Taps With Spiral Flutes for Whitworth Pipe Thread

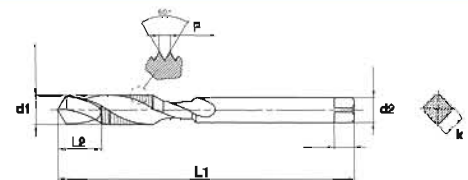
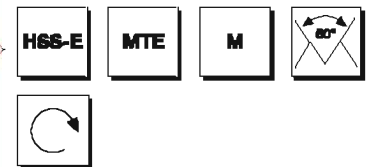
**Application:** Suitable in tapping blind holes. The spiral flutes provide good chip removal from the blind hole. Used for fittings, ductile steel, bronze, copper, structural steel, stainless steels and thermoplastic materials.



| Product Code | d1<br>BSP | P<br>pitch<br>G/Inch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|----------------------|----------|----------|----------|------------------|-------|
| B00109420074 | G 1/8"    | 28                   | 90       | 20       | 7,0      | 5,5              | •     |
| B00109420053 | G 1/4"    | 19                   | 100      | 22       | 11,0     | 9,0              | •     |
| B00109420054 | G 3/8"    | 19                   | 100      | 22       | 12,0     | 9,0              | •     |
| B00109420061 | G 1/2"    | 14                   | 125      | 25       | 16,0     | 12,0             | •     |
| B00109420055 | G 3/4"    | 14                   | 140      | 28       | 20,0     | 16,0             | •     |

## Drilling - Tapping Combined Tools

**Application:** Combined Tool for drilling and threading through holes in thickness of 5-6 mm, without changing the tool. The length of the combined tool, when used for through holes, has to be at most equal to the nut length. Recommended generally for the soft materials, for instance, for steels with tensile strength up to 600 N/mm<sup>2</sup>. The machine using the combined drill-tap tool should be capable to operate with two different cutting speeds and feeds. Using of a pressure tapping apparatus with compression is not recommended for the combined tool.

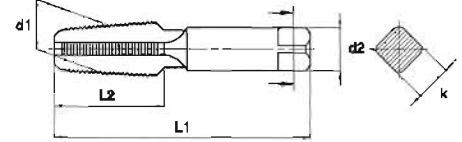
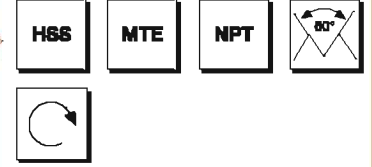


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|-------|
| B00109370400 | M 4      | 0,7        | 70       | 10       | 4,5      | •     |
| B00109370500 | M 5      | 0,8        | 78       | 12       | 6,0      | •     |
| B00109370600 | M 6      | 1          | 85       | 14       | 6,0      | •     |
| B00109370800 | M 8      | 1,25       | 93       | 20       | 8,0      | •     |
| B00109371000 | M 10     | 1,5        | 110      | 25       | 9,0      | •     |



## Machine Taps for NPT - Thread TAPER 1/16

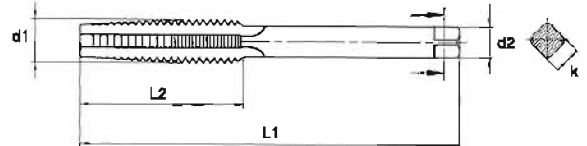
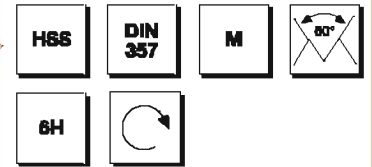
**Application:** Used for threading where required, mould connections, sealing and fittings  
Suitable for unalloyed and alloyed steels, brass and cast materials



| Product Code | d1<br>NPT | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|-----------|------------|----------|----------|----------|------------------|-------|
| B00104401029 | 1/8"      | 27         | 54       | 19       | 7        | 5,5              | •     |
| B00104401372 | 1/4"      | 18         | 62       | 27       | 11       | 9,0              | •     |
| B00104401714 | 3/8"      | 18         | 65       | 27       | 12       | 9,0              | •     |
| B00104402134 | 1/2"      | 14         | 80       | 35       | 16       | 12,0             | •     |
| B00104402667 | 3/4"      | 14         | 83       | 35       | 20       | 16,0             | •     |

## Machine Nut Taps for Metric Thread

**Application:** Suitable for batch production in special nut production machinery.

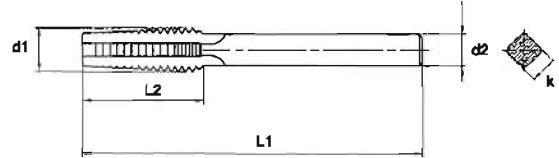
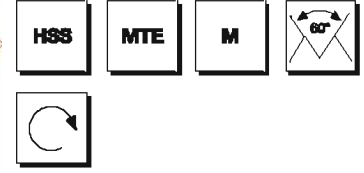


| Product Code | d1<br>mm | P<br>pitch | L1<br>mm | L2<br>mm | d2<br>mm | k<br>(h12)<br>mm | Stock |
|--------------|----------|------------|----------|----------|----------|------------------|-------|
| B00106020300 | M3       | 0,5        | 70       | 22       | 2,2      | -                | ○     |
| B00106020400 | M4       | 0,7        | 90       | 25       | 2,8      | 2,1              | ○     |
| B00106020500 | M5       | 0,8        | 100      | 28       | 3,5      | 2,7              | ○     |
| B00106020600 | M6       | 1          | 110      | 32       | 4,5      | 3,4              | ○     |
| B00106020800 | M8       | 1,25       | 125      | 40       | 6,0      | 4,9              | ○     |
| B00106021000 | M10      | 1,5        | 140      | 45       | 7,0      | 5,5              | ○     |
| B00106021200 | M12      | 1,75       | 180      | 50       | 9,0      | 7,0              | ○     |
| B00106021400 | M14      | 2          | 200      | 56       | 11,0     | 11,0             | ○     |
| B00106021600 | M16      | 2          | 200      | 63       | 12,0     | 12,0             | ○     |
| B00106021800 | M18      | 2,5        | 220      | 63       | 14,0     | 14,0             | ○     |
| B00106022000 | M20      | 2,5        | 250      | 70       | 16,0     | 16,0             | ○     |
| B00106022200 | M22      | 2,5        | 280      | 80       | 18,0     | 18,0             | ○     |
| B00106022400 | M24      | 3          | 280      | 80       | 18,0     | 18,0             | ○     |
| B00106022700 | M27      | 3          | 315      | 90       | 20,0     | 20,0             | ○     |



## Machine Nut Taps for Metric Thread

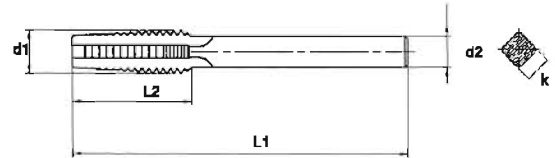
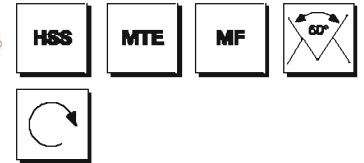
**Application:** Suitable for batch production in special nut production machinery.  
Treading Length: 25 pitch



| Product Code | d1 mm | P pitch | L1 mm | L2 mm | d2 mm | Stock |
|--------------|-------|---------|-------|-------|-------|-------|
| B00106500400 | M4    | 0,7     | 60    | 18    | 3,00  | •     |
| B00106500500 | M5    | 0,8     | 70    | 21    | 3,80  | •     |
| B00106500600 | M6    | 1       | 80    | 25    | 4,50  | •     |
| B00106500800 | M8    | 1,25    | 100   | 32    | 6,10  | •     |
| B00106501000 | M10   | 1,5     | 110   | 40    | 7,75  | •     |
| B00106501200 | M12   | 1,75    | 120   | 46    | 9,35  | •     |
| B00106501400 | M14   | 2       | 140   | 50    | 11,00 | •     |
| B00106501600 | M16   | 2       | 140   | 50    | 13,00 | •     |
| B00106501800 | M18   | 2,5     | 160   | 65    | 14,00 | •     |
| B00106502000 | M20   | 2,5     | 160   | 65    | 16,00 | •     |

## Machine Nut Taps for Metric Fine Thread

**Application:** Suitable for batch production in special nut production machinery.  
Treading Length: 25 pitch



| Product Code | d1 mm | P pitch | L1 mm | L2 mm | d2 mm | Stock |
|--------------|-------|---------|-------|-------|-------|-------|
| B00106511005 | M10   | 1       | 100   | 25    | 8,3   | •     |
| B00106511000 | M10   | 1,25    | 110   | 32    | 8,0   | •     |
| B00106511200 | M12   | 1,25    | 120   | 32    | 10,0  | •     |
| B00106511208 | M12   | 1,5     | 120   | 40    | 9,8   | •     |
| B00106511406 | M14   | 1,5     | 120   | 40    | 11,5  | •     |
| B00106511606 | M16   | 1,5     | 140   | 40    | 13,5  | •     |
| B00106511808 | M18   | 1,5     | 140   | 40    | 15,4  | •     |
| B00106512006 | M20   | 1,5     | 160   | 40    | 17,3  | •     |



## Recommendations from Ali Usta

### Ali Usta;

#### How to choose the Tap?

The Tap is chosen depending on the thread profile, type of material work piece and the condition of the hole.

Most Used Thread Profiles:

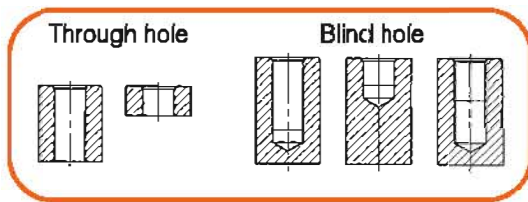
- Metric thread and USA ( $\alpha=60^\circ$ )
- Whitworth thread ( $\alpha=55^\circ$ )



### Ali Usta says;

Taps are most precise cutting tools with respect to measuring. Taps are divided into two groups depending on the using method;

- Hand Taps ( Sets of Two and Three ).
- Machine Taps (for machine using, providing stand-alone the required size).



### Ali Usta does not use the same Tap for every kind of hole:

In through holes use form A (long lead ) or form B (Spiral point sharpening); as in blind holes use Taps form C with helical flutes. The wrong using may causes chip congestion and may break the Tap.

### Ali Usta recommends you;

Different Taps for every different type of material.

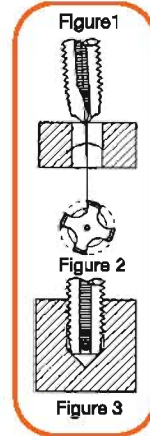
- for materials forming long chips (steel, aluminium, brass) **BLUE TYPE - BRIGHT**
- for adhesive materials, forming long chips (construction steel, cementation steel) **BLUE TYPE - STEAM TEMPERED or TiN coated**
- for cast materials (cast iron, GG10 / GG25 / GG30 / GG45) **WHITE TYPE**
- for soft materials with long chips (Al - Alloys, low carbon steel) **YELLOW TYPE**
- for hard materials with long chips (Ni - Ni alloys, Stainless steel, Steel cast) **GREEN TYPE**
- for very hard materials (Alloyed tool steel, Tool steel, Ti alloys, HSS and Cast Steel) **RED TYPE**

Note: Recommendations of Ali Usta must be apply upon problem occurs with the standard Tap.

## Solutions of Ali Usta

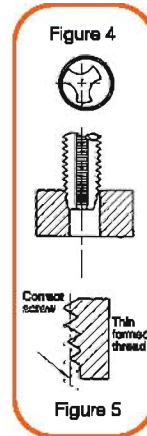
### Tap breakage

- 1.1. Tapping hole size too small
- 1.2. Tap axis and hole axis are not aligned with each other. (Figure 1)
- 1.3. Tap became blunt.
- 1.4. Tap is improperly sharpened.
- 1.5. Rake angle is not suitable for threading material.
- 1.6. Cutting speed is not suitable.
- 1.7. Chip congestion, used Tap type is not suitable. (Figure 2)
- 1.8. Tap face continues to advance even though it touches to the bottom of the hole (blind hole). (Figure 3)



### Thread surface don't accords to the requirements

- 2.1. Rake angle of the Tap is not suitable.
- 2.2. GTap is improperly sharpened or blunt
- 2.3. Diameter of the hole is drilled too small
- 2.4. Cutting fluid is wrong or inadequate.
- 2.5. Threads of the Tap are broken.
- 2.6. Tap or work piece is not fixed properly.
- 2.7. Threaded material is very hard or contains structural inaccuracies.



### Thread size is larger than gauge

- 3.1. Tap with runout.
- 3.2. Cutting speed is high.
- 3.3. Rake angle is selected improperly.
- 3.4. Wrong graduation on the lead of the Tap. (Figure 4)
- 3.5. Excessive pressure applied on the Tap. (Figure 5)
- 3.6. Tapping assembly is not suitable or has gaps.
- 3.7. Chip compaction in the flutes.
- 3.8. Cutting fluid is unsuitable or inadequate
- 3.9. The pitch diameter is too large.



### Chip adhesion on Tap surface

- 5.1. Enlarge diameter of hole.
- 5.2. Change rake angle.
- 5.3. Replace coolant or increase its pressure.
- 5.4. Use Tap with surface treatment

### Tap gets blunt quickly

- 4.1. Use Tap with surface treatment (Steam tempering, nitration or TiN coating).
- 4.2. Increase the chamfer length
- 4.3. Reduce cutting speed.
- 4.4. Tap axis and hole axis are not the same. (Figure 6)
- 4.5. Increase cutting fluid oil or change cutting oil.
- 4.6. Change rake angle.

### Thread cracking

- 6.1. Use Tap with long threads.
- 6.2. Use coated (PVD) Taps.
- 6.3. Use coolant largely.
- 6.4. Reduce cutting speed.
- 6.5. Use helical fluted Taps.
- 6.6. Avoid high cutting torque (easily cutting tap)



## ROUND DIES / THREAD CHASERS



**MAKİNA TAKİM ENDÜSTRİSİ A.Ş.**





## ROUND DIES / THREAD CHASERS

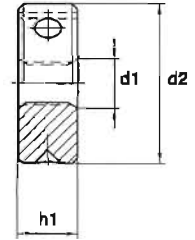
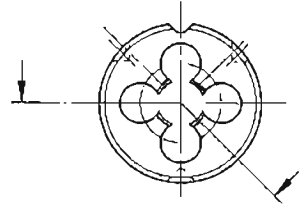
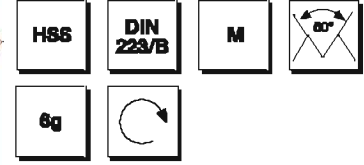
| TOOL TYPE                            | QUALITY | STANDARD     | PAGE |
|--------------------------------------|---------|--------------|------|
| Round Dies For Metric Thread         | HSS     | DIN 223 / B  | 77   |
| Round Dies For Metric Fine Thread    | HSS     | DIN 223 / B  | 78   |
| Round Dies For Whitworth Thread      | HSS     | DIN 223 / B  | 79   |
| Round Dies For UNC Thread            | HSS     | DIN 223 / B  | 80   |
| Round Dies For UNF Thread            | HSS     | DIN 223 / B  | 81   |
| Round Dies For Whitworth Pipe Thread | HSS     | DIN 5158 / B | 82   |
| Round Dies For NPT Thread            | HSS     | MTE Standard | 82   |
| Radial Thread Chasers                | HSS     | MTE Standard | 83   |





## Round Dies for Metric Thread

**Application :** Suitable for machine and hand using. The spiral point provides better chip removal in feed direction. Suitable for all types of steel. ( If dies use for brass, it should be specified special cutting geometry during ordering. )



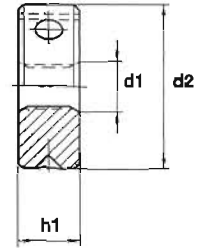
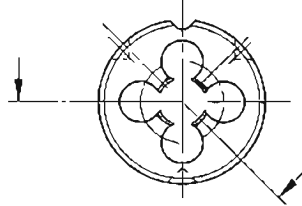
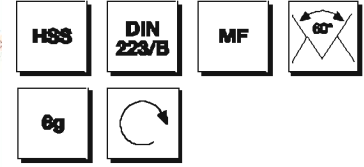
| Product Code | d1<br>mm | P<br>pitch | d2<br>(f9)<br>mm | h1<br>mm | Stock |
|--------------|----------|------------|------------------|----------|-------|
| B00110020200 | M2       | 0,4        | 16               | 5        | •     |
| B00110020250 | M2,5     | 0,45       | 16               | 5        | •     |
| B00110020300 | M3       | 0,5        | 20               | 5        | •     |
| B00110020350 | M3,5     | 0,6        | 20               | 5        | •     |
| B00110020400 | M4       | 0,7        | 20               | 5        | •     |
| B00110020500 | M5       | 0,8        | 20               | 7        | •     |
| B00110020600 | M6       | 1          | 20               | 7        | •     |
| B00110020700 | M7       | 1          | 25               | 9        | •     |
| B00110020800 | M8       | 1,25       | 25               | 9        | •     |
| B00110020900 | M9       | 1,25       | 25               | 9        | •     |
| B00110021000 | M10      | 1,5        | 30               | 11       | •     |
| B00110021200 | M12      | 1,75       | 38               | 14       | •     |
| B00110021400 | M14      | 2          | 38               | 14       | •     |
| B00110021600 | M16      | 2          | 45               | 18       | •     |
| B00110021800 | M18      | 2,5        | 45               | 18       | •     |
| B00110022000 | M20      | 2,5        | 45               | 18       | •     |
| B00110022200 | M22      | 2,5        | 55               | 22       | •     |
| B00110022400 | M24      | 3          | 55               | 22       | •     |
| B00110022700 | M27      | 3          | 65               | 25       | •     |
| B00110023000 | M30      | 3,5        | 65               | 25       | •     |
| B00110023300 | M33      | 3,5        | 65               | 25       | ○     |
| B00110023360 | M36      | 4          | 65               | 25       | ○     |
| B00110023390 | M39      | 4          | 75               | 30       | ○     |
| B00110023420 | M42      | 4,5        | 75               | 30       | ○     |
| B00110023450 | M45      | 4,5        | 90               | 36       | ○     |
| B00110023480 | M48      | 5          | 90               | 36       | ○     |
| B00110023520 | M52      | 5          | 90               | 36       | ○     |
| B00110023560 | M56      | 5,5        | 105              | 36       | ○     |
| B00110023600 | M60      | 5,5        | 105              | 36       | ○     |
| B00110023640 | M64      | 6          | 120              | 36       | ○     |
| B00110023680 | M68      | 6          | 120              | 36       | ○     |

○ Ask Price and Deadline.



## Round Dies for Metric Fine Thread

**Application :** Suitable for machine and hand using. The spiral point provides better chip removal in feed direction. Suitable for all types of steel. ( If dies use for brass, it should be specified special cutting geometry during ordering. )

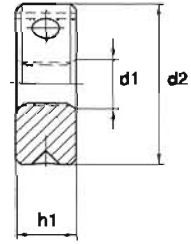
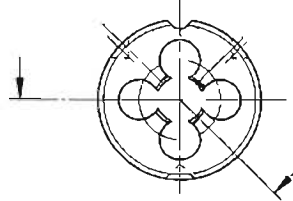
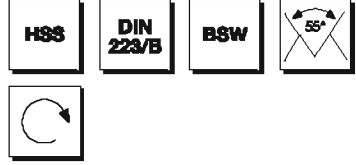


| Product Code | d1<br>mm | P<br>pitch | d2<br>(Ø)<br>mm | h1<br>mm | Stock |
|--------------|----------|------------|-----------------|----------|-------|
| B00110030302 | M 3      | 0,35       | 20              | 5        | ○     |
| B00110030352 | M 3,5    | 0,35       | 20              | 5        | ○     |
| B00110030402 | M 4      | 0,35       | 20              | 5        | ○     |
| B00110030403 | M 4      | 0,5        | 20              | 5        | ○     |
| B00110030503 | M 5      | 0,5        | 20              | 5        | ○     |
| B00110030603 | M 6      | 0,5        | 20              | 5        | ○     |
| B00110030804 | M 6      | 0,75       | 20              | 5        | ●     |
| B00110030803 | M 8      | 0,5        | 25              | 9        | ○     |
| B00110030804 | M 8      | 0,75       | 25              | 9        | ○     |
| B00110030805 | M 8      | 1          | 25              | 9        | ●     |
| B00110030905 | M 9      | 1          | 25              | 9        | ○     |
| B00110031003 | M 10     | 0,5        | 30              | 11       | ○     |
| B00110031004 | M 10     | 0,75       | 30              | 11       | ○     |
| B00110031005 | M 10     | 1          | 30              | 11       | ●     |
| B00110031000 | M 10     | 1,25       | 30              | 11       | ●     |
| B00110031105 | M 11     | 1          | 30              | 11       | ○     |
| B00110031205 | M 12     | 1          | 38              | 10       | ●     |
| B00110031200 | M 12     | 1,25       | 38              | 10       | ●     |
| B00110031206 | M 12     | 1,5        | 38              | 10       | ●     |
| B00110031405 | M 14     | 1          | 38              | 10       | ●     |
| B00110031400 | M 14     | 1,25       | 38              | 10       | ●     |
| B00110031406 | M 14     | 1,5        | 38              | 10       | ●     |
| B00110031605 | M 16     | 1          | 45              | 14       | ●     |
| B00110031606 | M 16     | 1,5        | 45              | 14       | ●     |
| B00110031805 | M 18     | 1          | 45              | 14       | ○     |
| B00110031806 | M 18     | 1,5        | 45              | 14       | ●     |
| B00110032005 | M 20     | 1          | 45              | 14       | ○     |
| B00110032006 | M 20     | 1,5        | 45              | 14       | ●     |
| B00110032008 | M 20     | 2          | 45              | 14       | ○     |
| B00110032205 | M 22     | 1          | 55              | 16       | ○     |
| B00110032206 | M 22     | 1,5        | 55              | 16       | ●     |
| B00110032208 | M 22     | 2          | 55              | 16       | ○     |
| B00110032405 | M 24     | 1          | 55              | 16       | ○     |
| B00110032406 | M 24     | 1,5        | 55              | 16       | ●     |
| B00110032408 | M 24     | 2          | 55              | 16       | ○     |
| B00110032608 | M 26     | 1,5        | 55              | 16       | ○     |
| B00110032808 | M 26     | 2          | 55              | 16       | ○     |
| B00110032706 | M 27     | 1,5        | 65              | 18       | ○     |
| B00110032708 | M 27     | 2          | 65              | 18       | ○     |
| B00110032806 | M 28     | 1,5        | 65              | 18       | ○     |
| B00110032808 | M 28     | 2          | 65              | 18       | ○     |
| B00110033006 | M 30     | 1,5        | 65              | 18       | ○     |
| B00110033008 | M 30     | 2          | 65              | 18       | ○     |



## Round Dies for Whitworth Thread

**Application :** Suitable for machine and hand using. The spiral point provides better chip removal in feed direction. Suitable for all types of steel. ( If dies use for brass, it should be specified special cutting geometry during ordering. )



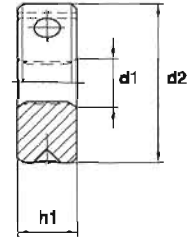
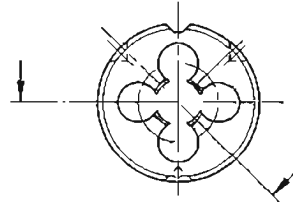
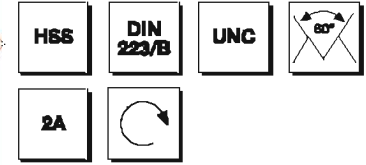
| Product Code | d1<br>BSW | P<br>pitch<br>G/inch | d2<br>(f9)<br>mm | h1<br>mm | Stock |
|--------------|-----------|----------------------|------------------|----------|-------|
| B00110040317 | W 1/8"    | 40                   | 20               | 5        | •     |
| B00110040397 | W 5/32"   | 32                   | 20               | 7        | •     |
| B00110040476 | W 3/16"   | 24                   | 20               | 7        | •     |
| B00110040558 | W 7/32"   | 24                   | 20               | 7        | ○     |
| B00110040635 | W 1/4"    | 20                   | 25               | 9        | •     |
| B00110040794 | W 5/16"   | 18                   | 25               | 9        | •     |
| B00110040852 | W 3/8"    | 18                   | 30               | 11       | •     |
| B00110041111 | W 7/16"   | 14                   | 30               | 11       | •     |
| B00110041270 | W 1/2"    | 12                   | 38               | 14       | •     |
| B00110041429 | W 9/16"   | 12                   | 38               | 14       | •     |
| B00110041587 | W 5/8"    | 11                   | 45               | 18       | •     |
| B00110041905 | W 3/4"    | 10                   | 45               | 18       | •     |
| B00110042222 | W 7/8"    | 9                    | 55               | 22       | •     |
| B00110042540 | W 1"      | 8                    | 55               | 22       | •     |
| B00110043810 | W 1 1/2"  | 6                    | 75               | 30       | ○     |

○ Ask Price and Deadline.



## Round Dies for UNC Thread

**Application :** Suitable for machine and hand using. The spiral point provides better chip removal in feed direction. Suitable for all types of steel. ( If dies use for brass, it should be specified special cutting geometry during ordering. )



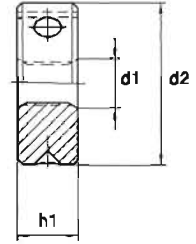
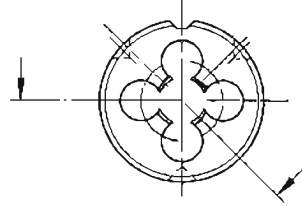
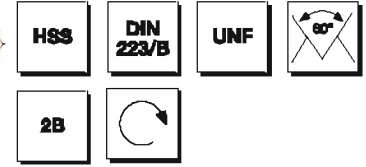
| Product Code | d1<br>UNC | P<br>pitch<br>G/inch | d2<br>(I9)<br>mm | h1<br>mm | Stock |
|--------------|-----------|----------------------|------------------|----------|-------|
| B00110060284 | Nr. 4     | 40                   | 20               | 5        | ○     |
| B00110060317 | Nr. 5     | 40                   | 20               | 5        | ○     |
| B00110060350 | Nr. 6     | 32                   | 20               | 7        | ○     |
| B00110060417 | Nr. 8     | 32                   | 20               | 7        | ○     |
| B00110060483 | Nr.10     | 24                   | 20               | 7        | ○     |
| B00110060549 | Nr.12     | 24                   | 20               | 7        | ○     |
| B00110060635 | 1/4"      | 20                   | 25               | 9        | ●     |
| B00110060794 | 5/16"     | 18                   | 25               | 9        | ●     |
| B00110060952 | 3/8"      | 16                   | 30               | 11       | ●     |
| B00110061111 | 7/16"     | 14                   | 30               | 11       | ●     |
| B00110061270 | 1/2"      | 13                   | 38               | 14       | ●     |
| B00110061429 | 9/16"     | 12                   | 38               | 14       | ●     |
| B00110061587 | 5/8"      | 11                   | 45               | 18       | ●     |
| B00110061905 | 3/4"      | 10                   | 45               | 18       | ●     |
| B00110062222 | 7/8"      | 9                    | 55               | 22       | ●     |
| B00110062540 | 1"        | 8                    | 55               | 22       | ●     |
| B00110063175 | 1 1/4"    | 7                    | 65               | 25       | ○     |
| B00110063492 | 1 3/8"    | 6                    | 65               | 25       | ○     |
| B00110063810 | 1 1/2"    | 6                    | 75               | 30       | ○     |
| B00110064445 | 1 3/4"    | 5                    | 90               | 36       | ○     |
| B00110065080 | 2"        | 4,5                  | 90               | 36       | ○     |

○ Ask Price and Deadline.



