

## Cutting data for tapping

The specified cutting data represents average standard values.  
For specific applications, adjustment is recommended.

| Material group                 |  = Coolant recommendation<br><br>E = Emulsion<br>O = Oil<br>v <sub>c</sub> = Cutting speed |                                       |                                         | Brinell hardness HB | Tensile strength R <sub>m</sub><br>N/mm <sup>2</sup> | Machining group <sup>1</sup> | HSS-E (PM) taps        |    |    |  |   |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------------|---------------------|------------------------------------------------------|------------------------------|------------------------|----|----|-------------------------------------------------------------------------------------|---|
|                                | Overview of the main material groups and code letters                                                                                                                       |                                       |                                         |                     |                                                      |                              | Coated                 |    |    |                                                                                     |   |
|                                |                                                                                                                                                                             |                                       |                                         |                     |                                                      |                              | v <sub>c</sub> [m/min] |    |    |                                                                                     |   |
|                                | 1,5 × D <sub>N</sub>                                                                                                                                                        | 2 × D <sub>N</sub>                    | 2,5 × D <sub>N</sub>                    |                     |                                                      |                              |                        |    |    |                                                                                     |   |
| P                              | Non-alloyed steel                                                                                                                                                           | C ≤ 0.25%                             | Annealed                                | 125                 | 430                                                  | P1                           | 37                     | 30 | 26 | E                                                                                   |   |
|                                |                                                                                                                                                                             | C > 0.25 to ≤ 0.55%                   | Annealed                                | 190                 | 640                                                  | P2                           | 37                     | 31 | 26 | E                                                                                   |   |
|                                |                                                                                                                                                                             | C > 0.25 to ≤ 0.55%                   | Heat-treated                            | 210                 | 710                                                  | P3                           | 23                     | 19 | 17 | E                                                                                   |   |
|                                |                                                                                                                                                                             | C > 0.55%                             | Annealed                                | 190                 | 640                                                  | P4                           | 23                     | 19 | 16 | E                                                                                   |   |
|                                |                                                                                                                                                                             | C > 0.55%                             | Heat-treated                            | 300                 | 1010                                                 | P5                           | 14                     | 12 | 10 | E                                                                                   |   |
|                                |                                                                                                                                                                             | Free-machining steel (short-chipping) | Annealed                                | 220                 | 750                                                  | P6                           | 23                     | 19 | 16 | E                                                                                   |   |
|                                | Heat-treated                                                                                                                                                                | 285                                   | 960                                     | P8                  | 12                                                   | 10                           | 9                      | E  |    |                                                                                     |   |
|                                | Heat-treated                                                                                                                                                                | 380                                   | 1280                                    | P9                  | 7                                                    | 6                            | 5                      | E  |    |                                                                                     |   |
|                                | Heat-treated                                                                                                                                                                | 430                                   | 1480                                    | P10                 | 5                                                    |                              |                        | O  |    |                                                                                     |   |
|                                | Hardened and tempered                                                                                                                                                       | 300                                   | 1010                                    | P12                 | 14                                                   | 12                           | 10                     | E  |    |                                                                                     |   |
|                                | Hardened and tempered                                                                                                                                                       | 380                                   | 1280                                    | P13                 | 7                                                    | 6                            | 5                      | O  |    |                                                                                     |   |
|                                | Martensitic, heat-treated                                                                                                                                                   | 330                                   | 1110                                    | P15                 | 5                                                    | 4                            | 3                      | E  |    |                                                                                     |   |
|                                | M                                                                                                                                                                           | Stainless steel                       | Austenitic, quench hardened             | 200                 | 680                                                  | M1                           | 8                      | 7  | 6  | E                                                                                   |   |
|                                |                                                                                                                                                                             |                                       | Austenitic, precipitation hardened (PH) | 300                 | 1010                                                 | M2                           | 5                      | 4  | 3  | E                                                                                   |   |
|                                |                                                                                                                                                                             |                                       | Austenitic/ferritic, duplex             | 230                 | 780                                                  | M3                           | 6                      | 5  | 4  | E                                                                                   |   |
| K                              | Malleable cast iron                                                                                                                                                         | Ferritic                              | 200                                     | 400                 | K1                                                   | 22                           | 18                     | 16 | E  |                                                                                     |   |
|                                |                                                                                                                                                                             | Pearlitic                             | 260                                     | 700                 | K2                                                   | 11                           | 9                      | 8  | E  |                                                                                     |   |
|                                | High strength/austenitic                                                                                                                                                    | 245                                   | 350                                     | K4                  | 17                                                   | 14                           | 12                     | E  |    |                                                                                     |   |
|                                | Pearlitic                                                                                                                                                                   | 265                                   | 700                                     | K6                  | 12                                                   | 10                           | 9                      | E  |    |                                                                                     |   |
|                                | GGV (CGI)                                                                                                                                                                   |                                       | 230                                     | 400                 | K7                                                   | 10                           | 8                      | 7  | E  |                                                                                     |   |