## Round Dies for UNF Thread

**Application :** Suitable for machine and hand using. The spiral point provides better chip removal in feed direction. Suitable for all types of steel. ( If dies use for brass, it should be specified special cutting geometry during ordering. )



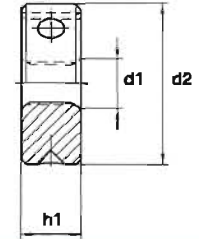
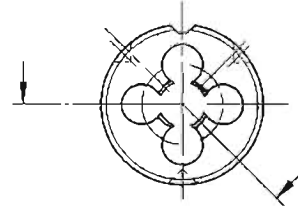
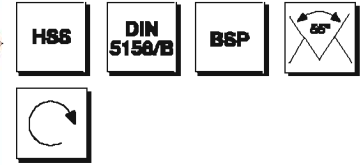
| Product Code | d1<br>UNF | P<br>pitch<br>G/Inch | d2<br>(f9)<br>mm | h1<br>mm | Stock |
|--------------|-----------|----------------------|------------------|----------|-------|
| B00110070284 | Nr. 4     | 48                   | 20               | 5        | ○     |
| B00110070317 | Nr. 5     | 44                   | 20               | 5        | ○     |
| B00110070350 | Nr. 6     | 40                   | 20               | 7        | ○     |
| B00110070417 | Nr. 8     | 36                   | 20               | 7        | ○     |
| B00110070483 | Nr.10     | 32                   | 20               | 7        | ○     |
| B00110070549 | Nr.12     | 28                   | 20               | 7        | ○     |
| B00110070635 | 1/4"      | 28                   | 20               | 7        | ●     |
| B00110070794 | 5/16"     | 24                   | 25               | 9        | ●     |
| B00110070952 | 3/8"      | 24                   | 30               | 11       | ●     |
| B00110071111 | 7/16"     | 20                   | 30               | 11       | ●     |
| B00110071270 | 1/2"      | 20                   | 38               | 10       | ●     |
| B00110071429 | 9/16"     | 18                   | 38               | 10       | ●     |
| B00110071587 | 5/8"      | 18                   | 45               | 14       | ●     |
| B00110071905 | 3/4"      | 16                   | 45               | 14       | ●     |
| B00110072222 | 7/8"      | 14                   | 55               | 16       | ●     |
| B00110072540 | 1"        | 12                   | 55               | 16       | ●     |
| B00110072857 | 1 1/8"    | 12                   | 65               | 18       | ○     |
| B00110073175 | 1 1/4"    | 12                   | 65               | 18       | ○     |
| B00110073492 | 1 3/8"    | 12                   | 65               | 18       | ○     |
| B00110073810 | 1 1/2"    | 12                   | 75               | 20       | ○     |

○ Ask Price and Deadline.



## Round Dies for Whitworth Pipe Thread

**Application:** Suitable for using in pipe fittings, alloyed and non-alloyed steel and cast materials.

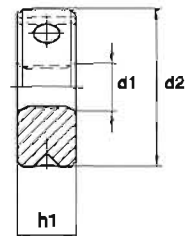
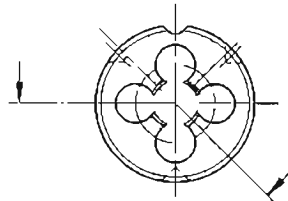
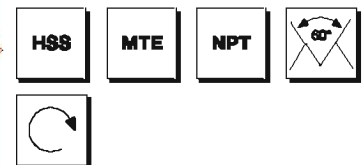


| Product Code | d1<br>BSP | P<br>pitch<br>G/Inch | d2<br>(f9)<br>mm | h1<br>mm | Stock |
|--------------|-----------|----------------------|------------------|----------|-------|
| B00110080973 | G 1/8"    | 28                   | 38               | 10       | •     |
| B00110081316 | G 1/4"    | 19                   | 38               | 10       | •     |
| B00110081666 | G 3/8"    | 19                   | 45               | 14       | •     |
| B00110082095 | G 1/2"    | 14                   | 45               | 14       | •     |
| B00110082291 | G 5/8"    | 14                   | 55               | 16       | ○     |
| B00110082644 | G 3/4"    | 14                   | 65               | 18       | •     |
| B00110083020 | G 7/8"    | 14                   | 65               | 18       | ○     |
| B00110083325 | G 1"      | 11                   | 65               | 18       | •     |
| B00110084191 | G 1 1/4"  | 11                   | 75               | 20       | ○     |
| B00110084780 | G 1 1/2"  | 11                   | 90               | 22       | ○     |
| B00110085375 | G 1 3/4"  | 11                   | 105              | 22       | ○     |
| B00110085961 | G 2"      | 11                   | 105              | 22       | ○     |

• Ask Price and Deadline.

## Round Dies for NPT Thread

**Application:** Used in Taper tap, pipe ends etc. Suitable for threading steel and alloy steel with stainless materials. ( If dies use for brass, it should be specified special cutting geometry during ordering. )

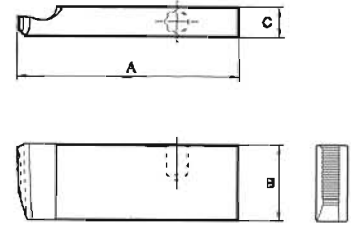
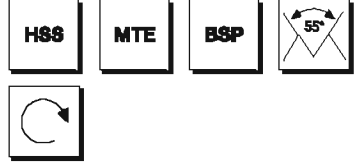


| Product Code | d1<br>NPT | P<br>pitch<br>G/Inch | d2<br>(f9)<br>mm | h1<br>mm | Stock |
|--------------|-----------|----------------------|------------------|----------|-------|
| B00110090136 | 1/8"      | 27                   | 38               | 10       | •     |
| B00110090137 | 1/4"      | 18                   | 38               | 15       | •     |
| B00110090138 | 3/8"      | 18                   | 45               | 15       | •     |
| B00110090139 | 1/2"      | 14                   | 45               | 19       | •     |
| B00110090140 | 3/4"      | 14                   | 65               | 20       | •     |
| B00110090141 | 1"        | 11 1/2               | 65               | 25       | •     |



## Radial Thread Chasers

**Application:** Used for threading pipe and pipe connection parts with adjustable special heads , in unalloyed structural steels, gray cast, brass etc. materials. ( 1 set = 4 pcs.)



| Product Code | Nominal Size<br>BSP | P<br>pitch<br>G/Inch | A<br>mm | B<br>mm | C<br>mm | Stock |
|--------------|---------------------|----------------------|---------|---------|---------|-------|
| B00121010005 | G 1/2" - G 3/4"     | 14                   | 71,5    | 25      | 10      | ○     |
| B00121010006 | G 1" - G 1 1/4"     | 11                   | 85,8    | 25      | 10      | ○     |
| B00121010007 | G 1 1/2" - G 2"     | 11                   | 58,4    | 25      | 10      | ○     |

○ Ask Price and Deadline.





REAMERS

REAMERS



MAKINA TAKIM ENDÜSTRİSİ A.Ş.





## REAMERS

| TOOL TYPE                         | QUALITY | STANDARD | PAGE |
|-----------------------------------|---------|----------|------|
| Hand Reamers                      | HSS     | DIN 206  | 88   |
| Hand Taper Reamers                | HSS     | DIN 9    | 89   |
| Straight Shank Machine Reamers    | HSS     | DIN 212  | 90   |
| Morse Taper Shank Machine Reamers | HSS     | DIN 208  | 91   |
| Taper Bridge Reamers              | HSS     | DIN 311  | 92   |
| Shell Reamers                     | HSS     | DIN 219  | 93   |



## Reaming Tolerance

Tables showing the lowest and highest values of the nominal diameters of reamers are below.

| Reamer nominal diameter d1 (mm) |      | Lower and upper measures of reamer nominal diameter d1 (measures in $\mu\text{m}$ ) Hole tolerance areas |      |      |      |      |      |      |      |      |      |
|---------------------------------|------|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|
| (from)                          | (up) | A9                                                                                                       | A11  | B8   | B9   | B10  | B11  | C8   | C9   | C10  | C11  |
| 1                               | 3    | +291                                                                                                     | +321 | +151 | +161 | +174 | +191 | +71  | +81  | +94  | +111 |
|                                 |      | +282                                                                                                     | +300 | +146 | +152 | +160 | +170 | +66  | +72  | +80  | +90  |
| 3                               | 6    | +295                                                                                                     | +333 | +155 | +165 | +180 | +203 | +85  | +95  | +110 | +133 |
|                                 |      | +284                                                                                                     | +306 | +148 | +154 | +163 | +176 | +78  | +84  | +93  | +106 |
| 6                               | 10   | +310                                                                                                     | +356 | +168 | +180 | +199 | +226 | +98  | +110 | +129 | +156 |
|                                 |      | +297                                                                                                     | +324 | +160 | +167 | +178 | +194 | +90  | +97  | +108 | +124 |
| 10                              | 18   | +326                                                                                                     | +383 | +172 | +186 | +209 | +243 | +117 | +131 | +154 | +188 |
|                                 |      | +310                                                                                                     | +344 | +162 | +170 | +184 | +204 | +107 | +115 | +129 | +149 |
| 18                              | 30   | +344                                                                                                     | +410 | +188 | +204 | +231 | +270 | +138 | +154 | +181 | +220 |
|                                 |      | +325                                                                                                     | +364 | +176 | +185 | +201 | +224 | +126 | +135 | +151 | +174 |
| 30                              | 40   | +362                                                                                                     | +446 | +203 | +222 | +255 | +306 | +153 | +172 | +205 | +256 |
|                                 |      | +340                                                                                                     | +390 | +189 | +200 | +220 | +250 | +139 | +150 | +170 | +200 |
| 40                              | 50   | +372                                                                                                     | +456 | +213 | +232 | +265 | +316 | +163 | +182 | +215 | +266 |
|                                 |      | +350                                                                                                     | +400 | +199 | +210 | +230 | +260 | +149 | +160 | +180 | +210 |
| 50                              | 65   | +402                                                                                                     | +501 | +229 | +252 | +292 | +351 | +179 | +202 | +242 | +301 |
|                                 |      | +376                                                                                                     | +434 | +212 | +226 | +250 | +284 | +162 | +176 | +200 | +234 |
| 65                              | 80   | +422                                                                                                     | +521 | +239 | +262 | +302 | +361 | +189 | +212 | +252 | +311 |
|                                 |      | +396                                                                                                     | +454 | +222 | +236 | +260 | +294 | +172 | +186 | +210 | +244 |
| 80                              | 100  | +453                                                                                                     | +567 | +265 | +293 | +339 | +407 | +215 | +243 | +289 | +357 |
|                                 |      | +422                                                                                                     | +490 | +246 | +262 | +290 | +330 | +196 | +212 | +240 | +280 |
| 100                             | 120  | +483                                                                                                     | +597 | +285 | +313 | +359 | +427 | +225 | +253 | +299 | +367 |
|                                 |      | +452                                                                                                     | +520 | +266 | +282 | +310 | +350 | +206 | +222 | +250 | +290 |
| 120                             | 140  | +545                                                                                                     | +672 | +313 | +345 | +396 | +472 | +253 | +285 | +336 | +412 |
|                                 |      | +510                                                                                                     | +584 | +290 | +310 | +340 | +384 | +230 | +250 | +280 | +324 |
| 140                             | 160  | +605                                                                                                     | +732 | +333 | +365 | +416 | +492 | +263 | +295 | +346 | +422 |
|                                 |      | +570                                                                                                     | +644 | +310 | +330 | +360 | +404 | +240 | +260 | +290 | +334 |
| 160                             | 180  | +665                                                                                                     | +792 | +363 | +395 | +446 | +522 | +283 | +315 | +366 | +442 |
|                                 |      | +630                                                                                                     | +704 | +340 | +360 | +390 | +434 | +260 | +280 | +310 | +354 |

| (from) | (up) | D8   | D9   | D10  | D11  | E7   | E8   | E9   | F6  | F7  | F8  | F9   | G6  | G7  |
|--------|------|------|------|------|------|------|------|------|-----|-----|-----|------|-----|-----|
| 1      | 3    | +31  | +41  | +54  | +71  | +22  | +25  | +35  | +11 | +14 | +17 | +27  | +7  | +10 |
|        |      | +26  | +32  | +40  | +50  | +18  | +20  | +26  | +8  | +10 | +12 | +18  | +4  | +6  |
| 3      | 6    | +45  | +55  | +70  | +93  | +30  | +35  | +45  | +16 | +20 | +25 | +35  | +10 | +14 |
|        |      | +38  | +44  | +53  | +66  | +25  | +28  | +34  | +13 | +15 | +18 | +24  | +7  | +9  |
| 6      | 10   | +58  | +70  | +89  | +116 | +37  | +43  | +55  | +20 | +25 | +31 | +43  | +12 | +17 |
|        |      | +50  | +57  | +68  | +84  | +31  | +35  | +42  | +16 | +19 | +23 | +30  | +8  | +11 |
| 10     | 18   | +72  | +86  | +109 | +143 | +47  | +54  | +68  | +25 | +31 | +38 | +52  | +15 | +21 |
|        |      | +62  | +70  | +84  | +104 | +40  | +44  | +52  | +21 | +24 | +28 | +36  | +11 | +14 |
| 18     | 30   | +93  | +109 | +136 | +175 | +57  | +68  | +84  | +31 | +37 | +48 | +64  | +18 | +24 |
|        |      | +81  | +90  | +106 | +129 | +49  | +56  | +65  | +26 | +29 | +36 | +45  | +13 | +16 |
| 30     | 50   | +113 | +132 | +165 | +216 | +71  | +83  | +102 | +38 | +46 | +58 | +77  | +22 | +30 |
|        |      | +99  | +110 | +130 | +160 | +62  | +69  | +80  | +32 | +37 | +44 | +55  | +16 | +21 |
| 50     | 80   | +139 | +162 | +202 | +261 | +85  | +99  | +122 | +46 | +55 | +69 | +92  | +26 | +35 |
|        |      | +122 | +136 | +160 | +194 | +74  | +82  | +96  | +39 | +44 | +52 | +66  | +19 | +24 |
| 80     | 120  | +165 | +193 | +239 | +307 | +101 | +117 | +145 | +54 | +65 | +81 | +109 | +30 | +41 |
|        |      | +146 | +162 | +190 | +230 | +88  | +98  | +114 | +46 | +52 | +62 | +78  | +22 | +28 |
| 120    | 180  | +198 | +230 | +281 | +357 | +119 | +138 | +170 | +64 | +77 | +96 | +128 | +35 | +48 |
|        |      | +175 | +195 | +225 | +269 | +105 | +115 | +135 | +55 | +63 | +73 | +93  | +26 | +34 |



## Reaming Tolerance

| Reamer nominal diameter d1 (mm) |      | Lower and upper measures of reamer nominal diameter d1 (measures in $\mu\text{m}$ ) Hole tolerance areas |            |            |            |             |              |              |           |           |           |          |           |           |           |
|---------------------------------|------|----------------------------------------------------------------------------------------------------------|------------|------------|------------|-------------|--------------|--------------|-----------|-----------|-----------|----------|-----------|-----------|-----------|
| (from)                          | (up) | H6                                                                                                       | H7         | H8         | H9         | H10         | H11          | H12          | J6        | J7        | J8        | JS6      | JS7       | JS8       | JS9       |
| 1                               | 3    | +5<br>+2                                                                                                 | +8<br>+4   | +11<br>+6  | +21<br>+12 | +34<br>+20  | +51<br>+30   | +85<br>+50   | +1<br>-2  | +2<br>-2  | +3<br>-2  | +2<br>-1 | +3<br>-1  | +4<br>-1  | +8<br>-1  |
| 3                               | 6    | +6<br>+3                                                                                                 | +10<br>+5  | +15<br>+8  | +25<br>+14 | +40<br>+23  | +63<br>+36   | +102<br>+60  | +3<br>0   | +4<br>-1  | +7<br>0   | +2<br>-1 | +4<br>-1  | +6<br>-1  | +10<br>-1 |
| 6                               | 10   | +7<br>+3                                                                                                 | +12<br>+6  | +18<br>+10 | +30<br>+17 | +49<br>+28  | +76<br>+44   | +127<br>+74  | +3<br>-1  | +5<br>-1  | +8<br>0   | +3<br>-1 | +5<br>-1  | +7<br>-1  | +12<br>-1 |
| 10                              | 18   | +9<br>+5                                                                                                 | +15<br>+8  | +22<br>+12 | +36<br>+20 | +59<br>+34  | +93<br>+54   | +153<br>+90  | +4<br>0   | +7<br>0   | +10<br>0  | +3<br>-1 | +6<br>-1  | +9<br>-1  | +15<br>-1 |
| 18                              | 30   | +11<br>+6                                                                                                | +17<br>+9  | +28<br>+16 | +44<br>+25 | +71<br>+41  | +110<br>+64  | +178<br>+104 | +6<br>+1  | +8<br>0   | +15<br>+3 | +4<br>-1 | +7<br>-1  | +11<br>-1 | +18<br>-1 |
| 30                              | 50   | +13<br>+7                                                                                                | +21<br>+12 | +33<br>+19 | +52<br>+30 | +85<br>+50  | +136<br>+80  | +212<br>+124 | +7<br>+1  | +10<br>+1 | +18<br>+4 | +5<br>-1 | +8<br>-1  | +13<br>-1 | +21<br>-1 |
| 50                              | 80   | +16<br>+9                                                                                                | +25<br>+14 | +39<br>+22 | +62<br>+36 | +102<br>+60 | +161<br>+94  | +255<br>+150 | +10<br>+3 | +13<br>+2 | +21<br>+4 | +6<br>-1 | +10<br>-1 | +16<br>-1 | +25<br>-1 |
| 80                              | 120  | +18<br>+10                                                                                               | +29<br>+16 | +45<br>+26 | +73<br>+42 | +119<br>+70 | +187<br>+110 | +297<br>+174 | +12<br>+4 | +16<br>+3 | +25<br>+6 | +7<br>-1 | +12<br>-1 | +18<br>-1 | +30<br>-1 |
| 120                             | 180  | +21<br>+12                                                                                               | +34<br>+20 | +53<br>+30 | +85<br>+50 | +136<br>+80 | +212<br>+124 | +340<br>+200 | +14<br>+5 | +20<br>+6 | +31<br>+8 | +8<br>-1 | +14<br>0  | +22<br>-1 | +35<br>0  |

| (from) | (up) | K6       | K7       | K8         | M6         | M7        | M8        | N6         | N7         | N8         | N9         | N10        | N11         | P6         | P7         |
|--------|------|----------|----------|------------|------------|-----------|-----------|------------|------------|------------|------------|------------|-------------|------------|------------|
| 1      | 3    | -1<br>-4 | -2<br>-6 | -3<br>-8   | -3<br>-6   | -4<br>-8  | -<br>-    | -5<br>-8   | -6<br>-10  | -7<br>-12  | -8<br>-17  | -10<br>-24 | -13<br>-34  | -7<br>-10  | -8<br>-12  |
| 3      | 6    | 0<br>-3  | +1<br>-4 | +2<br>-5   | -3<br>-6   | -2<br>-7  | -1<br>-8  | -7<br>-10  | -6<br>-11  | -5<br>-12  | -5<br>-16  | -8<br>-25  | -12<br>-39  | -11<br>-14 | -10<br>-15 |
| 6      | 10   | 0<br>-4  | +2<br>-4 | +2<br>-6   | -5<br>-9   | -3<br>-9  | -3<br>-11 | -9<br>-13  | -7<br>-13  | -7<br>-15  | -6<br>-19  | -9<br>-30  | -14<br>-46  | -14<br>-18 | -12<br>-18 |
| 10     | 18   | 0<br>-4  | +3<br>-4 | +3<br>-7   | -6<br>-10  | -3<br>-10 | -3<br>-13 | -11<br>-15 | -8<br>-15  | -8<br>-18  | -7<br>-23  | -11<br>-36 | -17<br>-56  | -17<br>-21 | -14<br>-21 |
| 18     | 30   | 0<br>-5  | +2<br>-6 | +5<br>-7   | -6<br>-11  | -4<br>-12 | -1<br>-13 | -13<br>-18 | -11<br>-19 | -8<br>-20  | -8<br>-27  | -13<br>-43 | -20<br>-66  | -20<br>-25 | -18<br>-26 |
| 30     | 50   | 0<br>-6  | +3<br>-6 | +6<br>-8   | -7<br>-13  | -4<br>-13 | -1<br>-15 | -15<br>-21 | -12<br>-21 | -9<br>-23  | -10<br>-32 | -15<br>-50 | -24<br>-80  | -24<br>-30 | -21<br>-30 |
| 50     | 80   | +1<br>-6 | +4<br>-7 | +7<br>-10  | -8<br>-15  | -5<br>-16 | -2<br>-19 | -17<br>-24 | -14<br>-25 | -11<br>-28 | -12<br>-38 | -18<br>-60 | -29<br>-96  | -29<br>-36 | -26<br>-37 |
| 80     | 120  | 0<br>-8  | +4<br>-9 | +7<br>-12  | -10<br>-18 | -6<br>-19 | -3<br>-22 | -20<br>-28 | -16<br>-29 | -13<br>-32 | -14<br>-45 | -21<br>-70 | -33<br>-110 | -34<br>-42 | -30<br>-43 |
| 120    | 180  | 0<br>-9  | +6<br>-8 | +10<br>-13 | -12<br>-21 | -6<br>-20 | -2<br>-25 | -24<br>-33 | -18<br>-32 | -14<br>-37 | -15<br>-50 | -24<br>-80 | -38<br>-126 | -40<br>-49 | -34<br>-48 |



## Recommended Cutting Values for Machine Reamers

| Material                                 |    | Reamer Nominal Diameter - mm |       |       |       |       |       |       |       |       | Cooling and Cutting Fluid                             |
|------------------------------------------|----|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------------------------------------------------------|
|                                          |    | 5                            | 8     | 10    | 15    | 20    | 25    | 30    | 40    | 50    |                                                       |
| Steel<br><500N/mm <sup>2</sup>           | Vc | 10-12                        | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | Ductile Steel:<br>Boron-oil emulsion,<br>Cutting Oil  |
|                                          | f  | 0,1                          | 0,13  | 0,15  | 0,2   | 0,25  | 0,25  | 0,3   | 0,35  | 0,4   |                                                       |
|                                          | n  | 700                          | 440   | 350   | 232   | 176   | 137   | 115   | 88    | 71    |                                                       |
| Steel<br>500-700 mm <sup>2</sup>         | Vc | 8-10                         | 8-10  | 8-10  | 8-10  | 8-10  | 8-10  | 8-10  | 8-10  | 8-10  | Tool Steel:<br>Vegetable oil                          |
|                                          | f  | 0,1                          | 0,13  | 0,15  | 0,2   | 0,25  | 0,25  | 0,3   | 0,35  | 0,4   |                                                       |
|                                          | n  | 572                          | 358   | 288   | 191   | 143   | 115   | 95    | 72    | 58    |                                                       |
| Steel<br>700-900 N/mm <sup>2</sup>       | Vc | 6-8                          | 6-8   | 6-8   | 6-8   | 6-8   | 6-8   | 6-8   | 6-8   | 6-8   | Alloyed Steel:<br>Vegetable oil,<br>Cutting oil       |
|                                          | f  | 0,1                          | 0,13  | 0,15  | 0,2   | 0,25  | 0,25  | 0,3   | 0,35  | 0,4   |                                                       |
|                                          | n  | 445                          | 278   | 222   | 148   | 111   | 89    | 74    | 56    | 45    |                                                       |
| Steel<br>900-1100 N/mm <sup>2</sup>      | Vc | 4-6                          | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | Heat resistant and<br>stainless steel:<br>Cutting Oil |
|                                          | f  | 0,08                         | 0,1   | 0,1   | 0,15  | 0,2   | 0,25  | 0,3   | 0,35  | 0,4   |                                                       |
|                                          | n  | 318                          | 198   | 159   | 106   | 80    | 64    | 53    | 40    | 32    |                                                       |
| Cast Steel<br>400-500 N/mm <sup>2</sup>  | Vc | 6-10                         | 6-10  | 6-10  | 6-10  | 6-10  | 6-10  | 6-10  | 6-10  | 6-10  | Vegetable oil                                         |
|                                          | f  | 0,1                          | 0,13  | 0,15  | 0,2   | 0,25  | 0,25  | 0,3   | 0,35  | 0,4   |                                                       |
|                                          | n  | 510                          | 318   | 254   | 170   | 127   | 102   | 85    | 64    | 51    |                                                       |
| Cast Steel<br>500-700 N/mm <sup>2</sup>  | Vc | 4-6                          | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | Vegetable oil                                         |
|                                          | f  | 0,07                         | 0,08  | 0,1   | 0,13  | 0,18  | 0,18  | 0,22  | 0,25  | 0,3   |                                                       |
|                                          | n  | 318                          | 198   | 159   | 106   | 80    | 64    | 53    | 40    | 32    |                                                       |
| Gray Cast<br><200 HB                     | Vc | 8-10                         | 8-10  | 8-10  | 6-10  | 8-10  | 6-10  | 8-10  | 8-10  | 8-10  | Dry, Vegetable oil                                    |
|                                          | f  | 0,18                         | 0,2   | 0,23  | 0,25  | 0,3   | 0,3   | 0,35  | 0,4   | 0,45  |                                                       |
|                                          | n  | 572                          | 358   | 288   | 191   | 143   | 115   | 95    | 72    | 58    |                                                       |
| Gray Cast<br>>200 HB                     | Vc | 4-6                          | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | Dry, Vegetable oil                                    |
|                                          | f  | 0,12                         | 0,15  | 0,17  | 0,2   | 0,25  | 0,25  | 0,3   | 0,35  | 0,4   |                                                       |
|                                          | n  | 318                          | 198   | 159   | 106   | 80    | 64    | 53    | 40    | 32    |                                                       |
| Tempered Cast<br><450 N/mm <sup>2</sup>  | Vc | 8-10                         | 8-10  | 8-10  | 8-10  | 8-10  | 8-10  | 8-10  | 8-10  | 8-10  | Dry - Boron oil<br>emulsion                           |
|                                          | f  | 0,18                         | 0,2   | 0,23  | 0,25  | 0,3   | 0,3   | 0,35  | 0,4   | 0,45  |                                                       |
|                                          | n  | 572                          | 358   | 288   | 191   | 143   | 115   | 95    | 72    | 58    |                                                       |
| Tempered Cast<br>450-600 mm <sup>2</sup> | Vc | 6-8                          | 6-8   | 6-8   | 6-8   | 6-8   | 6-8   | 6-8   | 6-8   | 6-8   | Dry - Boron oil<br>emulsion                           |
|                                          | f  | 0,15                         | 0,18  | 0,2   | 0,2   | 0,25  | 0,3   | 0,35  | 0,4   | 0,4   |                                                       |
|                                          | n  | 445                          | 278   | 222   | 148   | 111   | 89    | 74    | 56    | 45    |                                                       |
| Copper                                   | Vc | 8-12                         | 8-12  | 8-12  | 8-12  | 8-12  | 8-12  | 8-12  | 8-12  | 8-12  | Boron-oil emulsion                                    |
|                                          | f  | 0,15                         | 0,18  | 0,2   | 0,25  | 0,3   | 0,3   | 0,35  | 0,4   | 0,45  |                                                       |
|                                          | n  | 636                          | 398   | 318   | 212   | 158   | 127   | 106   | 80    | 54    |                                                       |
| Brass-Soft                               | Vc | 10-12                        | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | Dry                                                   |
|                                          | f  | 0,2                          | 0,25  | 0,3   | 0,35  | 0,4   | 0,4   | 0,45  | 0,5   | 0,6   |                                                       |
|                                          | n  | 700                          | 440   | 350   | 232   | 176   | 137   | 115   | 88    | 71    |                                                       |
| Brass-Hard                               | Vc | 12-14                        | 12-14 | 12-14 | 12-14 | 12-14 | 12-14 | 12-14 | 12-14 | 12-14 | Boron-oil emulsion                                    |
|                                          | f  | 0,2                          | 0,25  | 0,3   | 0,35  | 0,4   | 0,4   | 0,45  | 0,5   | 0,6   |                                                       |
|                                          | n  | 828                          | 518   | 413   | 276   | 207   | 166   | 132   | 104   | 83    |                                                       |
| Light Metals                             | Vc | 15-20                        | 15-20 | 15-20 | 15-20 | 15-20 | 15-20 | 15-20 | 15-20 | 15-20 | Vegetable oil                                         |
|                                          | f  | 0,15                         | 0,18  | 0,2   | 0,25  | 0,3   | 0,3   | 0,35  | 0,4   | 0,4   |                                                       |
|                                          | n  | 1140                         | 720   | 573   | 382   | 288   | 225   | 189   | 144   | 117   |                                                       |
| Silumin                                  | Vc | 10-12                        | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | 10-12 | Diesel                                                |
|                                          | f  | 0,15                         | 0,18  | 0,2   | 0,25  | 0,3   | 0,3   | 0,35  | 0,4   | 0,4   |                                                       |
|                                          | n  | 700                          | 440   | 350   | 232   | 176   | 137   | 115   | 88    | 71    |                                                       |
| Plastic-Hard                             | Vc | 4-6                          | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | 4-6   | Dry, pressurized air                                  |
|                                          | f  | 0,2                          | 0,25  | 0,3   | 0,35  | 0,4   | 0,45  | 0,45  | 0,5   | 0,5   |                                                       |
|                                          | n  | 318                          | 198   | 159   | 106   | 80    | 64    | 53    | 40    | 32    |                                                       |
| Plastic-Soft                             | Vc | 6-10                         | 6-10  | 6-10  | 6-10  | 6-10  | 6-10  | 6-10  | 6-10  | 6-10  | Dry, pressurized air                                  |
|                                          | f  | 0,25                         | 0,3   | 0,35  | 0,4   | 0,45  | 0,5   | 0,55  | 0,6   | 0,6   |                                                       |
|                                          | n  | 510                          | 318   | 254   | 170   | 127   | 102   | 85    | 64    | 51    |                                                       |

Vc: Cutting speed(m/min)

f: Feed (mm/revolution)

n: Revolution (revolution/min)



## Size Range and Pass (mm)

RECOMMENDED REAMING RATES;

| Material                         | Reamer Nominal Diameter - mm |         |         |         |         |
|----------------------------------|------------------------------|---------|---------|---------|---------|
|                                  | 3-5                          | 5-10    | 10-20   | 20-30   | Over 30 |
| Steel <500N/mm <sup>2</sup>      | 0,1-0,2                      | 0,2     | 0,2-0,3 | 0,3-0,4 | 0,4-0,5 |
| Steel 700-1100 N/mm <sup>2</sup> | 0,1-0,2                      | 0,2     | 0,2     | 0,3     | 0,3-0,4 |
| Steel Cast                       | 0,1-0,2                      | 0,2     | 0,2     | 0,2-0,3 | 0,3-0,4 |
| Gray Cast                        | 0,1-0,2                      | 0,2     | 0,2-0,3 | 0,3-0,4 | 0,4-0,5 |
| Tempered Cast                    | 0,1-0,2                      | 0,2     | 0,3     | 0,4     | 0,5     |
| Copper                           | 0,1-0,2                      | 0,2-0,3 | 0,3-0,4 | 0,4-0,5 | 0,5     |
| Brass - Bronze                   | 0,1-0,2                      | 0,2     | 0,2-0,3 | 0,3     | 0,3-0,4 |
| Light Metal                      | 0,1-0,2                      | 0,2-0,3 | 0,3-0,4 | 0,4-0,5 | 0,5     |
| Plastic - Hard                   | 0,1-0,2                      | 0,3     | 0,4     | 0,4-0,5 | 0,5     |
| Plastic - Soft                   | 0,1-0,2                      | 0,2     | 0,2     | 0,3     | 0,3-0,4 |

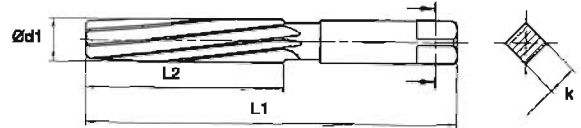
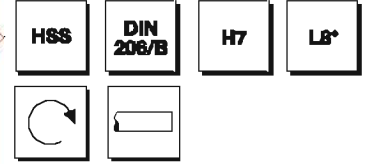
### Notes

- If left very little pass the front side of the reamer gets blunt.  
Rear surfaces apply pressure only on the lateral surfaces of the hole.
- In preliminary reaming table values must be increased with 50%.
- On ground reamers and reamers with indexable bits, it's recommended less pass thickness
- For acquiring a high quality hole surface, particularly in hard materials it's recommended preliminary and final reaming.



## Hand Reamers

**Application :** Hand reamer with long lead and nonequal cutting edges provides a precision cylindrical reaming. Ideal for reaming of holes with H7 tolerance. Due to the long bevel lead, not sufficient for blind holes. For all steel types, NE-metals and plastics.



| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | k<br>mm | Stock |
|--------------|----------|----------|----------|---------|-------|
| B00301010300 | 3,0      | 62       | 31       | 2,24    | •     |
| B00301010400 | 4,0      | 76       | 38       | 3,15    | •     |
| B00301010450 | 4,5      | 81       | 41       | 3,55    | •     |
| B00301010500 | 5,0      | 87       | 44       | 4,00    | •     |
| B00301010550 | 5,5      | 93       | 47       | 4,50    | •     |
| B00301010600 | 6,0      | 93       | 47       | 4,50    | •     |
| B00301010650 | 6,5      | 100      | 50       | 5,00    | •     |
| B00301010700 | 7,0      | 107      | 54       | 5,60    | •     |
| B00301010800 | 8,0      | 115      | 58       | 6,30    | •     |
| B00301010850 | 8,5      | 115      | 58       | 6,30    | •     |
| B00301010900 | 9,0      | 124      | 62       | 7,10    | •     |
| B00301011000 | 10,0     | 133      | 66       | 8,00    | •     |
| B00301011100 | 11,0     | 142      | 71       | 9,00    | •     |
| B00301011200 | 12,0     | 152      | 76       | 10,00   | •     |
| B00301011300 | 13,0     | 152      | 76       | 10,00   | •     |
| B00301011400 | 14,0     | 163      | 81       | 11,20   | •     |
| B00301011500 | 15,0     | 163      | 81       | 11,20   | •     |
| B00301011600 | 16,0     | 175      | 87       | 12,50   | •     |
| B00301011700 | 17,0     | 175      | 87       | 12,50   | •     |
| B00301011800 | 18,0     | 188      | 93       | 14,00   | •     |
| B00301012000 | 20,0     | 201      | 100      | 16,00   | •     |
| B00301012200 | 22,0     | 215      | 107      | 18,00   | ○     |
| B00301012400 | 24,0     | 231      | 115      | 20,00   | ○     |
| B00301012600 | 26,0     | 231      | 115      | 20,00   | ○     |
| B00301013000 | 30,0     | 247      | 124      | 22,40   | ○     |
| B00301013200 | 32,0     | 265      | 133      | 25,00   | ○     |
| B00301013500 | 35,0     | 284      | 142      | 28,00   | ○     |
| B00301014000 | 40,0     | 305      | 152      | 31,50   | ○     |

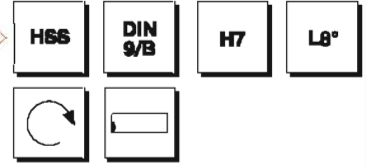
FORM A ( STRAIGHT FLUTE), TIN COATING AND DIFFERENT TOLERANCES AVAILABLE UPON REQUEST.

○ **Ask Price and Deadline.**



## Hand Taper Reamers

**Application:** Suitable for reaming 1/50 conic pins and pin holes. For all steel types and NE-metals.



| Product Code | d1<br>mm | d2<br>mm | d3<br>mm | L1<br>mm | L2<br>mm | L3<br>mm | k<br>mm | Stock |
|--------------|----------|----------|----------|----------|----------|----------|---------|-------|
| B00300010200 | 2,0      | 1,9      | 2,86     | 68       | 48       | 5        | 2,50    | ○     |
| B00300010250 | 2,5      | 2,4      | 3,36     | 68       | 48       | 5        | 2,50    | ○     |
| B00300010300 | 3,0      | 2,9      | 4,06     | 80       | 58       | 5        | 3,15    | ●     |
| B00300010400 | 4,0      | 3,9      | 5,26     | 93       | 68       | 5        | 4,00    | ●     |
| B00300010500 | 5,0      | 4,9      | 6,36     | 100      | 73       | 5        | 5,00    | ●     |
| B00300010600 | 6,0      | 5,9      | 8,00     | 135      | 105      | 5        | 6,30    | ●     |
| B00300010800 | 8,0      | 7,9      | 10,80    | 180      | 145      | 5        | 8,00    | ●     |
| B00300011000 | 10,0     | 9,9      | 13,40    | 215      | 175      | 5        | 10,00   | ●     |
| B00300011200 | 12,0     | 11,8     | 16,00    | 255      | 210      | 10       | 11,20   | ○     |
| B00300011600 | 16,0     | 15,8     | 20,40    | 280      | 230      | 10       | 14,00   | ○     |
| B00300012000 | 20,0     | 19,8     | 24,80    | 310      | 250      | 10       | 18,00   | ○     |
| B00300012500 | 25,0     | 24,7     | 30,70    | 370      | 300      | 15       | 22,40   | ○     |
| B00300013000 | 30,0     | 29,7     | 36,10    | 400      | 320      | 15       | 25,00   | ○     |
| B00300014000 | 40,0     | 39,7     | 46,50    | 430      | 340      | 15       | 31,50   | ○     |
| B00300015000 | 50,0     | 49,7     | 56,90    | 460      | 360      | 15       | 40,00   | ○     |

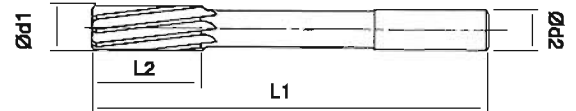
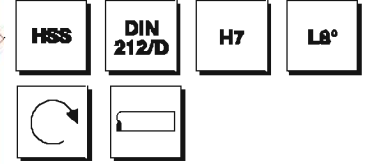
FORM A ( STRAIGHT FLUTE), TIN COATING AND DIFFERENT TOLERANCES AVAILABLE UPON REQUEST.

○ Ask Price and Deadline.



## Straight Shank Machine Reamers

**Application :** Machine reamer with short bevel lead and nonequal cutting edges, ideal for round reaming according to the tolerance. For all ferrous and non-ferrous metals, NE-metals, hard and soft plastics, for reaming blind holes to H7 tolerance.



| Product Code | d1<br>mm | d2<br>(h9)<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|------------------|----------|----------|-------|
| B00303010300 | 3,0      | 3,0              | 61       | 15       | •     |
| B00303010350 | 3,5      | 3,5              | 70       | 18       | ○     |
| B00303010400 | 4,0      | 4,0              | 75       | 19       | •     |
| B00303010450 | 4,5      | 4,5              | 80       | 21       | ○     |
| B00303010500 | 5,0      | 5,0              | 86       | 23       | •     |
| B00303010550 | 5,5      | 5,6              | 93       | 26       | ○     |
| B00303010600 | 6,0      | 5,6              | 93       | 26       | •     |
| B00303010650 | 6,5      | 6,3              | 101      | 28       | ○     |
| B00303010700 | 7,0      | 7,1              | 109      | 31       | •     |
| B00303010750 | 7,5      | 7,1              | 109      | 31       | ○     |
| B00303010800 | 8,0      | 8,0              | 117      | 33       | •     |
| B00303010850 | 8,5      | 8,0              | 117      | 33       | ○     |
| B00303010900 | 9,0      | 9,0              | 125      | 36       | ○     |
| B00303010950 | 9,5      | 9,0              | 125      | 36       | ○     |
| B00303011000 | 10,0     | 10,0             | 133      | 38       | •     |
| B00303011050 | 10,5     | 10,0             | 133      | 38       | ○     |
| B00303011100 | 11,0     | 10,0             | 142      | 41       | ○     |
| B00303011150 | 11,5     | 10,0             | 142      | 41       | ○     |
| B00303011200 | 12,0     | 10,0             | 151      | 44       | •     |
| B00303011300 | 13,0     | 10,0             | 151      | 44       | ○     |
| B00303011400 | 14,0     | 12,5             | 160      | 47       | •     |
| B00303011500 | 15,0     | 12,5             | 162      | 50       | ○     |
| B00303011600 | 16,0     | 12,5             | 170      | 52       | •     |
| B00303011700 | 17,0     | 14,0             | 175      | 54       | ○     |
| B00303011800 | 18,0     | 14,0             | 182      | 56       | •     |
| B00303011900 | 19,0     | 16,0             | 189      | 58       | ○     |
| B00303012000 | 20,0     | 16,0             | 195      | 60       | •     |

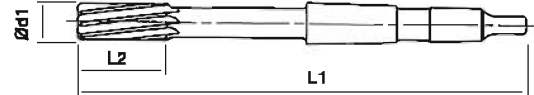
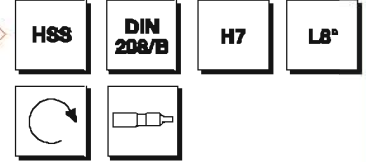
HSS-E, FORM A ( STRAIGHT FLUTE), TIN COATING AND DIFFERENT TOLERANCES AVAILABLE UPON REQUEST.

• Ask Price and Deadline.



## Morse Taper Shank Machine Reamers

**Application :** Machine reamer morse taper shank with short bevel lead. The non-equal cutting edges provide precision cylindrical reaming. For all ferrous and non-ferrous metals, NE-metals, hard and soft plastics, for reaming blind holes to H7 tolerance.



| Product Code | d1<br>mm | L1<br>mm | L2<br>mm | Mors<br>Taper | Stock |
|--------------|----------|----------|----------|---------------|-------|
| B00302010800 | 8        | 158      | 33       | 1             | •     |
| B00302011000 | 10       | 168      | 38       | 1             | •     |
| B00302011100 | 11       | 175      | 41       | 1             | •     |
| B00302011200 | 12       | 182      | 44       | 1             | •     |
| B00302011300 | 13       | 182      | 44       | 1             | •     |
| B00302011400 | 14       | 189      | 47       | 1             | •     |
| B00302011500 | 15       | 204      | 50       | 2             | •     |
| B00302011600 | 16       | 210      | 52       | 2             | •     |
| B00302011700 | 17       | 214      | 54       | 2             | •     |
| B00302011800 | 18       | 219      | 56       | 2             | •     |
| B00302011900 | 19       | 223      | 58       | 2             | •     |
| B00302012000 | 20       | 228      | 60       | 2             | •     |
| B00302012200 | 22       | 237      | 64       | 2             | •     |
| B00302012400 | 24       | 268      | 68       | 3             | •     |
| B00302012500 | 25       | 268      | 68       | 3             | •     |
| B00302012800 | 28       | 277      | 71       | 3             | •     |
| B00302013000 | 30       | 281      | 73       | 3             | •     |
| B00302013200 | 32       | 317      | 77       | 4             | •     |
| B00302013500 | 35       | 321      | 78       | 4             | ○     |
| B00302014000 | 40       | 329      | 81       | 4             | ○     |
| B00302014500 | 45       | 336      | 83       | 4             | ○     |
| B00302015000 | 50       | 344      | 86       | 4             | ○     |

HSS-E, FORM A ( STRAIGHT FLUTE), TIN COATING AND DIFFERENT TOLERANCES AVAILABLE UPON REQUEST.

○ Ask Price and Deadline.

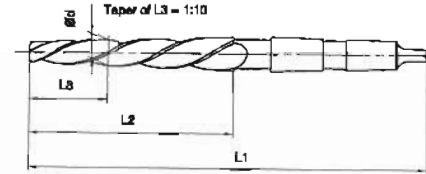


## Taper Bridge Reamers

**Application:** Used in the steel construction, bridges, ship building industries etc. Correct hole displacement of sandwiched sheet metal parts to the required hole diameter.

HSS

DIN  
311



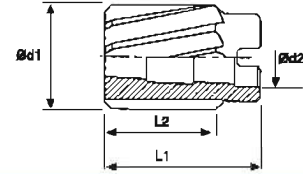
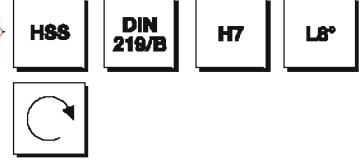
| Product Code | d<br>mm | L1<br>mm | L2<br>mm | L3<br>mm | Morse<br>Taper | Stock |
|--------------|---------|----------|----------|----------|----------------|-------|
| B00305001000 | 10      | 171      | 95       | 30       | 1              | ○     |
| B00305001200 | 12      | 199      | 105      | 39       | 2              | ○     |
| B00305001300 | 13      | 199      | 105      | 39       | 2              | ○     |
| B00305001500 | 15      | 219      | 125      | 45       | 2              | ○     |
| B00305001800 | 16      | 229      | 135      | 48       | 2              | ○     |
| B00305001700 | 17      | 251      | 135      | 51       | 3              | ○     |
| B00305001800 | 18      | 261      | 145      | 58       | 3              | ○     |
| B00305002000 | 20      | 271      | 155      | 62       | 3              | ○     |
| B00305002200 | 22      | 281      | 165      | 66       | 3              | ○     |
| B00305002300 | 23      | 281      | 165      | 66       | 3              | ○     |
| B00305002400 | 24      | 296      | 180      | 72       | 3              | ○     |
| B00305002500 | 25      | 296      | 180      | 72       | 3              | ○     |
| B00305002600 | 26      | 296      | 180      | 72       | 3              | ○     |
| B00305002700 | 27      | 311      | 195      | 78       | 3              | ○     |
| B00305002800 | 28      | 311      | 195      | 78       | 3              | ○     |
| B00305003000 | 30      | 311      | 195      | 78       | 3              | ○     |
| B00305003100 | 31      | 326      | 210      | 84       | 3              | ○     |
| B00305003200 | 32      | 354      | 210      | 84       | 4              | ○     |
| B00305003300 | 33      | 354      | 210      | 84       | 4              | ○     |
| B00305003400 | 34      | 364      | 220      | 88       | 4              | ○     |
| B00305003600 | 36      | 364      | 220      | 88       | 4              | ○     |
| B00305003700 | 37      | 364      | 220      | 88       | 4              | ○     |
| B00305004000 | 40      | 374      | 230      | 92       | 4              | ○     |

○ Ask Price and Deadline.



## Shell Reamers

**Application:** For cast iron and non-ferrous metals, synthetic material hard and soft. Slow helix type suitable for reaming of broken borings, slots, crossborings. Can be utilized for special and serial production



| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|----------|-------|
| B00304012500 | 25       | 13       | 45       | 32       | ○     |
| B00304012600 | 26       | 13       | 45       | 32       | ○     |
| B00304012700 | 27       | 13       | 45       | 32       | ○     |
| B00304012800 | 28       | 13       | 45       | 32       | ○     |
| B00304012900 | 29       | 13       | 45       | 32       | ○     |
| B00304013000 | 30       | 13       | 45       | 32       | ○     |
| B00304013100 | 31       | 16       | 50       | 36       | ○     |
| B00304013200 | 32       | 16       | 50       | 36       | ○     |
| B00304013300 | 33       | 16       | 50       | 36       | ○     |
| B00304013400 | 34       | 16       | 50       | 36       | ○     |
| B00304013500 | 35       | 16       | 50       | 36       | ○     |
| B00304013600 | 36       | 19       | 50       | 40       | ○     |
| B00304013700 | 37       | 19       | 50       | 40       | ○     |
| B00304013800 | 38       | 19       | 50       | 40       | ○     |
| B00304014000 | 40       | 19       | 50       | 40       | ○     |
| B00304014200 | 42       | 19       | 50       | 40       | ○     |
| B00304014400 | 44       | 22       | 63       | 45       | ○     |
| B00304014500 | 45       | 22       | 63       | 45       | ○     |
| B00304014600 | 46       | 22       | 63       | 45       | ○     |
| B00304014700 | 47       | 22       | 63       | 45       | ○     |
| B00304014800 | 48       | 22       | 63       | 45       | ○     |
| B00304015000 | 50       | 22       | 63       | 45       | ○     |
| B00304015200 | 52       | 27       | 71       | 50       | ○     |
| B00304015500 | 55       | 27       | 71       | 50       | ○     |
| B00304015800 | 58       | 27       | 71       | 50       | ○     |
| B00304016000 | 60       | 27       | 71       | 50       | ○     |
| B00304016200 | 62       | 32       | 80       | 56       | ○     |
| B00304016500 | 65       | 32       | 80       | 56       | ○     |
| B00304016800 | 68       | 32       | 80       | 56       | ○     |
| B00304017000 | 70       | 32       | 80       | 56       | ○     |
| B00304017200 | 72       | 40       | 90       | 63       | ○     |
| B00304017500 | 75       | 40       | 90       | 63       | ○     |
| B00304017800 | 78       | 40       | 90       | 63       | ○     |
| B00304018000 | 80       | 40       | 90       | 63       | ○     |
| B00304018200 | 82       | 40       | 90       | 63       | ○     |
| B00304018500 | 85       | 40       | 90       | 63       | ○     |
| B00304018800 | 88       | 50       | 100      | 71       | ○     |
| B00304019000 | 90       | 50       | 100      | 71       | ○     |
| B00304019200 | 92       | 50       | 100      | 71       | ○     |
| B00304019500 | 95       | 50       | 100      | 71       | ○     |
| B00304019800 | 98       | 50       | 100      | 71       | ○     |
| B00304010000 | 100      | 50       | 100      | 71       | ○     |

○ Ask Price and Deadline.



## **Recommendations of Ali Usta**

### **Ali Usta says;**

Reamers are precision tools used for acquiring of smooth hole surface and measuring accuracy.

#### **Hand reamers:**

- Cylindrical shank hand reamer
- 1/50 taper pin hand reamer

#### **Machine Reamers:**

- Cylindrical shank machine reamer
- Morse taper shank machine reamer



### **Ali Usta;**

#### **IMPORTANT CRITERIAS IN**

#### **Choosing Reamers:**

- For easy cutting and better surface quality, choose reamer with helical flutes.
- The reamers are produced with straight or helical flutes. (Left helix, Right hand) For steel with resistance 1200 N/mm<sup>2</sup>, hard cast iron and stainless steel is used carbide tipped reamers.



### **Ali Usta recommends also;**

For different materials use different types of reamers.

- TYPE N - 8° Left helix right hand (Rake angle 0°-5°)  
For long chipped ductile steel and cast iron with medium hardness an normal resistance.
- TYPE W - 35°-40° Left helix, right hand. (Rake angle 8°- 5°)  
For long chipped materials such as soft aluminium, brass, copper and copper alloys with low resistance



## Solutions of Ali Usta

### Hole size is found too large.

- There is clearance in the machine's shaft and slides or runout reamer.
- Faulty reamer attachment (shell, clips, etc).
- Reamer's lead length is not suitable or sharpening is faulty.
- Cutting speed and feed is too high.
- Cutting oil with low concentration is used.



### Hole size is found too small.

- Reamer's size and tolerance are not suitable and sharpening is faulty.
- The material is subject to plastic deformation since sufficient chip is not removed because the reamer is chosen small.
- Cutting oil with high concentration is used.



### Taper or oval hole is found.

- There is runout on the machine shaft.
- The tool's lead is not suitable.
- The axis of the front hole and the reamer's axis don't coincide.



### Surface quality of the hole is not good.

- Reamer margin is selected small.
- Lead length is short and there is runout on cutting edges.
- Helical direction is chosen wrongly.
- Cutting speed and feed is not suitable.
- Cutting oil is not suitable. Cooling pressure must be increased.



COUNTERSINKS



MAKİNA TAKİM ENDÜSTRİSİ A.Ş.