|                                | N                                                                                                                                                                           | Wrought aluminium alloys              | Not hardenable                          | 30                  | –                                                    | N1                           | 8                      | 7  | 6  | E                                                                                   |   |
|                                |                                                                                                                                                                             |                                       | Hardenable, hardened                    | 100                 | 340                                                  | N2                           | 32                     | 26 | 22 | E                                                                                   |   |
| ≤ 12% Si, hardenable, hardened |                                                                                                                                                                             | 90                                    | 310                                     | N4                  | 22                                                   | 18                           | 16                     | E  |    |                                                                                     |   |
| > 12% Si, not hardenable       |                                                                                                                                                                             | 130                                   | 450                                     | N5                  | 25                                                   | 21                           | 18                     | E  |    |                                                                                     |   |
|                                |                                                                                                                                                                             | 100                                   | 340                                     | N7                  | 14                                                   | 12                           | 10                     | E  |    |                                                                                     |   |
| Brass, bronze, red brass       |                                                                                                                                                                             | 110                                   | 380                                     | N9                  | 48                                                   | 40                           | 34                     | E  |    |                                                                                     |   |
| Cu alloys, short-chipping      |                                                                                                                                                                             | 300                                   | 1010                                    | N10                 |                                                      |                              |                        | E  |    |                                                                                     |   |
| S                              |                                                                                                                                                                             | Heat-resistant alloys                 | Fe-based                                | Annealed            | 200                                                  | 680                          | S1                     |    |    |                                                                                     | E |
|                                |                                                                                                                                                                             |                                       |                                         | Hardened            | 280                                                  | 940                          | S2                     | 3  |    |                                                                                     | E |
|                                | Ni- or Co-based                                                                                                                                                             |                                       | Annealed                                | 250                 | 840                                                  | S3                           |                        |    |    | E                                                                                   |   |
|                                |                                                                                                                                                                             |                                       | Hardened                                | 350                 | 1180                                                 | S4                           | 3                      |    |    | O                                                                                   |   |
|                                |                                                                                                                                                                             |                                       | Cast                                    | 320                 | 1080                                                 | S5                           | 3                      |    |    | O                                                                                   |   |
|                                | α and β alloys, hardened                                                                                                                                                    | 375                                   | 1260                                    | S7                  | 4                                                    | 4                            |                        | O  |    |                                                                                     |   |
|                                | β alloys                                                                                                                                                                    | 410                                   | 1400                                    | S8                  | 4                                                    | 4                            |                        | O  |    |                                                                                     |   |
|                                | Molybdenum alloys                                                                                                                                                           |                                       | 300                                     | 1010                | S10                                                  | 7                            | 5                      |    | O  |                                                                                     |   |
|                                | H                                                                                                                                                                           | Hardened steel                        | Hardened and tempered                   | 50 HRC              | –                                                    | H1                           |                        |    |    | O                                                                                   |   |
|                                |                                                                                                                                                                             |                                       | Hardened and tempered                   | 55 HRC              | –                                                    | H2                           |                        |    |    | O                                                                                   |   |
| Hardened and tempered          |                                                                                                                                                                             |                                       | 60 HRC                                  | –                   | H3                                                   |                              |                        |    | O  |                                                                                     |   |
| Hardened cast iron             |                                                                                                                                                                             | Hardened and tempered                 | 55 HRC                                  | –                   | H4                                                   |                              |                        |    | O  |                                                                                     |   |
| O                              | Thermoplastics                                                                                                                                                              | Without abrasive fillers              |                                         |                     | O1                                                   | 22                           | 18                     | 15 | E  |                                                                                     |   |
|                                | Thermosets                                                                                                                                                                  | Without abrasive fillers              |                                         |                     | O2                                                   | 13                           | 10                     | 9  | E  |                                                                                     |   |
|                                | Plastic, glass-fibre-reinforced                                                                                                                                             | GFRP                                  |                                         |                     | O3                                                   | 8                            | 6                      | 5  | E  |                                                                                     |   |
|                                | Plastic, carbon-fibre-reinforced                                                                                                                                            | CFRP                                  |                                         |                     | O4                                                   | 8                            | 6                      | 5  | E  |                                                                                     |   |
|                                | Plastic, aramid-fibre-reinforced                                                                                                                                            | AFRP                                  |                                         |                     | O5                                                   | 8                            | 6                      | 5  | E  |                                                                                     |   |
|                                | Graphite (technical)                                                                                                                                                        |                                       | 80 Shore                                |                     | O6                                                   | 19                           | 16                     | 13 | E  |                                                                                     |   |