## COUNTERSINKS

| TOOL TYPE                             | QUALITY | STANDARD     | PAGE |
|---------------------------------------|---------|--------------|------|
| Taper Sheet Drills                    | HSS     | MTE Standard | 98   |
| Step Drills                           | HSS     | MTE Standard | 98   |
| Countersinks - 90°                    | HSS     | DIN 335/A    | 99   |
| Countersinks ( 3 Flutes) - 90°        | HSS     | DIN 335/C    | 99   |
| Countersinks - 60°                    | HSS     | DIN 334/A    | 100  |
| Countersinks (3 Flutes) - 60°         | HSS     | DIN 334/C    | 100  |
| Countersinks - Cross-hole - 90°       | HSS-E   | MTE Standard | 101  |
| Core Drills With Weldon Shank - SHORT | HSS     | MTE Standard | 102  |
| Core Drills With Weldon Shank - LONG  | HSS     | MTE Standard | 103  |





## Recommended Cutting Values for Countersinks

| Material                | Unalloyed steel up to 700 N/mm <sup>2</sup> | Unalloyed steel higher than 700 N/mm <sup>2</sup> | Unalloyed steel up to 1000 N/mm <sup>2</sup> | Steel cast up to 250 N/mm <sup>2</sup> | Steel cast higher than 250 N/mm <sup>2</sup> | Brittle brass           | Ductile brass           | Al. alloys up to 11% Si | Thermo plastic | Duro plastic            |
|-------------------------|---------------------------------------------|---------------------------------------------------|----------------------------------------------|----------------------------------------|----------------------------------------------|-------------------------|-------------------------|-------------------------|----------------|-------------------------|
| Cutting speed (m/min.)  | 20                                          | 15                                                | 10                                           | 10                                     | 8                                            | 40                      | 20                      | 20                      | 15             | 10                      |
| Cutting Fluid Size Ø mm | Cutting Spray Rev/min                       | Cutting Spray Rev/min                             | Cutting Spray Rev/min                        | Pressurized Air Rev/min                | Pressurized Air Rev/min                      | Pressurized Air Rev/min | Pressurized Air Rev/min | Cutting Spray Rev/min   | Water Rev/min  | Pressurized Air Rev/min |
| 4,3                     | 1481                                        | 1111                                              | 741                                          | 741                                    | 593                                          | 2963                    | 1481                    | 1481                    | 1111           | 741                     |
| 5,0                     | 1274                                        | 955                                               | 637                                          | 637                                    | 510                                          | 2548                    | 1274                    | 1274                    | 955            | 637                     |
| 5,3                     | 1202                                        | 901                                               | 601                                          | 601                                    | 481                                          | 2404                    | 1202                    | 1202                    | 901            | 601                     |
| 5,8                     | 1098                                        | 824                                               | 549                                          | 549                                    | 439                                          | 2196                    | 1098                    | 1098                    | 824            | 549                     |
| 6,0                     | 1062                                        | 796                                               | 531                                          | 531                                    | 425                                          | 2123                    | 1062                    | 1062                    | 796            | 531                     |
| 6,3                     | 1011                                        | 758                                               | 506                                          | 506                                    | 404                                          | 2022                    | 1011                    | 1011                    | 758            | 506                     |
| 7,0                     | 910                                         | 682                                               | 455                                          | 455                                    | 364                                          | 1820                    | 910                     | 910                     | 682            | 455                     |
| 7,3                     | 873                                         | 654                                               | 436                                          | 436                                    | 349                                          | 1745                    | 873                     | 873                     | 654            | 436                     |
| 8,0                     | 796                                         | 597                                               | 398                                          | 398                                    | 318                                          | 1592                    | 796                     | 796                     | 597            | 398                     |
| 8,3                     | 767                                         | 576                                               | 384                                          | 384                                    | 307                                          | 1535                    | 767                     | 767                     | 576            | 384                     |
| 9,4                     | 678                                         | 508                                               | 339                                          | 339                                    | 271                                          | 1355                    | 678                     | 678                     | 508            | 339                     |
| 10,0                    | 637                                         | 478                                               | 318                                          | 318                                    | 255                                          | 1274                    | 637                     | 637                     | 478            | 318                     |
| 10,4                    | 612                                         | 459                                               | 306                                          | 306                                    | 245                                          | 1225                    | 612                     | 612                     | 459            | 306                     |
| 11,5                    | 554                                         | 415                                               | 277                                          | 277                                    | 222                                          | 1108                    | 554                     | 554                     | 415            | 277                     |
| 12,0                    | 531                                         | 398                                               | 265                                          | 265                                    | 212                                          | 1062                    | 531                     | 531                     | 398            | 265                     |
| 12,4                    | 514                                         | 385                                               | 257                                          | 257                                    | 205                                          | 1027                    | 514                     | 514                     | 385            | 257                     |
| 12,5                    | 510                                         | 382                                               | 255                                          | 255                                    | 204                                          | 1019                    | 510                     | 510                     | 382            | 255                     |
| 13,4                    | 475                                         | 356                                               | 238                                          | 238                                    | 190                                          | 951                     | 475                     | 475                     | 356            | 238                     |
| 15,0                    | 425                                         | 318                                               | 212                                          | 212                                    | 170                                          | 849                     | 425                     | 425                     | 318            | 212                     |
| 16,0                    | 398                                         | 299                                               | 199                                          | 199                                    | 159                                          | 796                     | 398                     | 398                     | 299            | 199                     |
| 16,5                    | 386                                         | 290                                               | 193                                          | 193                                    | 154                                          | 772                     | 386                     | 386                     | 290            | 193                     |
| 19,0                    | 335                                         | 251                                               | 168                                          | 168                                    | 134                                          | 670                     | 335                     | 335                     | 251            | 168                     |
| 20,0                    | 318                                         | 239                                               | 159                                          | 159                                    | 127                                          | 637                     | 318                     | 318                     | 239            | 159                     |
| 20,5                    | 311                                         | 233                                               | 155                                          | 155                                    | 124                                          | 621                     | 311                     | 311                     | 233            | 155                     |
| 23,0                    | 277                                         | 208                                               | 138                                          | 138                                    | 111                                          | 554                     | 277                     | 277                     | 208            | 138                     |
| 25,0                    | 255                                         | 191                                               | 127                                          | 127                                    | 102                                          | 510                     | 255                     | 255                     | 191            | 127                     |
| 26,0                    | 245                                         | 184                                               | 122                                          | 122                                    | 98                                           | 490                     | 245                     | 245                     | 184            | 122                     |
| 28,0                    | 227                                         | 171                                               | 114                                          | 114                                    | 91                                           | 455                     | 227                     | 227                     | 171            | 114                     |
| 30,0                    | 212                                         | 159                                               | 106                                          | 106                                    | 85                                           | 425                     | 212                     | 212                     | 159            | 106                     |
| 31,0                    | 205                                         | 154                                               | 103                                          | 103                                    | 82                                           | 411                     | 205                     | 205                     | 154            | 103                     |
| 31,5                    | 202                                         | 152                                               | 101                                          | 101                                    | 81                                           | 404                     | 202                     | 202                     | 152            | 101                     |
| 34,0                    | 187                                         | 141                                               | 94                                           | 94                                     | 75                                           | 375                     | 187                     | 187                     | 141            | 94                      |
| 37,0                    | 172                                         | 129                                               | 86                                           | 86                                     | 69                                           | 344                     | 172                     | 172                     | 129            | 86                      |
| 40,0                    | 159                                         | 119                                               | 80                                           | 80                                     | 64                                           | 318                     | 159                     | 159                     | 119            | 80                      |
| 50,0                    | 127                                         | 96                                                | 64                                           | 64                                     | 51                                           | 255                     | 127                     | 127                     | 96             | 64                      |
| 63,0                    | 101                                         | 76                                                | 51                                           | 51                                     | 40                                           | 202                     | 101                     | 101                     | 76             | 51                      |
| 80,0                    | 80                                          | 60                                                | 40                                           | 40                                     | 32                                           | 159                     | 80                      | 80                      | 60             | 40                      |

Note: Cutting speeds may vary depending on the operating conditions.



## Recommended Cutting Values for Sheet Drills

| Material             |           | Unalloyed steel up to 700 N/mm <sup>2</sup> | Unalloyed steel higher than 700 N/mm <sup>2</sup> | Unalloyed steel up to 1000 N/mm <sup>2</sup> | Steel cast up to 250 N/mm <sup>2</sup> | Steel cast higher than 250 N/mm <sup>2</sup> | Brittle brass   | Ductile brass   | Al. alloys up to 11% Si | Thermo plastic | Duro plastic    |
|----------------------|-----------|---------------------------------------------|---------------------------------------------------|----------------------------------------------|----------------------------------------|----------------------------------------------|-----------------|-----------------|-------------------------|----------------|-----------------|
| Sheet thickness      |           | Up to 4 mm                                  | Up to 4 mm                                        | Up to 4 mm                                   | Up to 4 mm                             | Up to 4 mm                                   | Up to 4 mm      | Up to 4 mm      | Up to 4 mm              | Up to 4 mm     | Up to 4 mm      |
| Cutting speed m/min. |           | 30                                          | 20                                                | 20                                           | 15                                     | 10                                           | 60              | 35              | 30                      | 20             | 15              |
| Cutting Fluid        |           | Cutting Spray                               | Cutting Spray                                     | Cutting Spray                                | Pressurized Air                        | Pressurized Air                              | Pressurized Air | Pressurized Air | Cutting Spray           | Water          | Pressurized Air |
| Size                 | Ø mm      | Rev/min                                     | Rev/min                                           | Rev/min                                      | Rev/min                                | Rev/min                                      | Rev/min         | Rev/min         | Rev/min                 | Rev/min        | Rev/min         |
| No. 1                | 3,0-14,0  | 3185-682                                    | 2123-455                                          | 2123-455                                     | 1592-341                               | 1062-227                                     | 6369-1365       | 3715-796        | 3185-682                | 2123-455       | 1592-345        |
| No. 2                | 5,0-20,0  | 1911-478                                    | 1274-318                                          | 1274-318                                     | 955-239                                | 637-159                                      | 3822-955        | 2229-557        | 1911-478                | 1274-318       | 955-239         |
| No. 3                | 16,0-30,5 | 597-313                                     | 398-209                                           | 398-209                                      | 299-157                                | 199-104                                      | 1194-627        | 697-365         | 597-313                 | 398-209        | 299-135         |
| No. 4                | 24,0-40,0 | 398-239                                     | 265-159                                           | 265-159                                      | 199-119                                | 133-80                                       | 796-478         | 464-279         | 398-239                 | 265-159        | 199-114         |
| No. 5                | 36,0-50,0 | 265-191                                     | 177-127                                           | 177-127                                      | 133-96                                 | 88-64                                        | 531-382         | 310-223         | 265-191                 | 177-127        | 133-98          |
| No. 6                | 40,0-61,0 | 239-157                                     | 159-104                                           | 159-104                                      | 119-78                                 | 80-52                                        | 478-313         | 279-183         | 239-157                 | 159-104        | 119-78          |
| No. 7                | 5,0-25,4  | 1911-376                                    | 1274-251                                          | 1274-251                                     | 955-188                                | 637-125                                      | 3822-752        | 2229-439        | 1911-376                | 1274-251       | 955-86          |
| No. 8                | 5,0-31,0  | 1911-308                                    | 1274-205                                          | 1274-205                                     | 955-154                                | 637-103                                      | 3822-616        | 2229-360        | 1911-308                | 1274-205       | 955-154         |
| No. 9                | 5,0-22,5  | 1911-425                                    | 1274-283                                          | 1274-283                                     | 955-212                                | 637-142                                      | 3822-849        | 2229-495        | 1911-425                | 1274-283       | 955-215         |

Note: Cutting speeds may vary depending on the operating conditions.

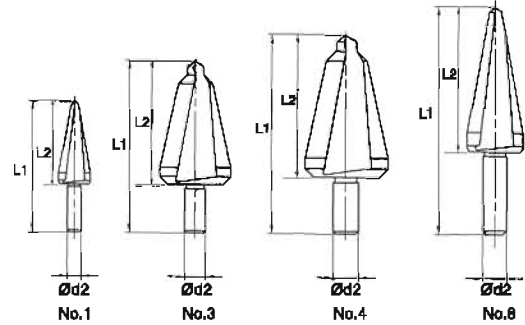


## Taper Sheet Drills

**Application:** Used for drilling steel sheets with thickness 0,1 mm - 5 mm, for producing clean holes in sheet metal and other thin-walled materials. Efficient cutting geometry, the diameter of the finished hole is infinitely variable within the range of each drill, according to depth of feed.

HSS

MTE



| Product Code | No   | Drilling Range | d2 mm | L1 mm | L2 mm | Stock |
|--------------|------|----------------|-------|-------|-------|-------|
| B00319990646 | No 1 | 3-14           | 6     | 58    | 20    | •     |
| B00319990647 | No 2 | 5-20           | 8     | 71    | 20    | •     |
| B00319990648 | No 3 | 16-30,5        | 9     | 76    | 22    | •     |
| B00319990649 | No 4 | 24-40          | 10    | 89    | 24    | •     |
| B00319990650 | No 8 | 5-31           | 9     | 103   | 20    | •     |

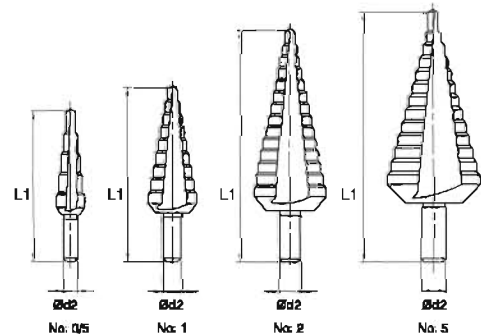
COATING AVAILABLE UPON REQUEST.

## Step Drills

**Application :** Fixed diameter at each step enables removing the chip around the bore while it's being drilled by the transition chamfer between the steps.

HSS

MTE



| Product Code | No     | Drilling Range | L1 mm | d2 mm           | Diameter Steps | Stock |
|--------------|--------|----------------|-------|-----------------|----------------|-------|
| B00314010512 | No 0,5 | 4-12           | 65    | 6               | 5              | •     |
| B00314010120 | No 1   | 4-20           | 75    | 8               | 9              | •     |
| B00314010230 | No 2   | 4-30           | 100   | 10              | 14             | •     |
| B00314010539 | No 5   | 4-39           | 107   | 10              | 13             | •     |
| B00314020120 | No 1   | 4-20           | 75    | 1/4-8 hexagonal | 9              | ○     |

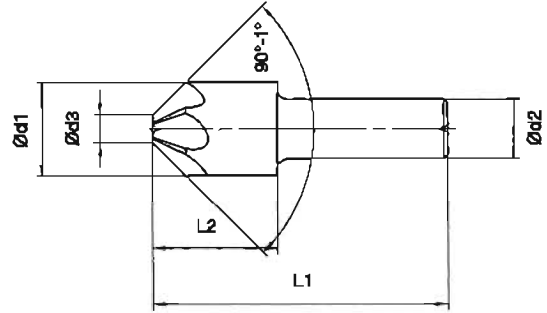
◦ Ask Price and Deadline.

COATING AVAILABLE UPON REQUEST.



## Countersinks - 90°

**Application :** Used for countersinking and deburring of steel, steel cast, brass etc. short-chip metals.

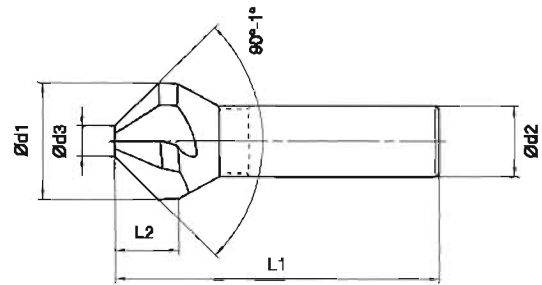


| Product Code | d1<br>mm | d2<br>mm | d3<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|----------|----------|-------|
| B00313100800 | 8,0      | 8        | -        | 48       | -        | •     |
| B00313101250 | 12,5     | 8        | 2,0      | 48       | 16       | •     |
| B00313101600 | 16,0     | 10       | 3,2      | 56       | 20       | •     |
| B00313102000 | 20,0     | 10       | 5,0      | 60       | 24       | •     |
| B00313102500 | 25,0     | 10       | 7,0      | 71       | 26       | •     |

COATING AVAILABLE UPON REQUEST.

## COUNTERSINKS (3 FLUTES) - 90°

**Application :** Used for drilling and countersinking operations in ferrous and non-ferrous metals, soft and hard materials.



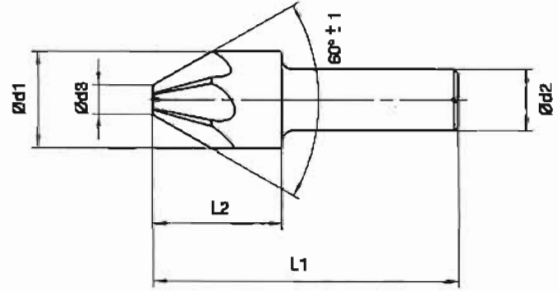
| Product Code | d1<br>mm | d2<br>mm | d3<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|----------|----------|-------|
| B00313120630 | 6,3      | 5,0      | 1,5      | 45       | 5,0      | •     |
| B00313120830 | 8,3      | 6,0      | 2,0      | 50       | 6,0      | •     |
| B00313121040 | 10,4     | 6,0      | 2,5      | 50       | 7,1      | •     |
| B00313121240 | 12,4     | 8,0      | 2,8      | 56       | 8,0      | •     |
| B00313121650 | 16,5     | 10,0     | 3,2      | 60       | 10,0     | •     |
| B00313122050 | 20,5     | 10,0     | 3,5      | 63       | 12,5     | •     |
| B00313122500 | 25,0     | 10,0     | 3,8      | 67       | 15,0     | •     |
| B00313123150 | 31,5     | 12,0     | 4,2      | 71       | 18,0     | •     |

COATING AVAILABLE UPON REQUEST.



## COUNTERSINKS - 60°

**Application :** Used for countersinking and and deburring of steel, steel cast, brass etc. short-chip metals.



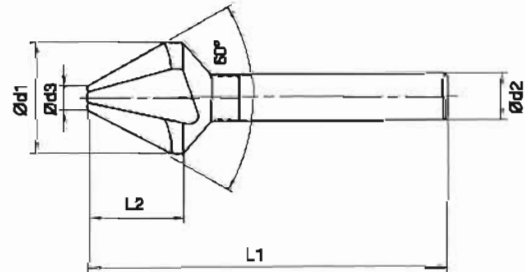
| Product Code | d1 mm | d2 mm | d3 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|-------|-------|
| B00313000800 | 8,0   | 8     | -     | 50    | -     | ○     |
| B00313001250 | 12,5  | 8     | 2,0   | 50    | 18    | ○     |
| B00313001600 | 16,0  | 10    | 3,2   | 60    | 24    | ○     |
| B00313002000 | 20,0  | 10    | 5,0   | 63    | 27    | ○     |
| B00313002500 | 25,0  | 10    | 7,0   | 78    | 33    | ○     |

○ Ask Price and Deadline.

COATING AVAILABLE UPON REQUEST.

## Countersinks (3 Flutes) - 60°

**Application :** Used for drilling and countersinking operations in ferrous and non-ferrous metals, soft and hard materials.



| Product Code | d1 mm | d2 mm | d3 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|-------|-------|
| B00313020800 | 8,0   | 8     | 2,0   | 50    | 8,0   | ○     |
| B00313021250 | 12,5  | 8     | 3,2   | 56    | 11,2  | ○     |
| B00313021600 | 16,0  | 10    | 4,0   | 63    | 14,0  | ○     |
| B00313022000 | 20,0  | 10    | 5,0   | 67    | 17,0  | ○     |
| B00313022500 | 25,0  | 10    | 6,3   | 71    | 20,0  | ○     |

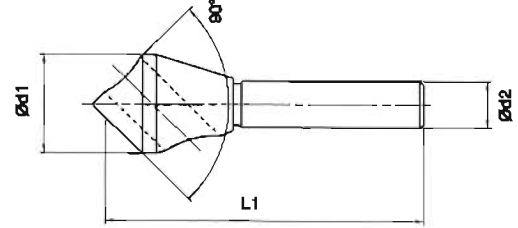
○ Ask Price and Deadline.

COATING AVAILABLE UPON REQUEST.



## Countersinks - Cross-hole - 90° (QUERLOCHSENKER)

**Application :** The hole in the body ensures the easy chip evacuation. Ideal for precise countersinking at the workpiece.



| Product Code | Operating Range | d1 mm | d2 mm | L mm | Stock |
|--------------|-----------------|-------|-------|------|-------|
| B00369990068 | 2 - 5           | 10    | 6,0   | 45   | ○     |
| B00369990069 | 5 - 10          | 14    | 8,0   | 48   | ○     |
| B00369990070 | 10 - 15         | 21    | 10,0  | 65   | ○     |
| B00369990071 | 15 - 20         | 28    | 12,0  | 85   | ○     |
| B00369990072 | 20 - 25         | 35    | 12,7  | 102  | ○     |

○ Ask Price and Deadline.





## Core Drill With Weldon Shank - SHORT

**Application:** Designed upon MTE's experience with special geometry, oriented to purpose of usage. Used in steel constructions, bridges etc. buildings for precise, high-speed and low-cost drilling operations.

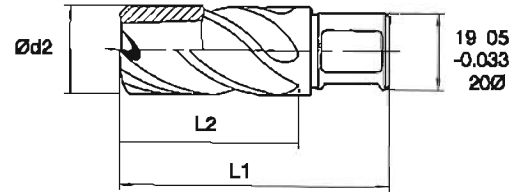
HSS

MTE

R30°



Drilling length 25 mm



| Product Code | d2 mm | L1 mm | L2 mm | Z (Number of flutes) | Stock |
|--------------|-------|-------|-------|----------------------|-------|
| B00310301200 | 12    | 65    | 38    | 4                    | •     |
| B00310301300 | 13    | 65    | 36    | 4                    | •     |
| B00310301400 | 14    | 65    | 36    | 4                    | •     |
| B00310301500 | 15    | 65    | 38    | 4                    | •     |
| B00310301600 | 16    | 65    | 36    | 6                    | •     |
| B00310301700 | 17    | 65    | 36    | 6                    | •     |
| B00310301800 | 18    | 65    | 36    | 6                    | •     |
| B00310301900 | 19    | 65    | 36    | 6                    | •     |
| B00310302000 | 20    | 65    | 36    | 6                    | •     |
| B00310302100 | 21    | 65    | 38    | 6                    | •     |
| B00310302200 | 22    | 65    | 38    | 6                    | •     |
| B00310302300 | 23    | 65    | 38    | 6                    | •     |
| B00310302400 | 24    | 65    | 38    | 6                    | •     |
| B00310302500 | 25    | 65    | 38    | 6                    | •     |
| B00310302600 | 26    | 65    | 38    | 6                    | •     |
| B00310302700 | 27    | 65    | 38    | 6                    | •     |
| B00310302800 | 28    | 65    | 38    | 8                    | •     |
| B00310302900 | 29    | 65    | 38    | 8                    | •     |
| B00310303000 | 30    | 65    | 38    | 8                    | •     |
| B00310303100 | 31    | 65    | 40    | 8                    | •     |
| B00310303200 | 32    | 65    | 40    | 8                    | •     |
| B00310303300 | 33    | 65    | 40    | 8                    | •     |
| B00310303400 | 34    | 65    | 40    | 10                   | •     |
| B00310303500 | 35    | 65    | 40    | 10                   | •     |
| B00310303600 | 36    | 65    | 40    | 10                   | •     |
| B00310303700 | 37    | 65    | 40    | 10                   | •     |
| B00310303800 | 38    | 65    | 40    | 10                   | •     |
| B00310303900 | 39    | 65    | 40    | 10                   | •     |
| B00310304000 | 40    | 65    | 40    | 10                   | •     |

HSS-E and TIN, TiCN COATING AVAILABLE UPON REQUEST.



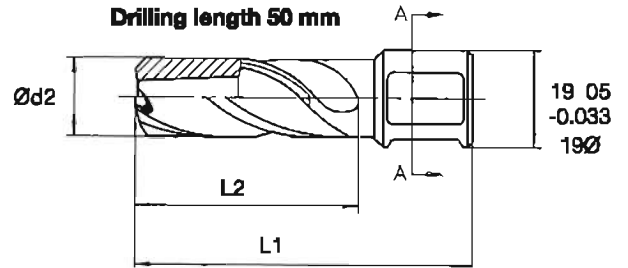
## Core Drill With Weldon Shank - LONG

**Application:** Designed upon MTE's experience with special geometry, oriented to purpose of usage. Used in steel constructions, bridges etc. buildings for precise, high-speed and low-cost drilling operations.

HSS

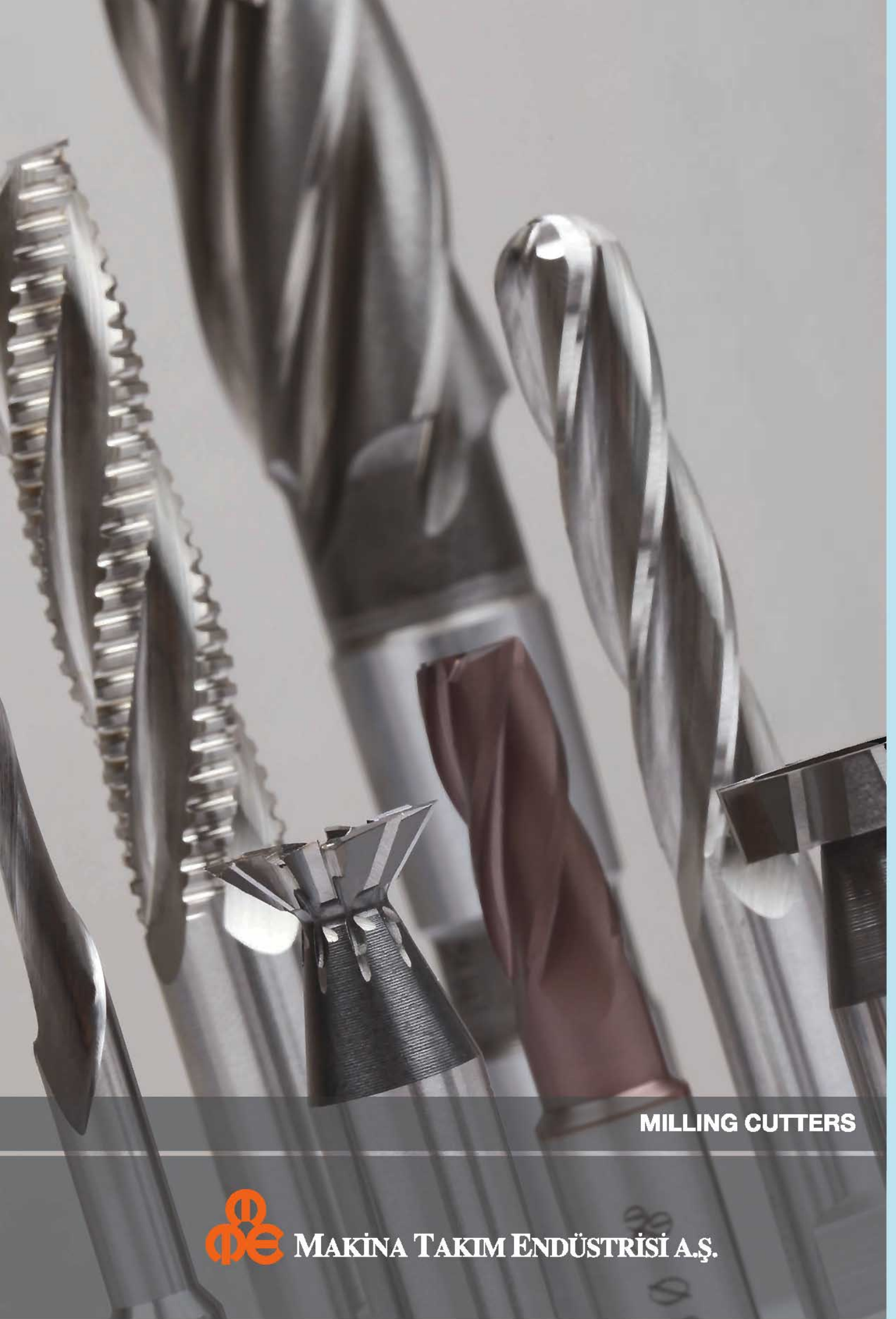
MTE

R30°



| Product Code | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>(Number<br>of flutes) | Stock |
|--------------|----------|----------|----------|----------------------------|-------|
| B00310401200 | 12       | 90       | 60       | 4                          | •     |
| B00310401300 | 13       | 90       | 60       | 4                          | •     |
| B00310401400 | 14       | 90       | 60       | 4                          | •     |
| B00310401500 | 15       | 90       | 60       | 4                          | •     |
| B00310401600 | 16       | 90       | 60       | 6                          | •     |
| B00310401700 | 17       | 90       | 60       | 6                          | •     |
| B00310401800 | 18       | 90       | 60       | 6                          | •     |
| B00310401900 | 19       | 90       | 60       | 6                          | •     |
| B00310402000 | 20       | 90       | 60       | 6                          | •     |
| B00310402100 | 21       | 90       | 60       | 6                          | •     |
| B00310402200 | 22       | 90       | 60       | 6                          | •     |
| B00310402300 | 23       | 90       | 60       | 6                          | •     |
| B00310402400 | 24       | 90       | 60       | 6                          | •     |
| B00310402500 | 25       | 90       | 60       | 6                          | •     |
| B00310402600 | 26       | 90       | 60       | 6                          | •     |
| B00310402700 | 27       | 90       | 60       | 6                          | •     |
| B00310402800 | 28       | 90       | 60       | 8                          | •     |
| B00310402900 | 29       | 90       | 60       | 8                          | •     |
| B00310403000 | 30       | 90       | 60       | 8                          | •     |
| B00310403100 | 31       | 90       | 62       | 8                          | •     |
| B00310403200 | 32       | 90       | 62       | 8                          | •     |
| B00310403300 | 33       | 90       | 62       | 8                          | •     |
| B00310403400 | 34       | 90       | 62       | 10                         | •     |
| B00310403500 | 35       | 90       | 62       | 10                         | •     |
| B00310403600 | 36       | 90       | 62       | 10                         | •     |
| B00310403700 | 37       | 90       | 62       | 10                         | •     |
| B00310403800 | 38       | 90       | 62       | 10                         | •     |
| B00310403900 | 39       | 90       | 62       | 10                         | •     |
| B00310404000 | 40       | 90       | 62       | 10                         | •     |

HSS-E and TIN, TiCN COATING AVAILABLE UPON REQUEST.



## MILLING CUTTERS



**MAKINA TAKIM ENDÜSTRİSİ A.Ş.**

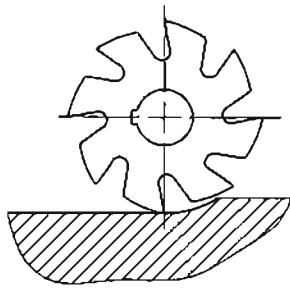




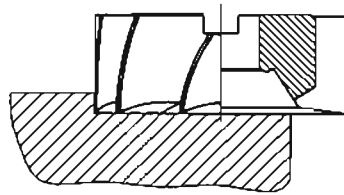
## MILLING CUTTERS

| TOOL TYPE                                        | QUALITY        | STANDARD     | PAGE |
|--------------------------------------------------|----------------|--------------|------|
| End Mills - Short Series - Type BN               | HSS - E (%8Co) | DIN 844      | 110  |
| End Mills - Short Series - Type BN - TiCN Coated | HSS - E (%8Co) | DIN 844      | 110  |
| End Mills - Short Series - Type BW               | HSS - E (%8Co) | DIN 844      | 111  |
| End Mills - Short Series - Type BNR              | HSS - E (%8Co) | DIN 844      | 112  |
| End Mills - Short Series - Type BNF              | HSS - E (%8Co) | DIN 844      | 112  |
| End Mills - Long Series - Type BN                | HSS - E (%8Co) | DIN 844      | 113  |
| End Mills - Long Series - Type BN - TiCN Coated  | HSS - E (%8Co) | DIN 844      | 113  |
| End Mills - Long Series - Type BW                | HSS - E (%8Co) | DIN 844      | 114  |
| End Mills - Long Series - Type BNR               | HSS - E (%8Co) | DIN 844      | 115  |
| End Mills - Long Series - Type BNF               | HSS - E (%8Co) | DIN 844      | 115  |
| Slot Cutters                                     | HSS - E (%8Co) | DIN 327/D    | 116  |
| Ball Nosed End Mills - Short Series              | HSS - E (%8Co) | DIN 1889/B   | 117  |
| Ball Nosed End Mills - Long Series               | HSS - E (%8Co) | DIN 1889/B   | 117  |
| Woodruff Keyseat Cutters - Staggered Teeth       | HSS - E        | DIN 850/D    | 118  |
| T- Slot Cutters - Staggered Teeth                | HSS - E        | DIN 851/B    | 119  |
| Dovetail Cutters                                 | HSS - E        | DIN 1833/C   | 119  |
| Single Flute Aluminium End Mills                 | HSS - E (%8Co) | MTE Standard | 120  |
| Single Flute Aluminium End Mills                 | HSS - E (%8Co) | MTE Standard | 120  |
| Shell End Mills                                  | HSS            | DIN 1880     | 121  |
| Side And Face Cutters - Straight Teeth           | HSS            | DIN 885/B    | 122  |
| Side And Face Cutters - Staggered Teeth          | HSS            | DIN 885/A    | 122  |
| Angular Cutters                                  | HSS            | DIN 842      | 123  |
| Double Angle Milling Cutters                     | HSS            | DIN 847      | 123  |
| Concave Radius Cutters                           | HSS            | DIN 855      | 124  |
| Convex Radius Cutters                            | HSS            | DIN 856      | 124  |

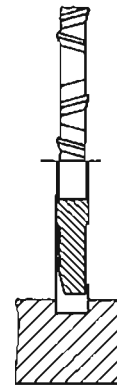
## Application Examples of Milling Cutter Types



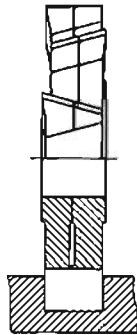
Plain Milling Cutter



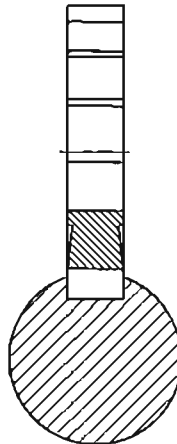
Shell End Mill



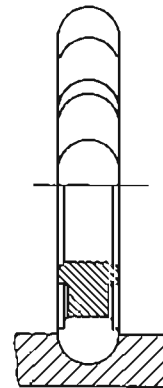
Side and Face Milling Cutter



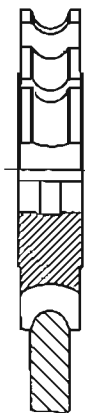
Adjustable Side and Face Milling Cutter



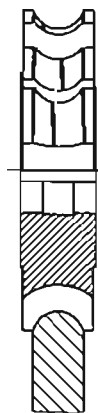
Side and Face Milling Cutter



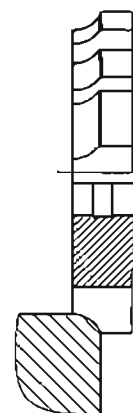
Convex Milling Cutter



Concave Milling Cutter

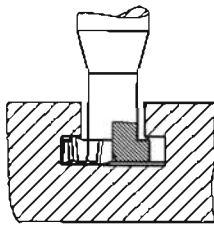


Adjustable Milling Cutter

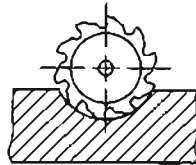


Corner Radius Milling Cutter

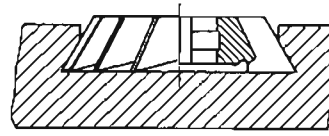
## Application Examples of Milling Cutter Types



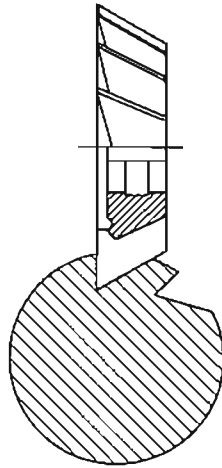
T-Slot Cutter



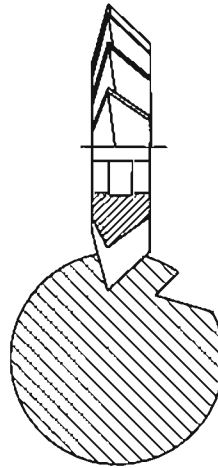
Woodruff Milling Cutter



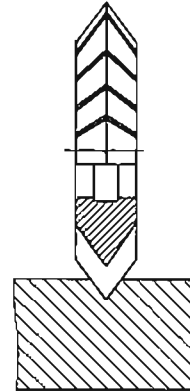
Angular Milling Cutter



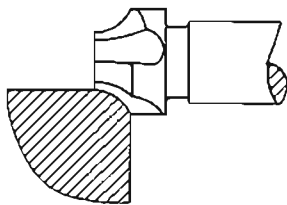
Single - Angled Milling Cutter



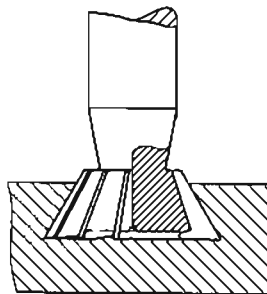
Double - Angled Milling Cutter



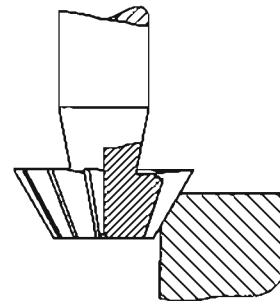
Double - Angled Milling Cutter



Corner Radius Milling Cutter



Dovetail Cutter



Dovetail Cutter



## Milling Cutters Types and Materials

The application of milling cutters according to the tool type is show on Table 1 below; the chip breaker form raughing milling cutters Table 2; using area according to the material is shown Table 3.

**Table1**

| Tool Type |    | Areas of Usage                                                                 |
|-----------|----|--------------------------------------------------------------------------------|
| DIN       | TS |                                                                                |
| N         | N  | Materials with normal resistance and hardness values                           |
| H         | S  | Hard, hard ductile materials with high resistance and short chipping materials |
| W         | Y  | Soft, ductile and / or long chipping materials                                 |

**Table 2**

| Tool Type | Areas of Usage       |
|-----------|----------------------|
| NF<br>HF  | Roughing & Finishing |
| NR<br>HR  | Roughing             |

**Table 3 A-** Steel and steel cast materials

| Description of Material                   |                                                    | Tensile Resistance (N/mm <sup>2</sup> ) |          | Milling Cutter Types |   |   |          |          |
|-------------------------------------------|----------------------------------------------------|-----------------------------------------|----------|----------------------|---|---|----------|----------|
|                                           |                                                    | from                                    | up to    | N                    | H | W | NF<br>NR | HF<br>HR |
| Automate Steel                            |                                                    | 370                                     | 600      | •                    |   | ○ | •        |          |
|                                           |                                                    | 550                                     | 1000     | •                    | ○ |   | •        | ○        |
| Construction Steel                        | Non-alloyed                                        | -                                       | 600      | •                    |   | ○ | •        |          |
|                                           | Alloyed                                            | 500                                     | 900      | •                    |   |   | •        |          |
| Stainless steels and stainless steel cast |                                                    | 450                                     | 950      | •                    |   |   | •        |          |
| Nitration Steel                           | Softened                                           | 700                                     | 900      | •                    |   |   | •        |          |
|                                           | Toughened                                          | 800                                     | 1250     | •                    | ○ |   | •        | •        |
| Steel Cast                                |                                                    | 400                                     | 1100     | •                    |   |   | •        |          |
| Toughened Steel                           | Soft or tempered                                   | 500                                     | 750      | •                    |   |   | •        |          |
|                                           | Non alloyed, toughened                             | 700                                     | 1000     | •                    |   |   | •        |          |
|                                           | Alloyed, toughened                                 | 700                                     | 1000     | •                    |   |   | •        |          |
|                                           | Alloyed, toughened                                 | 900                                     | 1250     | •                    | ○ |   | •        | •        |
| Tool Steel                                | Alloyed, toughened                                 | 900                                     | 1250     | •                    | ○ |   | •        | •        |
|                                           | Non-alloyed or alloyed, softened                   | Hardness 180                            | (HB) 240 | •                    |   |   | •        |          |
|                                           | High carbon and / or high alloyed softened, finned | Hardness 220                            | (HB) 300 | ○                    | • |   | ○        | •        |
|                                           |                                                    | 100                                     | 240      | •                    |   | • | •        |          |
| Cast Iron                                 | Graphite                                           | 230                                     | 320      | ○                    | • | • | ○        | •        |
|                                           | Round                                              | 100                                     | 240      | •                    |   | • | ○        | ○        |
|                                           | Graphite                                           | 230                                     | 320      | ○                    | • | • |          | •        |
| Tempered Cast                             |                                                    | 100                                     | 270      | •                    |   | • | ○        | ○        |

**Table3 B -** Non Ferrous Metals

| Description of Material                    |                                                             | Tensile Strength (N/mm <sup>2</sup> ) |      | Milling Cutter Types |   |   |          |          |
|--------------------------------------------|-------------------------------------------------------------|---------------------------------------|------|----------------------|---|---|----------|----------|
|                                            |                                                             | from                                  | to   | N                    | H | W | NF<br>NR | HF<br>HR |
| Aluminium cast alloy with up to 10% Si     |                                                             | -                                     | 180  | ○                    |   | • |          |          |
| Aluminium cast alloy with more than10 % Si |                                                             | 150                                   | 250  | •                    |   | ○ | ○        |          |
| Copper                                     |                                                             | 200                                   | 400  | ○                    |   | • |          |          |
| Copper and Copper alloys                   | Low resistance, High copper content                         | 200                                   | 550  | ○                    |   | • |          |          |
|                                            | High resistance, low or High copper content                 | 250                                   | 850  | •                    |   | ○ | ○        |          |
|                                            | Chip breaking characteristic (alloyed in Pb1 Ph1Te alloyed) | 250                                   | 500  | ○                    | • |   |          |          |
|                                            |                                                             |                                       |      |                      |   |   |          |          |
| Magnesium and Mg. alloys                   |                                                             | 150                                   | 300  | •                    |   | ○ |          |          |
| Titanium alloys                            | Medium resistance                                           | -                                     | 700  | •                    |   | ○ | •        | •        |
|                                            | Low resistance                                              | 600                                   | 1100 | ○                    | • |   | ○        | •        |

## Tool Types and Operating Values of Milling Cutters According to the Material

V= Cutting speed (m/min.)

fz= feed per (mm/thread)

F = Feed (mm/min)=fz.n.z.

z = Number of threads of milling cutter

n = Number of revolution of milling cutter (revolution/minute)

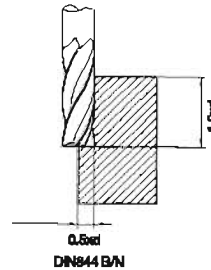
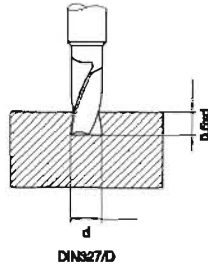
| Type of Material                                               | Milling cutter material | Shell End Mills |            | Tip  | Side and Face Milling Cutters |            |      |
|----------------------------------------------------------------|-------------------------|-----------------|------------|------|-------------------------------|------------|------|
|                                                                |                         | V               | fz         |      | V                             | fz         | Tip  |
| Non-alloyed steels<br>Up to 500 N/mm <sup>2</sup>              | HSS                     | 16..20          | 0.20       | N    | 16..20                        | 0.12       | N    |
|                                                                | HSS-E                   | 30..40          | 0.2..0.25  |      | 20..25                        | 0.10..1.16 |      |
| Non-alloyed and alloyed steels<br>Up to 800 N/mm <sup>2</sup>  | HSS                     | 14..16          | 0.16       | N    | 14..16                        | 0.10       | N    |
|                                                                | HSS-E                   | 27..33          | 0.2..0.25  |      | 16..20                        | 0.10..0.12 |      |
| Non-alloyed and alloyed steels<br>Up to 1000 N/mm <sup>2</sup> | HSS                     | 11..14          | 0.12       | N-H  | 11..14                        | 0.08       | N-H  |
|                                                                | HSS-E                   | 20..26          | 0.18..0.22 |      | 12..16                        | 0.08..0.10 |      |
| Non-alloyed and alloyed steels<br>Up to 1300 N/mm <sup>2</sup> | HSS                     | 8..11           | 0.06       | H    | 8..11                         | 0.05       | H    |
|                                                                | HSS-E                   | 13..15          | 0.09..0.15 |      | 10..12                        | 0.05..0.07 |      |
| Aluminium alloys<br>(soft)                                     | HSS                     | 300             | 0.12       | W    | 280                           | 0.12       | W    |
|                                                                | HSS-E                   | 300             | 0.15       |      | 300                           | 0.12       |      |
| Aluminium alloys<br>(medium, hard)                             | HSS                     | 220             | 0.12       | N-W  | 200                           | 0.10       | N-W  |
|                                                                | HSS-E                   | 240             | 0.12       |      | 220                           | 0.10       |      |
| Aluminium alloys<br>(hard)                                     | HSS                     | 180             | 0.10       | N-W  | 160                           | 0.10       | N-W  |
|                                                                | HSS-E                   | 200             | 0.10       |      | 180                           | 0.10       |      |
| Grey cast iron<br>Up to 200 HB                                 | HSS                     | 12..14          | 0.25       | N    | 12..14                        | 0.20       | N    |
|                                                                | HSS-E                   | 22..26          | 0.2..0.25  |      | 14..20                        | 0.20       |      |
| Grey cast iron<br>higher than 200 HB                           | HSS                     | 8..12           | 0.16       | H    | 8..12                         | 0.10       | H    |
|                                                                | HSS-E                   | 12..18          | 0.15..0.20 |      | 8..12                         | 0.10       |      |
| Tempered Cast<br>Up to 200 HB                                  | HSS                     | 14..18          | 0.20       | N    | 14..18                        | 0.16       | N    |
|                                                                | HSS-E                   | 16..20          | 0.20       |      | 16..20                        | 0.20       |      |
| Steel Cast<br>Up to 700 N/mm <sup>2</sup>                      | HSS                     | 11..14          | 0.16       | N(H) | 11..14                        | 0.16       | N(H) |
|                                                                | HSS-E                   | 12..18          | 0.15..0.20 |      | 11..14                        | 0.20       |      |
| Brass<br>(soft)                                                | HSS                     | 40              | 0.20       | W    | 36                            | 0.16       | W    |
|                                                                | HSS-E                   | 40-60           | 0.15..0.20 |      | 40                            | 0.20       |      |
| Brass-Bronze<br>(hard)                                         | HSS                     | 32              | 0.16       | N    | 32                            | 0.12       | N    |
|                                                                | HSS-E                   | 30..36          | 0.16       |      | 36                            | 0.20       |      |

The table values above are given as reference values;

- For materials with homogeneous structure;
- For stable machine and stable fixing conditions;
- For proper cooling conditions;
- For perpendicular positioning of the tool to the axis of the work piece.



## Recommended Operating Conditions for End Mills

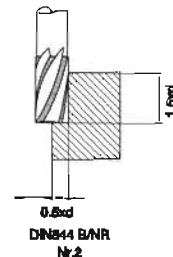
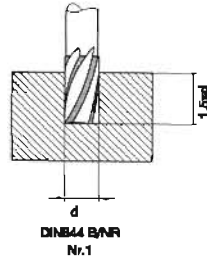


| Material |                                                                                                                          | Cutting speed (m/min.) | Number of Flute Diameter (mm) | DIN 327 / D |       |       |       |       |       |      |      |      |      | DIN 844 B / N |       |       |       |      |      |      |      |      |      |
|----------|--------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------|-------------|-------|-------|-------|-------|-------|------|------|------|------|---------------|-------|-------|-------|------|------|------|------|------|------|
|          |                                                                                                                          |                        |                               | 2           | 2     | 2     | 2     | 2     | 2     | 2    | 2    | 2    | 2    | 4             | 4     | 4     | 4     | 4    | 4    | 6    | 6    | 6    | 6    |
| I        | Structural, Nitride Steels, Automate Steels, Tempered Steels > 700 N/mm <sup>2</sup> Tool Steels Gray Cast Iron GG<200HB | HSS-E                  | 25-32                         | fz          | .004  | .008  | .015  | .025  | .040  | .050 | .075 | .090 | .100 | .006          | .007  | .010  | .016  | .022 | .028 | .035 | .040 | .046 | .046 |
|          |                                                                                                                          |                        |                               | n           | 4600  | 2300  | 1500  | 1100  | 900   | 760  | 680  | 480  | 300  | 2300          | 1600  | 1100  | 900   | 760  | 660  | 460  | 360  | 300  | 300  |
|          |                                                                                                                          | HSS-E TIN Coated       | 38-48                         | fz          | .004  | .008  | .015  | .025  | .040  | .050 | .075 | .090 | .100 | .006          | .007  | .010  | .016  | .022 | .028 | .035 | .040 | .046 | .046 |
|          |                                                                                                                          |                        |                               | n           | 6800  | 3400  | 2300  | 1700  | 1400  | 1100 | 850  | 700  | 450  | 3400          | 2300  | 1700  | 1400  | 1100 | 850  | 700  | 550  | 450  | 450  |
| II       | Acid and Heat resistant Steel, Alloyed Steel < 1000N/mm <sup>2</sup> Tempered and Tool Steels, Gray Cast Iron GG>200HB   | HSS-E                  | 18-25                         | fz          | .004  | .008  | .015  | .023  | .036  | .046 | .070 | .085 | .090 | .006          | .008  | .009  | .014  | .019 | .026 | .031 | .034 | .037 | .037 |
|          |                                                                                                                          |                        |                               | n           | 3400  | 1700  | 1100  | 900   | 700   | 550  | 450  | 350  | 250  | 1700          | 1100  | 900   | 700   | 550  | 450  | 350  | 300  | 250  | 250  |
|          |                                                                                                                          | HSS-E TIN Coated       | 27-37                         | fz          | .004  | .008  | .015  | .023  | .036  | .046 | .070 | .085 | .090 | .006          | .008  | .009  | .014  | .019 | .026 | .031 | .034 | .037 | .037 |
|          |                                                                                                                          |                        |                               | n           | 5100  | 2500  | 1700  | 1300  | 1000  | 850  | 650  | 500  | 350  | 2500          | 1700  | 1300  | 1000  | 850  | 650  | 500  | 400  | 350  | 350  |
| III      | Alloyed Steel < 1400 N/mm <sup>2</sup> Valve Steel, Cold Work Steels, Speed Steels, Acid Resistant Steels                | HSS-E                  | 12-18                         | fz          | .003  | .007  | .012  | .020  | .032  | .040 | .065 | .080 | .085 | .006          | .007  | .010  | .015  | .020 | .026 | .033 | .038 | .038 | .038 |
|          |                                                                                                                          |                        |                               | n           | 2400  | 1200  | 800   | 600   | 500   | 400  | 300  | 250  | 160  | 1200          | 800   | 600   | 500   | 400  | 300  | 250  | 200  | 160  | 160  |
|          |                                                                                                                          | HSS-E TIN Coated       | 12-27                         | fz          | .003  | .007  | .012  | .020  | .032  | .040 | .065 | .080 | .085 | .006          | .007  | .010  | .015  | .020 | .026 | .033 | .038 | .038 | .038 |
|          |                                                                                                                          |                        |                               | n           | 3100  | 1600  | 1000  | 800   | 600   | 500  | 400  | 300  | 200  | 1600          | 1000  | 800   | 600   | 500  | 400  | 300  | 250  | 200  | 200  |
| IV       | Difficult Chip Removal Steels, High Temperature Resistant Steels, Ti and Ni Alloyed Steels                               | HSS-E                  | 3-15                          | fz          | .002  | .006  | .010  | .019  | .028  | .036 | .055 | .065 | .070 | .008          | .007  | .011  | .016  | .022 | .028 | .035 | .037 | .043 | .043 |
|          |                                                                                                                          |                        |                               | n           | 1400  | 700   | 500   | 350   | 300   | 250  | 180  | 140  | 100  | 700           | 500   | 350   | 300   | 250  | 180  | 140  | 110  | 100  | 100  |
|          |                                                                                                                          | HSS-E TIN Coated       | 3-20                          | fz          | .002  | .006  | .010  | .019  | .028  | .036 | .055 | .065 | .070 | .008          | .007  | .011  | .016  | .022 | .028 | .035 | .037 | .043 | .043 |
|          |                                                                                                                          |                        |                               | n           | 1800  | 900   | 600   | 450   | 350   | 300  | 250  | 180  | 120  | 900           | 600   | 450   | 350   | 300  | 250  | 180  | 150  | 120  | 120  |
| V        | Aluminium with Non-Hardened Surface, Al - Mg Alloy                                                                       | HSS-E                  | 200-300                       | fz          | .004  | .008  | .015  | .025  | .040  | .050 | .080 | .110 | .170 | .007          | .008  | .014  | .021  | .029 | .037 | .050 | .060 | .075 | .075 |
|          |                                                                                                                          |                        |                               | n           | 40000 | 20000 | 13000 | 10000 | 8000  | 6800 | 5000 | 4000 | 2700 | 20000         | 13000 | 10000 | 8000  | 6600 | 5000 | 4000 | 3200 | 2700 | 2700 |
|          |                                                                                                                          | HSS-E TIN Coated       | 200-450                       | fz          | .004  | .008  | .015  | .025  | .040  | .050 | .080 | .110 | .170 | .007          | .008  | .014  | .021  | .029 | .037 | .050 | .060 | .075 | .075 |
|          |                                                                                                                          |                        |                               | n           | 51800 | 26000 | 17300 | 13000 | 10400 | 8800 | 7400 | 5200 | 3500 | 26000         | 17300 | 13000 | 10400 | 8800 | 7400 | 5200 | 4100 | 3500 | 3500 |
| VI       | Aluminium Cast <= 96% Si Aluminium with Non-Hardened Surface                                                             | HSS-E                  | 70-120                        | fz          | .004  | .008  | .015  | .025  | .040  | .050 | .080 | .110 | .170 | .007          | .008  | .014  | .021  | .029 | .037 | .050 | .060 | .075 | .075 |
|          |                                                                                                                          |                        |                               | n           | 15000 | 7600  | 5000  | 3800  | 3000  | 2500 | 1800 | 1500 | 1000 | 7600          | 5000  | 3800  | 3000  | 2500 | 1800 | 1500 | 1200 | 1000 | 1000 |
|          |                                                                                                                          | HSS-E TIN Coated       | 70-180                        | fz          | .004  | .008  | .015  | .025  | .040  | .050 | .080 | .110 | .170 | .007          | .008  | .014  | .021  | .029 | .037 | .050 | .060 | .075 | .075 |
|          |                                                                                                                          |                        |                               | n           | 20000 | 10000 | 6600  | 5000  | 4000  | 3300 | 2500 | 2000 | 1300 | 10000         | 6600  | 5000  | 4000  | 3300 | 2500 | 2000 | 1600 | 1300 | 1300 |
| VII      | Aluminium Cast >= 96% Si Copper Brass, Copper Alloys                                                                     | HSS-E                  | 40-70                         | fz          | .005  | .009  | .020  | .032  | .050  | .065 | .100 | .130 | .180 | .010          | .014  | .023  | .036  | .040 | .050 | .060 | .070 | .080 | .080 |
|          |                                                                                                                          |                        |                               | n           | 6800  | 4400  | 2900  | 2200  | 1800  | 1600 | 1100 | 900  | 600  | 4400          | 2900  | 2200  | 1800  | 1500 | 1100 | 900  | 700  | 600  | 600  |
|          |                                                                                                                          | HSS-E TIN Coated       | 40-100                        | fz          | .005  | .009  | .020  | .032  | .050  | .065 | .100 | .130 | .180 | .010          | .014  | .023  | .036  | .040 | .050 | .060 | .070 | .080 | .080 |
|          |                                                                                                                          |                        |                               | n           | 11000 | 5800  | 3700  | 2800  | 2200  | 1900 | 1400 | 1100 | 750  | 5800          | 3700  | 2800  | 2200  | 1900 | 1400 | 1100 | 900  | 750  | 750  |

fz: Feed per thread (mm/thread)  
n: Rev. (rev/min)  
vf: Total feed per minute (m/min)



## Recommended Operating Conditions for End Mills



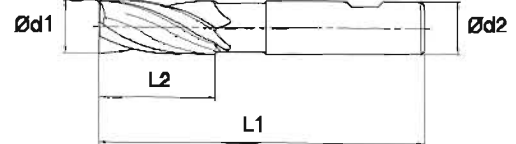
| Material |                                                                                                                     |                     | Cutting speed (m/min.) | Number of Flutes<br>Diameter (mm) | DIN 844 B / NR Nr.1 |       |       |      |      |      |      |      |      |       | DIN 844 B / NR Nr.2 |       |      |      |      |      |      |      |  |  |
|----------|---------------------------------------------------------------------------------------------------------------------|---------------------|------------------------|-----------------------------------|---------------------|-------|-------|------|------|------|------|------|------|-------|---------------------|-------|------|------|------|------|------|------|--|--|
|          |                                                                                                                     |                     |                        |                                   | 4 6                 | 4 8   | 4 10  | 4 12 | 4 16 | 4 20 | 5 25 | 5 30 | 6 40 | 4 6   | 4 8                 | 4 10  | 4 12 | 4 16 | 4 20 | 5 25 | 5 30 | 6 40 |  |  |
| I        | Structural, Nitride Steels, Free Cutting Steels, Tempered Steels > 700 N/mm²<br>Tool Steels Gray Cast Iron GG<200HB | HSS-E               | 25-32                  | fz                                | .007                | .010  | .016  | .022 | .028 | .035 | .040 | .046 | .054 | .014  | .020                | .032  | .044 | .056 | .070 | .080 | .092 | .108 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 1500                | 1100  | 900   | 750  | 550  | 450  | 350  | 300  | 250  | 1500  | 1100                | 900   | 750  | 550  | 450  | 350  | 300  | 250  |  |  |
|          |                                                                                                                     | HSS-E<br>TIN Coated | 38-48                  | fz                                | .007                | .010  | .016  | .022 | .028 | .035 | .040 | .046 | .054 | .014  | .020                | .032  | .044 | .056 | .070 | .080 | .092 | .108 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 2300                | 1700  | 1400  | 1100 | 850  | 700  | 560  | 450  | 360  | 2300  | 1700                | 1400  | 1100 | 850  | 700  | 560  | 450  | 360  |  |  |
| II       | Acid and Heat resistant Steel, Alloyed Steel < 1000N/mm²<br>Tempered and Tool Steels, Gray Cast Iron GG>200HB       | HSS-E               | 18-25                  | fz                                | .008                | .009  | .014  | .019 | .025 | .031 | .034 | .037 | .041 | .012  | .018                | .028  | .038 | .050 | .062 | .068 | .074 | .082 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 1100                | 900   | 700   | 550  | 450  | 350  | 300  | 250  | 170  | 1100  | 900                 | 700   | 550  | 450  | 350  | 300  | 250  | 170  |  |  |
|          |                                                                                                                     | HSS-E<br>TIN Coated | 27-37                  | fz                                | .008                | .009  | .014  | .019 | .025 | .031 | .034 | .037 | .041 | .012  | .018                | .028  | .038 | .050 | .062 | .068 | .074 | .082 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 1700                | 1300  | 1000  | 850  | 650  | 500  | 400  | 350  | 250  | 1700  | 1300                | 1000  | 850  | 650  | 500  | 400  | 350  | 250  |  |  |
| III      | Alloyed Steel < 1400 N/mm² Valve Steel, Cold Work Steels, Speed Steels, Acid Resistant Steels                       | HSS-E               | 12-18                  | fz                                | .007                | .010  | .015  | .020 | .026 | .033 | .036 | .039 | .045 | .014  | .020                | .030  | .040 | .052 | .066 | .072 | .078 | .090 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 800                 | 600   | 500   | 400  | 300  | 250  | 200  | 150  | 120  | 800   | 600                 | 500   | 400  | 300  | 250  | 200  | 150  | 120  |  |  |
|          |                                                                                                                     | HSS-E<br>TIN Coated | 12-27                  | fz                                | .007                | .010  | .015  | .020 | .026 | .033 | .036 | .039 | .045 | .014  | .020                | .030  | .040 | .052 | .066 | .072 | .078 | .090 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 1000                | 800   | 600   | 500  | 400  | 300  | 250  | 200  | 160  | 1000  | 800                 | 600   | 500  | 400  | 300  | 250  | 200  | 160  |  |  |
| IV       | Difficult Chip Removal Steels, High Temperature Resistant Steels, Ti and Ni Alloyed Steels                          | HSS-E               | 3-15                   | fz                                | .007                | .011  | .016  | .022 | .028 | .035 | .037 | .043 | .050 | .014  | .022                | .032  | .044 | .056 | .070 | .074 | .086 | .100 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 500                 | 350   | 300   | 250  | 180  | 140  | 110  | 100  | 70   | 500   | 350                 | 300   | 250  | 180  | 140  | 110  | 100  | 70   |  |  |
|          |                                                                                                                     | HSS-E<br>TIN Coated | 3-20                   | fz                                | .007                | .011  | .016  | .022 | .028 | .035 | .037 | .043 | .050 | .014  | .022                | .032  | .044 | .056 | .070 | .074 | .086 | .100 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 600                 | 450   | 350   | 300  | 250  | 180  | 150  | 120  | 90   | 600   | 450                 | 350   | 300  | 250  | 180  | 150  | 120  | 90   |  |  |
| V        | Aluminium with Non-Hardened Surface, Al - Mg Alloy                                                                  | HSS-E               | 200-300                | fz                                | .008                | .014  | .021  | .029 | .037 | .050 | .060 | .075 | .080 | .018  | .028                | .042  | .058 | .074 | .100 | .120 | .150 | .180 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 13300               | 10000 | 8000  | 6000 | 5000 | 4000 | 3200 | 2700 | 2000 | 13300 | 8000                | 6000  | 5000 | 4000 | 3200 | 2700 | 2000 |      |  |  |
|          |                                                                                                                     | HSS-E<br>TIN Coated | 200-450                | fz                                | .008                | .014  | .021  | .029 | .037 | .050 | .060 | .075 | .080 | .016  | .028                | .042  | .058 | .074 | .100 | .120 | .150 | .180 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 17300               | 13000 | 10400 | 8600 | 7400 | 5200 | 4100 | 3500 | 2600 | 17300 | 13000               | 10400 | 8600 | 7400 | 5200 | 4100 | 3500 | 2600 |  |  |
| VI       | Aluminium Cast <= 96 Si Aluminium with Hardened Surface                                                             | HSS-E               | 70-120                 | fz                                | .008                | .014  | .021  | .029 | .037 | .050 | .060 | .075 | .080 | .018  | .028                | .042  | .058 | .074 | .100 | .120 | .150 | .180 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 5000                | 3800  | 3000  | 2500 | 1900 | 1500 | 1200 | 1000 | 750  | 5000  | 3800                | 3000  | 2500 | 1900 | 1500 | 1200 | 1000 | 750  |  |  |
|          |                                                                                                                     | HSS-E<br>TIN Coated | 70-160                 | fz                                | .008                | .014  | .021  | .029 | .037 | .050 | .060 | .075 | .080 | .018  | .028                | .042  | .058 | .074 | .100 | .120 | .150 | .180 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 6600                | 5000  | 4000  | 3300 | 2500 | 2000 | 1600 | 1300 | 1000 | 6600  | 5000                | 4000  | 3300 | 2500 | 2000 | 1600 | 1300 | 1000 |  |  |
| VII      | Aluminium Cast >= 96 Si Copper Bronze, Copper Alloys                                                                | HSS-E               | 40-70                  | fz                                | .014                | .023  | .036  | .040 | .050 | .060 | .070 | .080 | .095 | .028  | .048                | .072  | .080 | .100 | .120 | .140 | .180 | .190 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 2900                | 2200  | 1800  | 1500 | 1100 | 900  | 700  | 600  | 450  | 2900  | 2200                | 1800  | 1500 | 1100 | 900  | 700  | 600  | 450  |  |  |
|          |                                                                                                                     | HSS-E<br>TIN Coated | 40-100                 | fz                                | .014                | .023  | .036  | .040 | .050 | .060 | .070 | .080 | .095 | .028  | .048                | .072  | .080 | .100 | .120 | .140 | .180 | .190 |  |  |
|          |                                                                                                                     |                     |                        | n                                 | 3700                | 2800  | 2200  | 1900 | 1400 | 1100 | 900  | 750  | 550  | 3700  | 2800                | 2200  | 1900 | 1400 | 1100 | 900  | 750  | 550  |  |  |

fz: Feed per thread (mm/thread)  
n: Rev. (rev/min)  
vf: Total feed per minute (m/min)



## End Mills - Short Series - TYPE BN

**Application:** Suitable for face and side surface milling, in structural steels with resistance 1200 N/mm<sup>2</sup>, forged steels and NE - metal materials.



| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Z<br>Nº of Flutes | Stock |
|--------------|-------|-------|-------|-------|-------------------|-------|
| B00276180200 | 2,0   | 6     | 51    | 7     | 3                 | •     |
| B00276180250 | 2,5   | 6     | 52    | 8     | 3                 | •     |
| B00276180300 | 3,0   | 6     | 52    | 8     | 3                 | •     |
| B00276180400 | 4,0   | 6     | 55    | 11    | 4                 | •     |
| B00276180500 | 5,0   | 6     | 57    | 13    | 4                 | •     |
| B00276180600 | 6,0   | 6     | 57    | 13    | 4                 | •     |
| B00276180700 | 7,0   | 10    | 66    | 16    | 4                 | •     |
| B00276180800 | 8,0   | 10    | 69    | 19    | 4                 | •     |
| B00276180900 | 9,0   | 10    | 69    | 19    | 4                 | •     |
| B00276181000 | 10,0  | 10    | 72    | 22    | 4                 | •     |
| B00276181100 | 11,0  | 12    | 79    | 22    | 4                 | •     |
| B00276181200 | 12,0  | 12    | 83    | 26    | 4                 | •     |
| B00276181300 | 13,0  | 12    | 83    | 26    | 4                 | •     |
| B00276181400 | 14,0  | 12    | 83    | 26    | 4                 | •     |
| B00276181500 | 15,0  | 12    | 83    | 26    | 4                 | •     |
| B00276181600 | 16,0  | 16    | 92    | 32    | 4                 | •     |

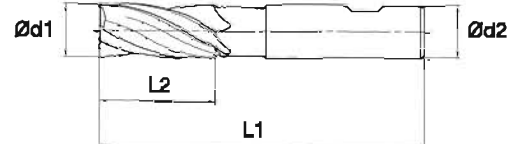
| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Z<br>Nº of Flutes | Stock |
|--------------|-------|-------|-------|-------|-------------------|-------|
| B00276181700 | 17,0  | 16    | 92    | 32    | 4                 | •     |
| B00276181800 | 18,0  | 16    | 92    | 32    | 4                 | •     |
| B00276181900 | 19,0  | 16    | 92    | 32    | 4                 | •     |
| B00276182000 | 20,0  | 20    | 104   | 38    | 4                 | •     |
| B00257182200 | 22,0  | 20    | 104   | 38    | 5                 | •     |
| B00257182400 | 24,0  | 25    | 121   | 45    | 5                 | •     |
| B00257182500 | 25,0  | 25    | 121   | 45    | 5                 | •     |
| B00257182600 | 26,0  | 25    | 121   | 45    | 5                 | •     |
| B00257182800 | 28,0  | 25    | 121   | 45    | 5                 | •     |
| B00257183000 | 30,0  | 25    | 121   | 45    | 5                 | •     |
| B00257183200 | 32,0  | 32    | 133   | 53    | 6                 | •     |
| B00257183400 | 34,0  | 32    | 133   | 53    | 6                 | ○     |
| B00257183600 | 36,0  | 32    | 133   | 53    | 6                 | ○     |
| B00257183800 | 38,0  | 40    | 155   | 63    | 6                 | ○     |
| B00257184000 | 40,0  | 40    | 155   | 63    | 6                 | ○     |

○ Ask Price and Deadline.

OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).

## End Mills - Short Series - TYPE BN TiCN COATED

**Application :** Recommended coated using for increased performance in high speeds, for face and side surface milling of structural steels with resistance 1200 N/mm<sup>2</sup> forged steels and NE - metal materials.



| Product Code     | d1 mm | d2 mm | L1 mm | L2 mm | Z<br>Nº of Flutes | Stock |
|------------------|-------|-------|-------|-------|-------------------|-------|
| B00276180200TiCN | 2,0   | 6     | 51    | 7     | 3                 | •     |
| B00276180300TiCN | 3,0   | 6     | 52    | 8     | 3                 | •     |
| B00276180400TiCN | 4,0   | 6     | 55    | 11    | 4                 | •     |
| B00276180500TiCN | 5,0   | 6     | 57    | 13    | 4                 | •     |
| B00276180600TiCN | 6,0   | 6     | 57    | 13    | 4                 | •     |
| B00276180800TiCN | 8,0   | 10    | 69    | 19    | 4                 | •     |

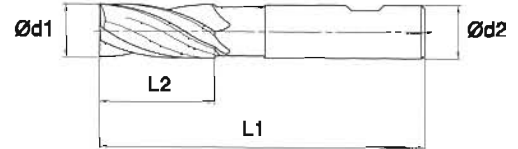
| Product Code     | d1 mm | d2 mm | L1 mm | L2 mm | Z<br>Nº of Flutes | Stock |
|------------------|-------|-------|-------|-------|-------------------|-------|
| B00276181000TiCN | 10,0  | 10    | 72    | 22    | 4                 | •     |
| B00276181200TiCN | 12,0  | 12    | 83    | 26    | 4                 | •     |
| B00276181400TiCN | 14,0  | 12    | 83    | 26    | 4                 | •     |
| B00276181600TiCN | 16,0  | 16    | 92    | 32    | 4                 | •     |
| B00276181800TiCN | 18,0  | 16    | 92    | 32    | 4                 | •     |
| B00276182000TiCN | 20,0  | 20    | 104   | 38    | 4                 | •     |

OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).



## End Mills - Short Series - TYPE BW

**Application:** Suitable especially for face and side surface milling of soft and long-chipping in a low-alloyed steel, aluminium, copper alloys, thermoplastic and plastic materials.



| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nº of<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|----------------------|-------|
| B00276190200 | 2,0      | 6        | 51       | 7        | 3                    | •     |
| B00276190300 | 3,0      | 6        | 52       | 8        | 3                    | •     |
| B00276190400 | 4,0      | 6        | 55       | 11       | 3                    | •     |
| B00276190500 | 5,0      | 6        | 57       | 13       | 3                    | •     |
| B00276190600 | 6,0      | 6        | 57       | 13       | 3                    | •     |
| B00276190800 | 8,0      | 10       | 69       | 19       | 3                    | •     |
| B00276191000 | 10,0     | 10       | 72       | 22       | 3                    | •     |
| B00276191200 | 12,0     | 12       | 83       | 26       | 4                    | •     |
| B00276191400 | 14,0     | 12       | 83       | 26       | 4                    | •     |
| B00276191600 | 16,0     | 16       | 92       | 32       | 4                    | •     |

COATED AVAILABLE UPON REQUEST

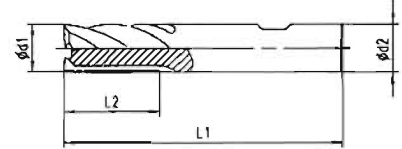
| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nº of<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|----------------------|-------|
| B00276191800 | 18,0     | 16       | 92       | 32       | 4                    | •     |
| B00276192000 | 20,0     | 20       | 104      | 38       | 4                    | •     |
| B00257192200 | 22,0     | 20       | 104      | 38       | 4                    | •     |
| B00257192400 | 24,0     | 25       | 121      | 45       | 4                    | •     |
| B00257192500 | 25,0     | 25       | 121      | 45       | 4                    | •     |
| B00257192600 | 26,0     | 25       | 121      | 45       | 4                    | •     |
| B00257192800 | 28,0     | 25       | 121      | 45       | 4                    | •     |
| B00257193000 | 30,0     | 25       | 121      | 45       | 4                    | •     |
| B00257193200 | 32,0     | 32       | 133      | 53       | 4                    | •     |

OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).



## End Mills - Short Series - TYPE BNR

**Application:** Ensure the best heat transmission due to chip breaker forms, provide quality face and side surface milling, in high speed for the normal and hard materials and NE metals with resistance 1200 N/mm<sup>2</sup>, titanium alloy, case hardened and tool steels, rust and acid-resistant steels, Cr-Ni alloyed steels and cast materials.



| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Z<br>Nr of Flutes | Stock |
|--------------|-------|-------|-------|-------|-------------------|-------|
| B00277330800 | 8,0   | 10    | 69    | 19    | 4                 | •     |
| B00277331000 | 10,0  | 10    | 72    | 22    | 4                 | •     |
| B00277331200 | 12,0  | 12    | 83    | 26    | 4                 | •     |
| B00277331400 | 14,0  | 12    | 83    | 26    | 4                 | •     |
| B00277331600 | 16,0  | 16    | 92    | 32    | 4                 | •     |
| B00277331800 | 18,0  | 16    | 92    | 32    | 4                 | •     |
| B00277332000 | 20,0  | 20    | 104   | 38    | 4                 | •     |

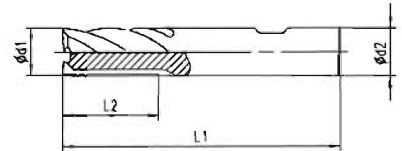
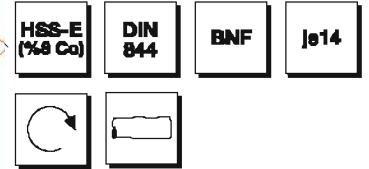
| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Z<br>Nr of Flutes | Stock |
|--------------|-------|-------|-------|-------|-------------------|-------|
| B00273332200 | 22,0  | 20    | 104   | 38    | 5                 | •     |
| B00273332400 | 24,0  | 25    | 121   | 45    | 5                 | •     |
| B00273332500 | 25,0  | 25    | 121   | 45    | 5                 | •     |
| B00273332800 | 26,0  | 25    | 121   | 45    | 5                 | •     |
| B00273332800 | 28,0  | 25    | 121   | 45    | 5                 | •     |
| B00273333000 | 30,0  | 25    | 121   | 45    | 5                 | •     |
| B00273333200 | 32,0  | 32    | 133   | 53    | 6                 | •     |

COATED AVAILABLE UPON REQUEST

OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).

## End Mills - Short Series - TYPE BNF

**Application:** Ensure the best heat transmission due to chip breaker forms, provide quality face and side surface milling, in high speed in normal and hard materials and NE metals with resistance 1200 N/mm<sup>2</sup>, titanium alloy, case hardening and tool steels, rust and acid-resistant steels, Cr-Ni alloyed steels and cast materials.



| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Z<br>Nr of Flutes | Stock |
|--------------|-------|-------|-------|-------|-------------------|-------|
| B00279330800 | 8,0   | 10    | 69    | 19    | 4                 | •     |
| B00279331000 | 10,0  | 10    | 72    | 22    | 4                 | •     |
| B00279331200 | 12,0  | 12    | 83    | 26    | 4                 | •     |
| B00279331400 | 14,0  | 12    | 83    | 26    | 4                 | •     |
| B00279331600 | 16,0  | 16    | 92    | 32    | 4                 | •     |
| B00279331800 | 18,0  | 16    | 92    | 32    | 4                 | •     |
| B00279332000 | 20,0  | 20    | 104   | 38    | 4                 | •     |

| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Z<br>Nr of Flutes | Stock |
|--------------|-------|-------|-------|-------|-------------------|-------|
| B00274332200 | 22,0  | 20    | 104   | 38    | 5                 | •     |
| B00274332400 | 24,0  | 25    | 121   | 45    | 5                 | •     |
| B00274332500 | 25,0  | 25    | 121   | 45    | 5                 | •     |
| B00274332600 | 26,0  | 25    | 121   | 45    | 5                 | •     |
| B00274332800 | 28,0  | 25    | 121   | 45    | 5                 | •     |
| B00274333000 | 30,0  | 25    | 121   | 45    | 5                 | •     |
| B00274333200 | 32,0  | 32    | 133   | 53    | 6                 | •     |

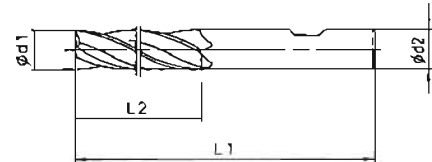
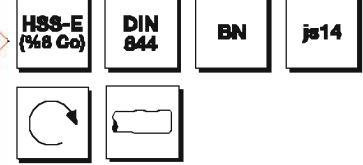
COATED AVAILABLE UPON REQUEST

OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).



## End Mills - Long Series - TYPE BN

**Application :** Suitable for face and side surface milling operation, in structural steels with resistance 1200 N/mm<sup>2</sup>, forged steels and NE - metal materials.



| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nr of<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|----------------------|-------|
| B00276220300 | 3        | 6        | 56       | 12       | 3                    | •     |
| B00276220400 | 4        | 8        | 63       | 19       | 4                    | •     |
| B00276220500 | 5        | 8        | 68       | 24       | 4                    | •     |
| B00276220600 | 6        | 6        | 68       | 24       | 4                    | •     |
| B00276220800 | 8        | 10       | 88       | 38       | 4                    | •     |
| B00276221000 | 10       | 10       | 95       | 45       | 4                    | •     |
| B00276221200 | 12       | 12       | 110      | 53       | 4                    | •     |
| B00276221400 | 14       | 12       | 110      | 53       | 4                    | •     |
| B00276221600 | 16       | 16       | 123      | 63       | 4                    | •     |
| B00276221800 | 18       | 16       | 123      | 63       | 4                    | •     |
| B00276222000 | 20       | 20       | 141      | 75       | 4                    | •     |

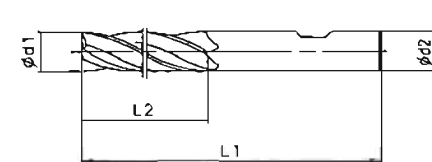
| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nr of<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|----------------------|-------|
| B00257222200 | 22       | 20       | 141      | 75       | 5                    | •     |
| B00257222400 | 24       | 25       | 166      | 90       | 5                    | •     |
| B00257222500 | 25       | 25       | 166      | 90       | 5                    | •     |
| B00257222600 | 26       | 25       | 166      | 90       | 5                    | •     |
| B00257222800 | 28       | 25       | 166      | 90       | 5                    | •     |
| B00257223000 | 30       | 25       | 186      | 90       | 5                    | •     |
| B00257223200 | 32       | 32       | 186      | 106      | 6                    | •     |
| B00257223400 | 34       | 32       | 186      | 106      | 6                    | ○     |
| B00257223600 | 36       | 32       | 186      | 106      | 6                    | ○     |
| B00257223800 | 38       | 40       | 217      | 125      | 8                    | ○     |
| B00257224000 | 40       | 40       | 217      | 125      | 6                    | ○     |

○ Ask Price and Deadline.

OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).

## End Mills - Long Series - TYPE BN - TiCN COATED

**Application :** Recommended coated using for increased performance in high speeds, in face and side surface milling in structural steels with resistance 1200 N/mm<sup>2</sup>, forged steels and NE - metal materials.



| Product Code     | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nr of<br>Flutes | Stock |
|------------------|----------|----------|----------|----------|----------------------|-------|
| B00276220400TiCN | 4,0      | 6        | 63       | 19       | 4                    | •     |
| B00276220500TiCN | 5,0      | 6        | 68       | 24       | 4                    | •     |
| B00276220600TiCN | 6,0      | 6        | 68       | 24       | 4                    | •     |
| B00276220800TiCN | 8,0      | 10       | 88       | 38       | 4                    | •     |

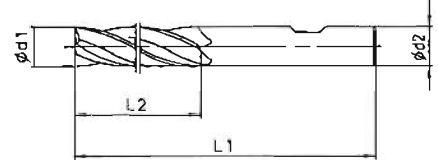
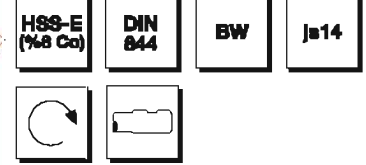
| Product Code     | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nr of<br>Flutes | Stock |
|------------------|----------|----------|----------|----------|----------------------|-------|
| B00276221000TiCN | 10,0     | 10       | 95       | 45       | 4                    | •     |
| B00276221200TiCN | 12,0     | 12       | 110      | 53       | 4                    | •     |
| B00276221600TiCN | 16,0     | 16       | 123      | 63       | 4                    | •     |
| B00276222000TiCN | 20,0     | 20       | 141      | 75       | 4                    | •     |

OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).



## End Mills - Long Series - TYPE BW

**Application:** Suitable especially for face and side surface milling in soft and long-chipping a low-alloyed steel, aluminium, copper alloys, thermoplastic, and plastic materials.



| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nr of<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|----------------------|-------|
| B00276230300 | 3        | 6        | 56       | 12       | 3                    | •     |
| B00276230400 | 4        | 6        | 63       | 19       | 3                    | •     |
| B00276230500 | 5        | 6        | 68       | 24       | 3                    | •     |
| B00276230600 | 6        | 6        | 68       | 24       | 3                    | •     |
| B00276230800 | 8        | 10       | 88       | 38       | 3                    | •     |
| B00276231000 | 10       | 10       | 95       | 45       | 3                    | •     |
| B00276231200 | 12       | 12       | 110      | 53       | 4                    | •     |
| B00276231400 | 14       | 12       | 110      | 53       | 4                    | •     |
| B00276231600 | 16       | 16       | 123      | 63       | 4                    | •     |

| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nr of<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|----------------------|-------|
| B00276231800 | 18       | 16       | 123      | 63       | 4                    | •     |
| B00276232000 | 20       | 20       | 141      | 75       | 4                    | •     |
| B00257232200 | 22       | 20       | 141      | 75       | 4                    | •     |
| B00257232400 | 24       | 25       | 166      | 90       | 4                    | •     |
| B00257232500 | 25       | 25       | 166      | 90       | 4                    | •     |
| B00257232600 | 26       | 25       | 166      | 90       | 4                    | •     |
| B00257232800 | 28       | 25       | 166      | 90       | 4                    | •     |
| B00257233000 | 30       | 25       | 166      | 90       | 4                    | •     |
| B00257233200 | 32       | 32       | 186      | 106      | 4                    | •     |

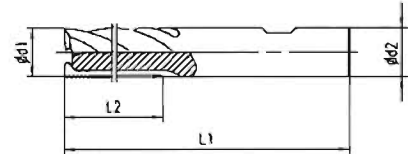
COATED AVAILABLE UPON REQUEST

OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).



## End Mills - Long Series - TYPE BNR

**Application:** Ensure the best heat transmission due to chip breaker forms, provide quality face and side surface milling, in high speed in normal and hard materials and NE metals with resistance 1200 N/mm<sup>2</sup>, titanium alloy, case hardening and tool steels, rust and acid-resistant steels, Cr-Ni alloyed steels and cast materials.



| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nr of<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|----------------------|-------|
| B00277391000 | 10       | 10       | 95       | 45       | 4                    | •     |
| B00277391200 | 12       | 12       | 110      | 53       | 4                    | •     |
| B00277391400 | 14       | 12       | 110      | 53       | 4                    | •     |
| B00277391600 | 16       | 16       | 123      | 63       | 4                    | •     |
| B00277391800 | 18       | 16       | 123      | 63       | 4                    | •     |
| B00277392000 | 20       | 20       | 141      | 75       | 4                    | •     |
| B00273392200 | 22       | 20       | 141      | 75       | 5                    | •     |

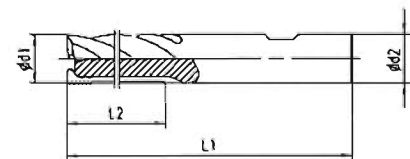
| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nr of<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|----------------------|-------|
| B00273392400 | 24       | 25       | 166      | 90       | 5                    | •     |
| B00273392500 | 25       | 25       | 166      | 90       | 5                    | •     |
| B00273392800 | 28       | 25       | 166      | 90       | 5                    | •     |
| B00273392800 | 28       | 25       | 166      | 90       | 5                    | •     |
| B00273393000 | 30       | 25       | 166      | 90       | 5                    | •     |
| B00273393200 | 32       | 32       | 188      | 106      | 6                    | •     |

COATED AVAILABLE UPON REQUEST

OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).

## End Mills - Long Series - TYPE BNF

**Application:** Ensure the best heat transmission due to chip breaker forms, provide quality face and side surface milling, in high speed in normal and hard materials and NE metals with resistance 1200 N/mm<sup>2</sup>, titanium alloy, case hardening and tool steels, rust and acid-resistant steels, Cr-Ni alloyed steels and cast materials.



| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nr of<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|----------------------|-------|
| B00279391000 | 10       | 10       | 95       | 45       | 4                    | •     |
| B00279391200 | 12       | 12       | 110      | 53       | 4                    | •     |
| B00279391400 | 14       | 12       | 110      | 53       | 4                    | •     |
| B00279391600 | 16       | 16       | 123      | 63       | 4                    | •     |
| B00279391800 | 18       | 16       | 123      | 63       | 4                    | •     |
| B00279392000 | 20       | 20       | 141      | 75       | 4                    | •     |
| B00274392200 | 22       | 20       | 141      | 75       | 5                    | •     |

| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nr of<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|----------------------|-------|
| B00274392400 | 24       | 25       | 166      | 90       | 5                    | •     |
| B00274392500 | 25       | 25       | 166      | 90       | 5                    | •     |
| B00274392800 | 28       | 25       | 166      | 90       | 5                    | •     |
| B00274392800 | 28       | 25       | 166      | 90       | 5                    | •     |
| B00274393000 | 30       | 25       | 166      | 90       | 5                    | •     |
| B00274393200 | 32       | 32       | 188      | 106      | 6                    | •     |

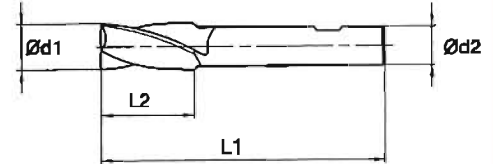
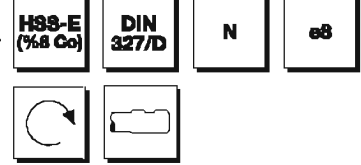
COATED AVAILABLE UPON REQUEST

OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).



## Slot Cutters

**Application :** Used for making long straight key way with P9 tolerance, and in forged-alloyed steels with resistance 1200 N/mm<sup>2</sup>, tool steels, stainless and high heat resistant steels and casting alloy materials.



| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nrof<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|---------------------|-------|
| B00278140400 | 4,0      | 8        | 51       | 7        | 2                   | •     |
| B00278140450 | 4,5      | 6        | 51       | 8        | 2                   | ○     |
| B00278140500 | 5,0      | 6        | 52       | 8        | 2                   | •     |
| B00278140550 | 5,5      | 8        | 52       | 8        | 2                   | ○     |
| B00278140600 | 6,0      | 8        | 52       | 8        | 2                   | •     |
| B00278140650 | 6,5      | 10       | 60       | 10       | 2                   | ○     |
| B00278140700 | 7,0      | 10       | 60       | 10       | 2                   | ○     |
| B00278140750 | 7,5      | 10       | 60       | 10       | 2                   | ○     |
| B00278140800 | 8,0      | 10       | 61       | 11       | 2                   | •     |
| B00278140850 | 8,5      | 10       | 61       | 11       | 2                   | ○     |
| B00278140900 | 9,0      | 10       | 61       | 11       | 2                   | ○     |
| B00278140950 | 9,5      | 10       | 61       | 11       | 2                   | ○     |

| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Z<br>Nrof<br>Flutes | Stock |
|--------------|----------|----------|----------|----------|---------------------|-------|
| B00278141000 | 10,0     | 10       | 63       | 13       | 2                   | •     |
| B00278141100 | 11,0     | 12       | 70       | 13       | 2                   | ○     |
| B00278141200 | 12,0     | 12       | 73       | 16       | 2                   | •     |
| B00278141300 | 13,0     | 12       | 73       | 16       | 2                   | ○     |
| B00278141400 | 14,0     | 12       | 73       | 16       | 2                   | •     |
| B00278141500 | 15,0     | 12       | 73       | 16       | 2                   | ○     |
| B00278141600 | 16,0     | 16       | 79       | 19       | 2                   | •     |
| B00278141700 | 17,0     | 16       | 79       | 19       | 2                   | ○     |
| B00278141800 | 18,0     | 16       | 79       | 19       | 2                   | •     |
| B00278141900 | 19,0     | 16       | 79       | 19       | 2                   | ○     |
| B00278142000 | 20,0     | 20       | 88       | 22       | 2                   | •     |

COATED AVAILABLE UPON REQUEST

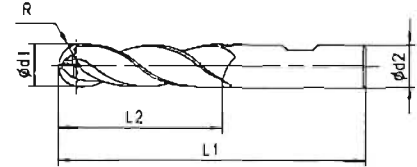
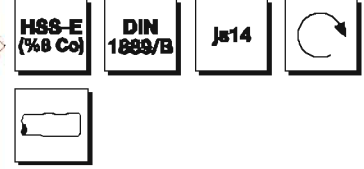
OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).

○ Ask Price and Deadline.



## Ball Nosed End Mills - SHORT SERIES

**Application:** Used in copy milling operations in high resistant, free-cutting steels, structural and stainless steels and steel cast materials.



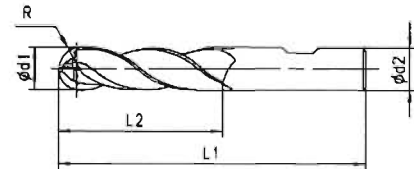
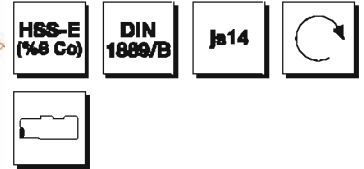
| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | R | Stock |
|--------------|----------|----------|----------|----------|---|-------|
| B00272300600 | 6        | 6        | 57       | 13       | 3 | •     |
| B00272300800 | 8        | 10       | 69       | 19       | 4 | •     |
| B00272301000 | 10       | 10       | 72       | 22       | 5 | •     |
| B00272301200 | 12       | 12       | 83       | 26       | 6 | •     |

| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | R  | Stock |
|--------------|----------|----------|----------|----------|----|-------|
| B00272301400 | 14       | 12       | 83       | 26       | 7  | •     |
| B00272301600 | 16       | 16       | 92       | 32       | 8  | •     |
| B00272301800 | 18       | 16       | 92       | 32       | 9  | •     |
| B00272302000 | 20       | 20       | 104      | 38       | 10 | •     |

COATED AVAILABLE UPON REQUEST

## Ball Nosed End Mills - LONG SERIES

**Application:** Used in copy milling operations in high resistant, free-cutting steels, structural and stainless steels and steel cast materials.



| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | R   | Stock |
|--------------|----------|----------|----------|----------|-----|-------|
| B00272501000 | 10       | 10       | 95       | 45       | 5,0 | •     |
| B00272501200 | 12       | 12       | 110      | 53       | 6,0 | •     |
| B00272501400 | 14       | 12       | 110      | 53       | 7,0 | •     |
| B00272501600 | 16       | 16       | 123      | 63       | 8,0 | •     |

| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | R    | Stock |
|--------------|----------|----------|----------|----------|------|-------|
| B00272501800 | 18       | 16       | 123      | 63       | 9,0  | •     |
| B00272502000 | 20       | 20       | 141      | 75       | 10,0 | •     |
| B00272502500 | 25       | 25       | 166      | 90       | 12,5 | ○     |
| B00272503200 | 32       | 32       | 186      | 106      | 16,0 | ○     |

COATED AVAILABLE UPON REQUEST

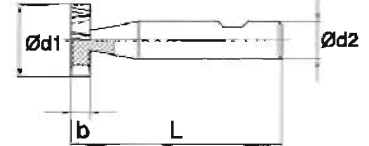
OVER Ø 20 mm PRODUCING FROM HSS-E (%5 Co).

○ Ask Price and Deadline.



## Woodruff Keyseat Cutters - STAGGERED TEETH

**Application :** Used for slotting half round key way with P9 tolerance in alloyed-forged steels with resistance 900 N/mm<sup>2</sup>, tool steels, toughened steels, stainless and high-heat resistant steels and casting-alloys materials.



| Product Code | d1<br>mm | b<br>(ød)<br>mm | d2<br>mm | L<br>mm | Stock |
|--------------|----------|-----------------|----------|---------|-------|
| B00261220600 | 13,5     | 3               | 10       | 56      | •     |
| B00261220700 | 13,5     | 4               | 10       | 56      | •     |
| B00261220800 | 16,5     | 3               | 10       | 56      | •     |
| B00261220900 | 16,5     | 4               | 10       | 56      | •     |
| B00261221000 | 16,5     | 5               | 10       | 56      | •     |
| B00261221100 | 19,5     | 4               | 10       | 63      | •     |
| B00261221200 | 19,5     | 5               | 10       | 63      | •     |
| B00261221300 | 19,5     | 6               | 10       | 63      | •     |
| B00261221400 | 22,5     | 5               | 10       | 63      | •     |

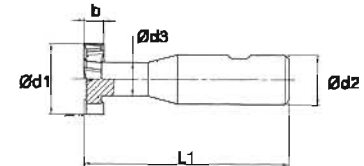
| Product Code | d1<br>mm | b<br>(ød)<br>mm | d2<br>mm | L<br>mm | Stock |
|--------------|----------|-----------------|----------|---------|-------|
| B00261221500 | 22,5     | 6               | 10       | 63      | •     |
| B00261221600 | 22,5     | 8               | 10       | 63      | •     |
| B00261221700 | 25,5     | 8               | 10       | 63      | •     |
| B00261221800 | 28,5     | 6               | 10       | 63      | •     |
| B00261221900 | 28,5     | 8               | 10       | 63      | •     |
| B00261222000 | 28,5     | 10              | 12       | 71      | •     |
| B00261222300 | 32,5     | 8               | 10       | 71      | •     |
| B00261222400 | 32,5     | 10              | 12       | 71      | •     |
| B00261222700 | 45,5     | 10              | 12       | 71      | ○     |

• **Ask Price and Deadline.**



## T- Slot Cutters - STAGGERED TEETH

**Application:** Used for slotting half round key way with P9 tolerance in alloyed-forged steels with resistance 900 N/mm<sup>2</sup>, tool steels, toughened steels, stainless and high-heat resistant steels and casting-alloys materials.



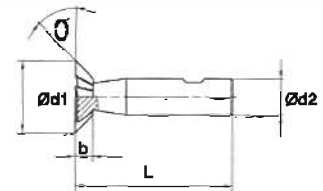
| Product Code | d1<br>mm | b<br>(e8)<br>mm | d2<br>mm | d3<br>mm | L1<br>mm | Stock |
|--------------|----------|-----------------|----------|----------|----------|-------|
| B00262111100 | 11,0     | 3,5             | 10       | 4        | 53,5     | ○     |
| B00262111250 | 12,5     | 6,0             | 10       | 5        | 57,0     | ○     |
| B00262111600 | 16,0     | 8,0             | 10       | 7        | 62,0     | ○     |
| B00262111800 | 18,0     | 8,0             | 12       | 8        | 70,0     | ○     |
| B00262112100 | 21,0     | 9,0             | 12       | 10       | 74,0     | ○     |
| B00262112500 | 25,0     | 11,0            | 16       | 12       | 82,0     | ○     |

| Product Code | d1<br>mm | b<br>(e8)<br>mm | d2<br>mm | d3<br>mm | L1<br>mm | Stock |
|--------------|----------|-----------------|----------|----------|----------|-------|
| B00262112800 | 28,0     | 12,0            | 16       | 13       | 85,0     | ○     |
| B00262113200 | 32,0     | 14,0            | 16       | 15       | 90,0     | ○     |
| B00262113600 | 36,0     | 16,0            | 25       | 17       | 103,0    | ○     |
| B00262114000 | 40,0     | 18,0            | 25       | 19       | 108,0    | ○     |
| B00262114500 | 45,0     | 20,0            | 25       | 21       | 113,0    | ○     |

○ Ask Price and Deadline.

## Dovetail Cutters

**Application:** Used for milling of 45° and 60° dovetail flutes, in steels with resistance 900 N/mm<sup>2</sup>, toughened steels, grey cast and NE- materials.



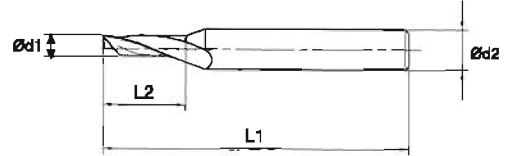
| Product Code | d1<br>mm | b<br>mm | L<br>mm | d2<br>mm | Stock |
|--------------|----------|---------|---------|----------|-------|
| B00263201600 | 16 X 45° | 4,0     | 60      | 12       | ●     |
| B00263202000 | 20 X 45° | 5,0     | 63      | 12       | ●     |
| B00263202500 | 25 X 45° | 6,3     | 67      | 12       | ●     |
| B00263203200 | 32 X 45° | 8,0     | 71      | 16       | ●     |

| Product Code | d1<br>mm | b<br>mm | L<br>mm | d2<br>mm | Stock |
|--------------|----------|---------|---------|----------|-------|
| B00263231600 | 16 X 60° | 6,3     | 60      | 12       | ●     |
| B00263232000 | 20 X 60° | 8,0     | 63      | 12       | ●     |
| B00263232500 | 25 X 60° | 10,0    | 67      | 12       | ●     |
| B00263233200 | 32 X 60° | 12,5    | 71      | 16       | ●     |



## Single Flute Aluminium End Mills

**Application:** Used for slotting discharge channels in aluminium and plastic joinery and the other slotting operations.

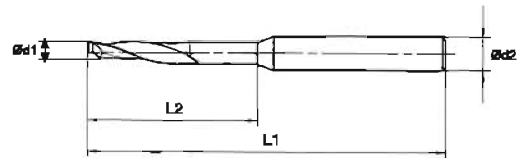


| Product Code | d1<br>mm | d2<br>(h8)<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|------------------|----------|----------|-------|
| B00276500400 | 4        | 8                | 60       | 12       | •     |
| B00276510400 | 4        | 8                | 100      | 25       | •     |
| B00276500500 | 5        | 8                | 60       | 14       | •     |
| B00276510500 | 5        | 8                | 100      | 25       | •     |

| Product Code | d1<br>mm | d2<br>(h8)<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|------------------|----------|----------|-------|
| B00276500600 | 6        | 8                | 60       | 14       | •     |
| B00276510600 | 6        | 8                | 100      | 25       | •     |
| B00276500800 | 8        | 8                | 80       | 14       | •     |
| B00276510800 | 8        | 8                | 120      | 25       | •     |

## Single Flute Aluminium End Mills

**Application:** Used for slotting discharge channels in aluminium and plastic joinery and the other slotting operations.



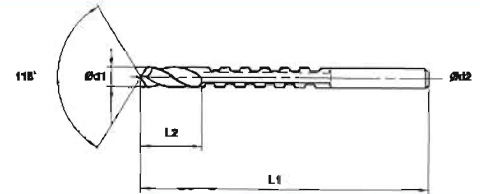
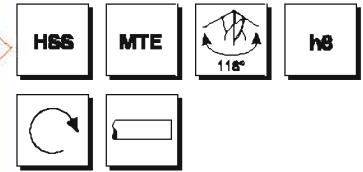
| Product Code | d1<br>mm | d2<br>(h8)<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|------------------|----------|----------|-------|
| B00257520400 | 4        | 8                | 20x45    | 80       | •     |
| B00257520500 | 5        | 8                | 20x45    | 80       | •     |

| Product Code | d1<br>mm | d2<br>(h8)<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|------------------|----------|----------|-------|
| B00257520600 | 6        | 8                | 20x45    | 80       | •     |



## Drilling - Milling Combined Tools

**Application :** Recommended particularly for thin materials, steel, plastic and wood.

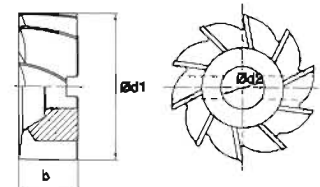
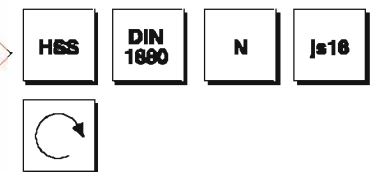


| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | Stock |
|--------------|----------|----------|----------|----------|-------|
| B00902000686 | 6        | 6        | 90       | 18       | ○     |
| B00902000688 | 8        | 8        | 90       | 18       | ○     |

○ **Ask Price and Deadline.**

## Shell End Mills

**Application:** Suitable for use unalloyed and low alloyed steel, structural steels, cast iron etc. materials.



| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(k18)<br>mm | Stock |
|--------------|----------|------------------|------------------|-------|
| B00201000040 | 40       | 16               | 32               | ○     |
| B00201000050 | 50       | 22               | 38               | ○     |
| B00201000063 | 63       | 27               | 40               | ○     |

| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(k18)<br>mm | Stock |
|--------------|----------|------------------|------------------|-------|
| B00201000080 | 80       | 27               | 45               | ○     |
| B00201000100 | 100      | 32               | 50               | ○     |

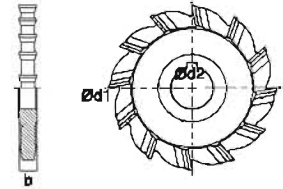
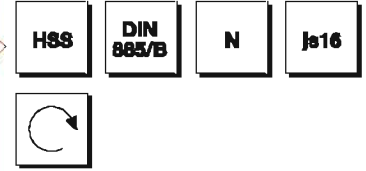
○ **Ask Price and Deadline.**

**HSS-E AVAILABLE UPON REQUEST.**



## Side And Face Cutters - STRAIGHT TEETH

**Application:** Used for slotting and milling with general purpose.



| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(k11)<br>mm | Stock |
|--------------|----------|------------------|------------------|-------|
| B00252030800 | 63       | 22               | 8                | ○     |
| B00252030900 | 63       | 22               | 10               | ○     |
| B00252031000 | 63       | 22               | 12               | ○     |
| B00252031100 | 63       | 22               | 14               | ○     |
| B00252033300 | 80       | 27               | 8                | ○     |
| B00252033400 | 80       | 27               | 10               | ○     |
| B00252033500 | 80       | 27               | 12               | ○     |
| B00252033600 | 80       | 27               | 14               | ○     |
| B00252033700 | 80       | 27               | 16               | ○     |
| B00252033800 | 80       | 27               | 18               | ○     |

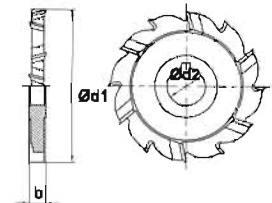
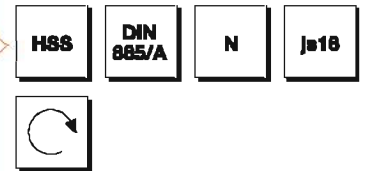
| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(k11)<br>mm | Stock |
|--------------|----------|------------------|------------------|-------|
| B00252033900 | 80       | 27               | 20               | ○     |
| B00252036000 | 100      | 32               | 10               | ○     |
| B00252036100 | 100      | 32               | 12               | ○     |
| B00252036200 | 100      | 32               | 14               | ○     |
| B00252036300 | 100      | 32               | 16               | ○     |
| B00252036400 | 100      | 32               | 18               | ○     |
| B00252036500 | 100      | 32               | 20               | ○     |
| B00252036600 | 100      | 32               | 22               | ○     |
| B00252036700 | 100      | 32               | 25               | ○     |

○ Ask Price and Deadline.

HSS-E AVAILABLE UPON REQUEST.

## Side And Face Cutters - STAGGERED TEETH

**Application :** Suitable for deep slotting, also used instead of straight teeth cutter in application, required a good chip removing and knockless operation.



| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(k11)<br>mm | Stock |
|--------------|----------|------------------|------------------|-------|
| B00252000400 | 50       | 16               | 10               | ○     |
| B00252000800 | 63       | 22               | 8                | ○     |
| B00252000900 | 63       | 22               | 10               | ○     |
| B00252001000 | 63       | 22               | 12               | ○     |
| B00252001100 | 63       | 22               | 14               | ○     |
| B00252003300 | 80       | 27               | 8                | ○     |
| B00252003400 | 80       | 27               | 10               | ○     |
| B00252003500 | 80       | 27               | 12               | ○     |
| B00252003600 | 80       | 27               | 14               | ○     |
| B00252003700 | 80       | 27               | 16               | ○     |

| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(k11)<br>mm | Stock |
|--------------|----------|------------------|------------------|-------|
| B00252003800 | 80       | 27               | 18               | ○     |
| B00252003900 | 80       | 27               | 20               | ○     |
| B00252008000 | 100      | 32               | 10               | ○     |
| B00252006100 | 100      | 32               | 12               | ○     |
| B00252006200 | 100      | 32               | 14               | ○     |
| B00252006300 | 100      | 32               | 16               | ○     |
| B00252006400 | 100      | 32               | 18               | ○     |
| B00252006500 | 100      | 32               | 20               | ○     |
| B00252006600 | 100      | 32               | 22               | ○     |
| B00252006700 | 100      | 32               | 25               | ○     |

○ Ask Price and Deadline.

HSS-E AVAILABLE UPON REQUEST.



## Angular Cutters

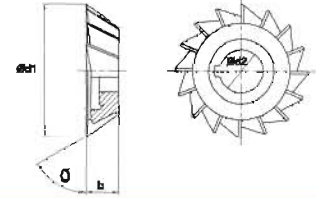
**Application :** Used in dovetail flutes and other machine construction applications.

HSS

DIN  
842

H

js16



| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(js14)<br>mm | α  | Stock |
|--------------|----------|------------------|-------------------|----|-------|
| B00203020040 | 40       | 10               | 10                | 45 | ○     |
| B00203020050 | 50       | 13               | 13                | 45 | ○     |
| B00203020063 | 63       | 18               | 16                | 45 | ○     |
| B00203020080 | 80       | 22               | 22                | 45 | ○     |
| B00203020100 | 100      | 28               | 27                | 45 | ○     |
| B00203040040 | 40       | 13               | 10                | 50 | ○     |
| B00203040050 | 50       | 16               | 13                | 50 | ○     |
| B00203040063 | 63       | 20               | 16                | 50 | ○     |

| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(js14)<br>mm | α  | Stock |
|--------------|----------|------------------|-------------------|----|-------|
| B00203040080 | 80       | 25               | 22                | 50 | ○     |
| B00203040100 | 100      | 32               | 27                | 50 | ○     |
| B00203060040 | 40       | 13               | 10                | 55 | ○     |
| B00203060050 | 50       | 16               | 13                | 55 | ○     |
| B00203060063 | 63       | 20               | 16                | 55 | ○     |
| B00203060080 | 80       | 25               | 22                | 55 | ○     |
| B00203060100 | 100      | 32               | 27                | 55 | ○     |

○ Ask Price and Deadline.

HSS-E AVAILABLE UPON REQUEST.

## Double Angle Milling Cutters

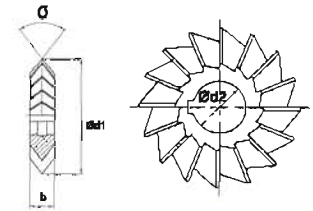
**Application;** Preferred in slotting, chamfering and similar applications.

HSS

DIN  
847

H

js16



| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(js16)<br>mm | α  | Stock |
|--------------|----------|------------------|-------------------|----|-------|
| B00206100050 | 50       | 16               | 8                 | 45 | ○     |
| B00206100063 | 63       | 22               | 10                | 45 | ○     |
| B00206100080 | 80       | 27               | 12                | 45 | ○     |
| B00206100100 | 100      | 32               | 18                | 45 | ○     |
| B00206110050 | 50       | 16               | 10                | 60 | ○     |
| B00206110063 | 63       | 22               | 14                | 60 | ○     |

| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(js16)<br>mm | α  | Stock |
|--------------|----------|------------------|-------------------|----|-------|
| B00206110080 | 80       | 27               | 18                | 60 | ○     |
| B00206110100 | 100      | 32               | 25                | 60 | ○     |
| B00206120050 | 50       | 16               | 14                | 90 | ○     |
| B00206120063 | 63       | 22               | 20                | 90 | ○     |
| B00206120080 | 80       | 27               | 22                | 90 | ○     |
| B00206120100 | 100      | 32               | 32                | 90 | ○     |

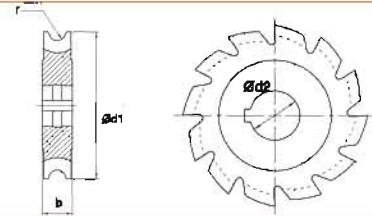
○ Ask Price and Deadline.

HSS-E AVAILABLE UPON REQUEST.



## Concave Radius Cutters

**Application:** Used in exterior cant, milling and for the purpose - formed process



| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(js16)<br>mm | (r11) | Stock |
|--------------|----------|------------------|-------------------|-------|-------|
| B00216320100 | 50       | 16               | 6,0               | 1,00  | ○     |
| B00216320125 | 50       | 16               | 6,0               | 1,25  | ○     |
| B00216320160 | 50       | 16               | 8,0               | 1,60  | ○     |
| B00216320200 | 50       | 16               | 9,0               | 2,00  | ○     |
| B00216320250 | 63       | 22               | 10,0              | 2,50  | ○     |
| B00216320300 | 63       | 22               | 12,0              | 3,00  | ○     |

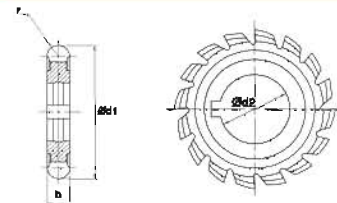
| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(js16)<br>mm | (r11) | Stock |
|--------------|----------|------------------|-------------------|-------|-------|
| B00216320315 | 63       | 22               | 12,0              | 3,15  | ○     |
| B00216320400 | 63       | 22               | 16,0              | 4,00  | ○     |
| B00216320500 | 63       | 22               | 20,0              | 5,00  | ○     |
| B00216320600 | 80       | 27               | 24,0              | 6,00  | ○     |
| B00216320630 | 80       | 27               | 24,0              | 6,30  | ○     |
| B00216320800 | 80       | 27               | 32,0              | 8,00  | ○     |

○ Ask Price and Deadline.

HSS-E AVAILABLE UPON REQUEST.

## Convex Radius Cutters

**Application:** Used in a various flute round form milling and special applications.



| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(js16)<br>mm | (r11) | Stock |
|--------------|----------|------------------|-------------------|-------|-------|
| B00216400100 | 50       | 16               | 2,0               | 1,00  | ○     |
| B00216400125 | 50       | 16               | 2,5               | 1,25  | ○     |
| B00216400160 | 50       | 16               | 3,2               | 1,60  | ○     |
| B00216400200 | 50       | 16               | 4,0               | 2,00  | ○     |
| B00216400250 | 63       | 22               | 5,0               | 2,50  | ○     |
| B00216400300 | 63       | 22               | 6,0               | 3,00  | ○     |

| Product Code | d1<br>mm | d2<br>(H7)<br>mm | b<br>(js16)<br>mm | (r11) | Stock |
|--------------|----------|------------------|-------------------|-------|-------|
| B00216400315 | 63       | 22               | 6,3               | 3,15  | ○     |
| B00216400400 | 63       | 22               | 8,0               | 4,00  | ○     |
| B00216400500 | 63       | 22               | 10,0              | 5,00  | ○     |
| B00216400600 | 80       | 27               | 12,0              | 6,00  | ○     |
| B00216400630 | 80       | 27               | 12,6              | 6,30  | ○     |
| B00216400800 | 80       | 27               | 16,0              | 8,00  | ○     |

○ Ask Price and Deadline.

HSS-E AVAILABLE UPON REQUEST.

## Ali Usta says;

Milling cutters are tools which are subject to the highest level of mechanic forces in machining.

Milling cutters are cutting tools for threading surfaces, holes and channels also used for special forms and threads for machining on metal, plastic, etc materials.

Milling cutters are divided into two classes:

- Drilling milling cutters; used by connecting from holes to the chuck.
- Cylindrical and Morse taper shank milling cutters; used by connecting to tool holders MK shells.

## Ali Usta recommends:

Use different types of milling cutters for each material to be processed.

- Use TYPE N for ductile, long chipping materials with medium hardness and normal resistance (non-alloyed or low-alloyed steels, grey cast iron, tempered cast and brass materials)
- Use TYPE H (or S) for hard and brittle materials which medium and short chipping (alloyed steel, cast steel, hard gray cast iron and brass materials)
- Use TYPE W (or Y) for soft, long chipping materials with low resistance (Aluminium and soft aluminium alloys, soft brass, MS 63, copper and copper alloys)

## Ali Usta;

In choosing milling cutters we must pay attention to the following:

Milling cutters are chosen depending on the connection positions of milling cutters, type of the material and the side or face cutting position of the milling cutter. In choosing the correct type of milling cutters we must pay attention to the type of steel made from.

### Milling cutters manufactured

**Type N:** Number of cutting edges, chip and helical length normal

**Type H:** Number of cutting edges, more chip and helical angle less than normal

**Type W:** Number of cutting edges, more chip and helical angle more than normal

### Materials of Milling Cutters

- Cobalt alloyed high speed steel (HSS-E)
- Solid carbide metals

### In addition:

- TITANIUM NITRIDE (TiN) AND
- TITANIUM CARBON-NITRIDE (TiCN) surface coatings can be used.



## Ali Usta reminds to keep the following principles always in mind:

- When proceed from soft materials to hard materials, in other words, from low resistant to high resistant materials, cutting speed and progress gradually decreases.
- The chips are the biggest enemy of the cutting tools; therefore chips must be immediately removed away from the work piece and tool. If necessary, better use rough machining cutters.
- TiN coated tools must be operated with higher revolutions than uncoated tools.
- The work piece and the end mills must be connected to the machine as close as possible.
- Do not use milling cutters with blunt and worn cutting edges.
- Must be preferred a down milling (in concurrent direction) as far as possible.
- Chuck must be ensured the clean, without burr and oil-free spindle, the tool's axis and the shaft's axis must match each other.



**Ali Usta presents the problems encountered in milling, their causes and solutions.**



**1- Breaking of the cutting edges**

**CAUSE**

- 1.1. Too much feed
- 1.2. Work place is not rigid
- 1.3. Cutting tool is not fixed tightly
- 1.4. The stability of cutting tool is inadequate
- 1.5. Threads are too sharp

**SOLUTION**

Feed must be decreased  
More rigid machine or connection devices is required  
Connecting nut must be assembled  
Must be used short type tool or short connection holder.  
Change the rake angle or chamfer the sharp edges

**2- Too much wearing**

**CAUSE**

- 2.1. Cutting speed is too high
- 2.2. Work piece is too hard
- 2.3. Formation of tempered chips
- 2.4. Unsuitable feed speed (too high)
- 2.5. Unsuitable cutting angle
- 2.6. Back of the cutting edge scuffs

**SOLUTION**

Reduce speed and use coolant  
Use TiN coated end mill  
Reduce the cutting speed  
Reduce feed rate  
Choose cutting angle as per material  
Increase the clearance angle

**3- Vibration**

**CAUSE**

- 3.1. Feed rate and cutting speed are too high
- 3.2. Cutting tool and connecting system are not suitable
- 3.3. Clearance angle is too large
- 3.4. Work piece is improperly connected
- 3.5. Cutting depth too large
- 3.6. Cutting tool is too long or total length is too long

**SOLUTION**

Suitable cutting values must be used  
More rigid tool and connection must be used  
Adjust the margin  
Work place must be connected properly  
Cutting depth must be reduced  
Cutting tool must be connected shorter or  
short milling cutter must be chosen

**4- Difficulty in chip removal**

**CAUSE**

- 4.1. Chip volume is too much
- 4.2. The chip flute is narrow in milling at the bottom of thread
- 4.3. Insufficient cooling

**SOLUTION**

Reduce the feed and cutting speed's rates  
Use an end mill with less threads and wide fluted  
Increase cooling pressure

**5- Bad surface quality**

**CAUSE**

- 5.1. The chosen feed rate may be too large
- 5.2. Cutting speed is too low
- 5.3. Wear out in cutting tool may be high
- 5.4. Formation of blue chips

**SOLUTION**

Reduce the feed rate  
Increase the speed  
Make point sharpening in short period  
Reduce the cutting speed





**SOLID CARBIDE TOOLS**



**MAKINA TAKIM ENDÜSTRİSİ A.Ş.**





## SOLID CARBIDE TOOLS

| TOOL TYPE                                               | QUALITY | STANDARD     | PAGE |
|---------------------------------------------------------|---------|--------------|------|
| Solid Carbide Twist Drills                              | KSM     | DIN 338      | 128  |
| Solid Carbide Twist Drills                              | KSM     | DIN 6539     | 128  |
| Solid Carbide Drills With Internal Coolant Supply (5xd) | KSM     | DIN 6537     | 129  |
| Solid Carbide End Mills - 2 Flutes                      | KSM     | DIN 6528     | 129  |
| Solid Carbide End Mills - 3 Flutes                      | KSM     | DIN 6528     | 130  |
| Solid Carbide End Mills - 4 Flutes                      | KSM     | DIN 6528     | 130  |
| Solid Carbide Ball Nose End Mills - 2 Flutes            | KSM     | MTE Standard | 131  |
| Solid Carbide Ball Nose End Mills - 4 Flutes            | KSM     | MTE Standard | 131  |



## Recommendations for Area of Use of Complete Hard Metal Milling Cutters

| End Mill           | z=2 | z=3 | z=4 | Multiple Edged End Mill z=6, 8 |
|--------------------|-----|-----|-----|--------------------------------|
| Operation Type     |     |     |     |                                |
| Very clean Milling |     |     |     |                                |
| Clean Milling      |     |     |     |                                |
| Rough Milling      |     |     |     |                                |
| Slot Milling       |     |     |     |                                |
| Slotting           |     |     |     |                                |

| End Mill       | Face Radius z=2 | Face Radius z=4 | Face Radius z=2 | End Mill z=4 | Ring Cutter z=2 |
|----------------|-----------------|-----------------|-----------------|--------------|-----------------|
| Operation Type |                 |                 |                 |              |                 |
| Form Milling   |                 |                 |                 |              |                 |
| Slot Milling   |                 |                 |                 |              |                 |
| Slotting       |                 |                 |                 |              |                 |



Suitable



Used when necessary



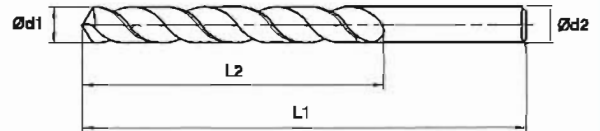
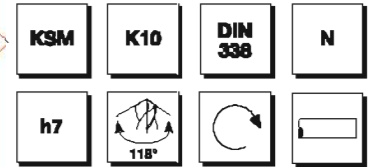
Not Suitable

Cutting length is very important with respect to the suitability of operating type. For example, a short cutting length means high stability and good result.



## Solid Carbide Twist Drills

**Application:** For high-speed CNC machining in low and high-alloyed steel with resistance 1200 N/mm<sup>2</sup>, in hard cast, gray and tempered cast, light Ne-metals, Ti and Ti-alloys.



| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|-------|
| B00551002000 | 2,0   | 2,0   | 49    | 24    | •     |
| B00551002500 | 2,5   | 2,5   | 57    | 30    | •     |
| B00551003000 | 3,0   | 3,0   | 61    | 33    | •     |
| B00551003500 | 3,5   | 3,5   | 70    | 39    | •     |
| B00551004000 | 4,0   | 4,0   | 75    | 43    | •     |
| B00551004500 | 4,5   | 4,5   | 80    | 47    | •     |
| B00551005000 | 5,0   | 5,0   | 86    | 52    | •     |
| B00551005500 | 5,5   | 5,5   | 93    | 57    | •     |
| B00551006000 | 6,0   | 6,0   | 93    | 57    | •     |
| B00551006500 | 6,5   | 6,5   | 101   | 63    | •     |
| B00551007000 | 7,0   | 7,0   | 109   | 69    | •     |
| B00551007500 | 7,5   | 7,5   | 109   | 69    | •     |
| B00551008000 | 8,0   | 8,0   | 117   | 75    | •     |
| B00551008500 | 8,5   | 8,5   | 117   | 75    | •     |

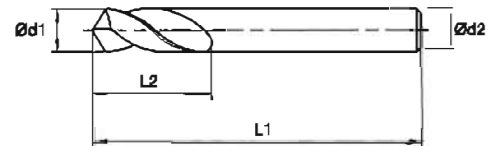
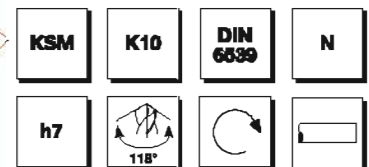
| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|-------|
| B00551009000 | 9,0   | 9,0   | 125   | 81    | •     |
| B00551009500 | 9,5   | 9,5   | 125   | 81    | •     |
| B00551010000 | 10,0  | 10,0  | 133   | 87    | •     |
| B00551011000 | 11,0  | 11,0  | 142   | 94    | •     |
| B00551012000 | 12,0  | 12,0  | 151   | 101   | •     |
| B00551013000 | 13,0  | 13,0  | 151   | 101   | ○     |
| B00551014000 | 14,0  | 14,0  | 160   | 108   | ○     |
| B00551015000 | 15,0  | 15,0  | 169   | 114   | ○     |
| B00551016000 | 16,0  | 16,0  | 178   | 120   | ○     |
| B00551017000 | 17,0  | 17,0  | 184   | 125   | ○     |
| B00551018000 | 18,0  | 18,0  | 191   | 130   | ○     |
| B00551019000 | 19,0  | 19,0  | 198   | 135   | ○     |
| B00551020000 | 20,0  | 20,0  | 205   | 140   | ○     |

• Ask Price and Deadline.

TIN, TiCN, TiAlN COATING AVAILABLE UPON REQUEST.

## Solid Carbide Twist Drills

**Application:** For high-speed CNC machining of low and high-alloyed steel with resistance 1200 N/mm<sup>2</sup>, in hard cast, gray and tempered cast, light Ne-metals, Ti and Ti-alloys.



| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|-------|
| B00551102000 | 2,0   | 2,0   | 38    | 12    | •     |
| B00551102500 | 2,5   | 2,5   | 43    | 14    | •     |
| B00551103000 | 3,0   | 3,0   | 46    | 16    | •     |
| B00551103500 | 3,5   | 3,5   | 52    | 20    | •     |
| B00551104000 | 4,0   | 4,0   | 55    | 22    | •     |
| B00551104500 | 4,5   | 4,5   | 58    | 24    | •     |
| B00551105000 | 5,0   | 5,0   | 62    | 26    | •     |
| B00551105500 | 5,5   | 5,5   | 68    | 28    | •     |
| B00551106000 | 6,0   | 6,0   | 66    | 28    | •     |
| B00551106500 | 6,5   | 6,5   | 70    | 31    | •     |
| B00551106800 | 6,8   | 6,8   | 74    | 34    | •     |

| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|-------|
| B00551108000 | 8,0   | 8,0   | 79    | 37    | •     |
| B00551108500 | 8,5   | 8,5   | 79    | 37    | •     |
| B00551109000 | 9,0   | 9,0   | 84    | 40    | •     |
| B00551109500 | 9,5   | 9,5   | 84    | 40    | •     |
| B00551110000 | 10,0  | 10,0  | 89    | 43    | •     |
| B00551111000 | 11,0  | 11,0  | 95    | 47    | •     |
| B00551112000 | 12,0  | 12,0  | 102   | 51    | •     |
| B00551114000 | 14,0  | 14,0  | 107   | 54    | •     |
| B00551116000 | 16,0  | 16,0  | 115   | 58    | ○     |
| B00551118000 | 18,0  | 18,0  | 123   | 62    | ○     |
| B00551120000 | 20,0  | 20,0  | 131   | 68    | ○     |

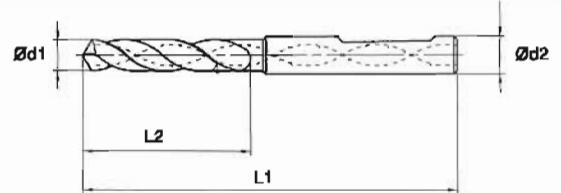
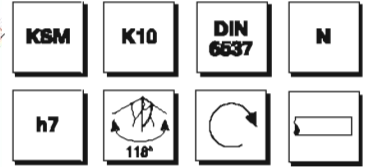
• Ask Price and Deadline.

TIN, TiCN, TiAlN COATING AVAILABLE UPON REQUEST.



## Solid Carbide Twist Drills

**Application:** For high-speed CNC machining of low and high-alloyed steel with resistance 1200 N/mm<sup>2</sup>, in hard cast, gray and tempered cast, light Ne-metals, Ti and Ti-alloys.



| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|-------|
| B00551204000 | 4,0   | 6     | 74    | 36    | ○     |
| B00551204500 | 4,5   | 6     | 74    | 36    | ○     |
| B00551205000 | 5,0   | 6     | 82    | 44    | ○     |
| B00551205500 | 5,5   | 8     | 82    | 44    | ○     |
| B00551206000 | 6,0   | 6     | 82    | 44    | ○     |
| B00551206500 | 6,5   | 8     | 91    | 53    | ○     |
| B00551207000 | 7,0   | 8     | 91    | 53    | ○     |
| B00551207500 | 7,5   | 8     | 91    | 53    | ○     |
| B00551208000 | 8,0   | 8     | 91    | 53    | ○     |

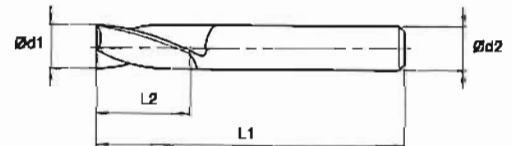
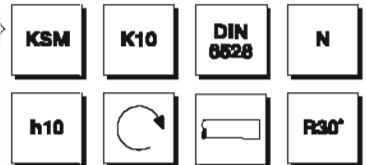
| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | Stock |
|--------------|-------|-------|-------|-------|-------|
| B00551208500 | 8,5   | 10    | 103   | 61    | ○     |
| B00551209000 | 9,0   | 10    | 103   | 61    | ○     |
| B00551209500 | 9,5   | 10    | 103   | 61    | ○     |
| B00551210000 | 10,0  | 10    | 103   | 61    | ○     |
| B00551210500 | 10,5  | 12    | 118   | 71    | ○     |
| B00551211000 | 11,0  | 12    | 118   | 71    | ○     |
| B00551211500 | 11,5  | 12    | 118   | 71    | ○     |
| B00551221200 | 12,0  | 12    | 118   | 71    | ○     |

○ Ask Price and Deadline.

TIN, TiCN, TiAlN COATING AVAILABLE UPON REQUEST.

## Solid Carbide End Mills - 2 FLUTES

**Application:** For high-speed face and side CNC machining of steel and steel cast, in gray, hard and tempered cast with hardness 50 HRC, in Cr-Ni alloyed steel, bronze, brass, Copper, Aluminum and plastics.



| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | z | Stock |
|--------------|-------|-------|-------|-------|---|-------|
| B00553203000 | 3     | 3     | 50    | 7     | 2 | •     |
| B00553204000 | 4     | 4     | 50    | 8     | 2 | •     |
| B00553205000 | 5     | 5     | 50    | 10    | 2 | •     |
| B00553206000 | 6     | 6     | 57    | 10    | 2 | •     |
| B00553207000 | 7     | 7     | 60    | 13    | 2 | •     |
| B00553208000 | 8     | 8     | 63    | 16    | 2 | •     |

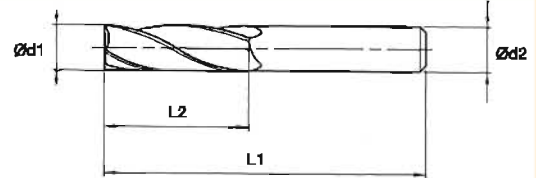
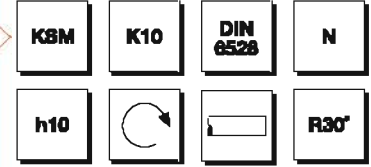
| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | z | Stock |
|--------------|-------|-------|-------|-------|---|-------|
| B00553209000 | 9     | 9     | 67    | 18    | 2 | •     |
| B00553210000 | 10    | 10    | 72    | 19    | 2 | •     |
| B00553212000 | 12    | 12    | 83    | 22    | 2 | •     |
| B00553214000 | 14    | 14    | 83    | 22    | 2 | •     |
| B00553216000 | 16    | 16    | 92    | 26    | 2 | •     |
| B00553220000 | 20    | 20    | 104   | 32    | 2 | •     |

TIN, TiCN, TiAlN COATING AVAILABLE UPON REQUEST.



## Solid Carbide End Mills - 3 FLUTES

**Application:** For high-speed face and side CNC machining of steel and steel cast, in gray, hard and tempered cast with hardness 50 HRC, in Cr-Ni alloyed steel, bronze, brass, Copper, Aluminium and plastics.



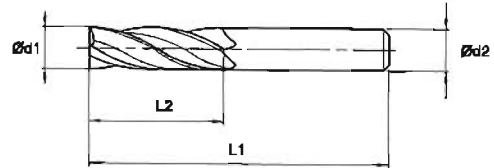
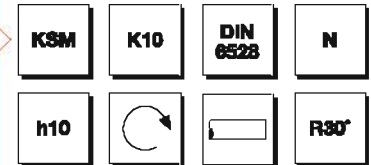
| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | z | Stock |
|--------------|-------|-------|-------|-------|---|-------|
| B00553103000 | 3     | 3     | 50    | 7     | 3 | •     |
| B00553104000 | 4     | 4     | 50    | 8     | 3 | •     |
| B00553105000 | 5     | 5     | 50    | 10    | 3 | •     |
| B00553106000 | 6     | 6     | 57    | 10    | 3 | •     |
| B00553107000 | 7     | 7     | 60    | 13    | 3 | •     |
| B00553108000 | 8     | 8     | 63    | 16    | 3 | •     |

| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | z | Stock |
|--------------|-------|-------|-------|-------|---|-------|
| B00553109000 | 9     | 9     | 67    | 16    | 3 | •     |
| B00553110000 | 10    | 10    | 72    | 19    | 3 | •     |
| B00553112000 | 12    | 12    | 83    | 22    | 3 | •     |
| B00553114000 | 14    | 14    | 83    | 22    | 3 | •     |
| B00553116000 | 16    | 16    | 92    | 26    | 3 | •     |
| B00553120000 | 20    | 20    | 104   | 32    | 3 | •     |

TIN, TiCN, TiAlN COATING AVAILABLE UPON REQUEST.

## Solid Carbide End Mills - 4 FLUTES

**Application:** For high-speed face and side CNC machining of steel and steel cast, in gray, hard and tempered cast with hardness 50 HRC, in Cr-Ni alloyed steel, bronze, brass, Copper, Aluminium and plastics.



| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | z | Stock |
|--------------|-------|-------|-------|-------|---|-------|
| B00553003000 | 3     | 3     | 50    | 10    | 4 | •     |
| B00553004000 | 4     | 4     | 50    | 11    | 4 | •     |
| B00553005000 | 5     | 5     | 50    | 13    | 4 | •     |
| B00553006000 | 6     | 6     | 57    | 13    | 4 | •     |
| B00553007000 | 7     | 7     | 60    | 16    | 4 | •     |
| B00553008000 | 8     | 8     | 63    | 19    | 4 | •     |

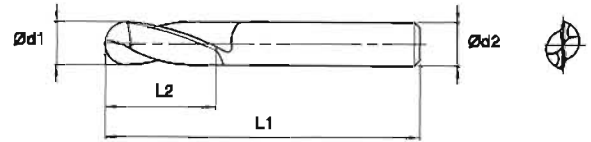
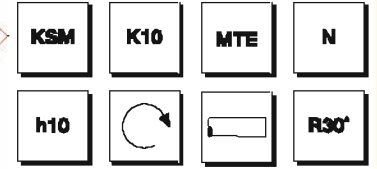
| Product Code | d1 mm | d2 mm | L1 mm | L2 mm | z | Stock |
|--------------|-------|-------|-------|-------|---|-------|
| B00553009000 | 9     | 9     | 67    | 19    | 4 | •     |
| B00553010000 | 10    | 10    | 72    | 22    | 4 | •     |
| B00553012000 | 12    | 12    | 83    | 26    | 4 | •     |
| B00553014000 | 14    | 14    | 83    | 26    | 4 | •     |
| B00553016000 | 16    | 16    | 92    | 32    | 4 | •     |
| B00553020000 | 20    | 20    | 104   | 38    | 4 | •     |

TIN, TiCN, TiAlN COATING AVAILABLE UPON REQUEST.



## Solid Carbide Ball Nose End Mills - 2 FLUTES

**Application:** For high-speed moulding and copying of steel and steel cast, in gray, hard and tempered cast with hardness 50 HRC, in Cr-Ni alloyed steel, bronze, brass, Copper, Aluminium and plastics.



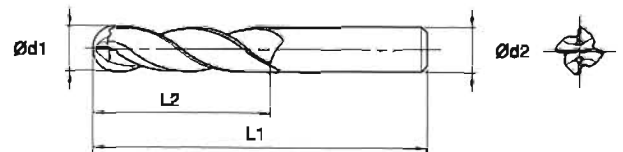
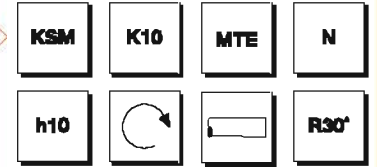
| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | z | Stock |
|--------------|----------|----------|----------|----------|---|-------|
| B00554003000 | 3        | 3        | 57       | 7        | 2 | •     |
| B00554004000 | 4        | 4        | 57       | 8        | 2 | •     |
| B00554005000 | 5        | 5        | 57       | 10       | 2 | •     |
| B00554006000 | 6        | 6        | 57       | 10       | 2 | •     |
| B00554008000 | 8        | 8        | 63       | 16       | 2 | •     |
| B00554010000 | 10       | 10       | 72       | 19       | 2 | •     |

| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | z | Stock |
|--------------|----------|----------|----------|----------|---|-------|
| B00554012000 | 12       | 12       | 83       | 22       | 2 | •     |
| B00554014000 | 14       | 14       | 83       | 22       | 2 | •     |
| B00554016000 | 16       | 16       | 92       | 26       | 2 | •     |
| B00554018000 | 18       | 18       | 92       | 26       | 2 | •     |
| B00554020000 | 20       | 20       | 104      | 32       | 2 | •     |

TIN, TiCN, TiAlN COATING AVAILABLE UPON REQUEST.

## Solid Carbide Ball Nose End Mills - 4 FLUTES

**Application:** For high-speed moulding and copying of steel and steel cast, in gray, hard and tempered cast with hardness 50 HRC, in Cr-Ni alloyed steel, bronze, brass, Copper, Aluminium and plastics.



| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | z | Stock |
|--------------|----------|----------|----------|----------|---|-------|
| B00554103000 | 3        | 3        | 57       | 7        | 4 | •     |
| B00554104000 | 4        | 4        | 57       | 8        | 4 | •     |
| B00554105000 | 5        | 5        | 57       | 10       | 4 | •     |
| B00554106000 | 6        | 6        | 57       | 13       | 4 | •     |
| B00554108000 | 8        | 8        | 63       | 19       | 4 | •     |
| B00554110000 | 10       | 10       | 72       | 22       | 4 | •     |

| Product Code | d1<br>mm | d2<br>mm | L1<br>mm | L2<br>mm | z | Stock |
|--------------|----------|----------|----------|----------|---|-------|
| B00554112000 | 12       | 12       | 83       | 26       | 4 | •     |
| B00554114000 | 14       | 14       | 83       | 26       | 4 | •     |
| B00554116000 | 16       | 16       | 92       | 32       | 4 | •     |
| B00554118000 | 18       | 18       | 92       | 32       | 4 | •     |
| B00554120000 | 20       | 20       | 104      | 38       | 4 | •     |

TIN, TiCN, TiAlN COATING AVAILABLE UPON REQUEST.



**MAKİNA TAKİM ENDÜSTRİSİ A.Ş.**



**MAKİNA TAKİM ENDÜSTRİSİ A.Ş.**

