

| Material group                                   | Hardness |       | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|--|----------|-------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|  | HRC      | BHN   |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Common structural steels                         | -        | ≤ 150 | 90  | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
|  | ≤ 32     | ≤ 301 | 70  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
| Free-cutting steels                              | ≤ 25     | ≤ 255 | 90  | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
|  | ≤ 32     | ≤ 301 | 70  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
| Unalloyed heat-treatable steels                  | ≤ 20     | ≤ 220 | 90  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
|  | ≤ 25     | ≤ 255 | 70  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
|  | ≤ 32     | ≤ 301 | 50  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
| Alloyed heat-treatable steels                    | ≤ 32     | ≤ 301 | 45  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
|  | ≤ 43     | ≤ 402 | 30  | 0.0007               | 0.0020              | 0.0030              | 0.0040              | 0.0050               |                      |                      |                    |                        |                        |
| Unalloyed case hardened steels                   | ≤ 25     | ≤ 255 | 90  | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
| Alloyed case hardened steels                     | ≤ 32     | ≤ 301 | 35  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
|  | ≤ 43     | ≤ 402 | 30  | 0.0007               | 0.0020              | 0.0030              | 0.0040              | 0.0050               |                      |                      |                    |                        |                        |
| Nitriding steels                                 | ≤ 32     | ≤ 301 | 30  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
|  | ≤ 43     | ≤ 402 | 25  | 0.0007               | 0.0020              | 0.0030              | 0.0040              | 0.0050               |                      |                      |                    |                        |                        |
| Tool steels                                      | ≤ 25     | ≤ 255 | 35  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
|  | ≤ 43     | ≤ 402 | 25  | 0.0007               | 0.0020              | 0.0030              | 0.0040              | 0.0050               |                      |                      |                    |                        |                        |
| High speed steels                                | ≤ 43     | ≤ 402 | 25  | 0.0007               | 0.0020              | 0.0030              | 0.0040              | 0.0050               |                      |                      |                    |                        |                        |
| Spring steels                                    | ≤ 38     | ≤ 354 | 15  | 0.0005               | 0.0015              | 0.0025              | 0.0030              | 0.0040               |                      |                      |                    |                        |                        |
| Hardened steels                                  | ≤ 48     | ≤ 460 |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|  | ≤ 66     | -     |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
| Stainless steels, sulphured                      | ≤ 28     | ≤ 273 | 30  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
| austenitic                                       | ≤ 36     | ≤ 337 | 25  | 0.0007               | 0.0020              | 0.0030              | 0.0040              | 0.0050               |                      |                      |                    |                        |                        |
| martensitic                                      | ≤ 46     | ≤ 435 | 30  | 0.0007               | 0.0020              | 0.0030              | 0.0040              | 0.0050               |                      |                      |                    |                        |                        |
| Cast iron  | ≤ 23     | ≤ 242 | 90  | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
|  | ≤ 38     | ≤ 354 | 70  | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
| Spheroidal graphite iron and malleable cast iron | ≤ 23     | ≤ 242 | 80  | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
|  | ≤ 38     | ≤ 354 | 55  | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
| Chilled cast iron                                | ≤ 38     | ≤ 354 | 15  | 0.0007               | 0.0020              | 0.0030              | 0.0040              | 0.0050               |                      |                      |                    |                        |                        |
| New cast materials GGV                           | ≤ 20     | ≤ 220 |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|  | ≤ 32     | ≤ 301 |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
| New cast materials ADI                           | ≤ 32     | ≤ 301 |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|  | ≤ 43     | ≤ 402 |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
| Special alloys                                   | ≤ 54     | ≤ 549 | 15  | 0.0005               | 0.0015              | 0.0025              | 0.0030              | 0.0040               |                      |                      |                    |                        |                        |
| Ti and Ti-alloys                                 | ≤ 25     | ≤ 255 | 25  | 0.0005               | 0.0015              | 0.0025              | 0.0030              | 0.0040               |                      |                      |                    |                        |                        |
|  | ≤ 43     | ≤ 402 | 15  | 0.0005               | 0.0015              | 0.0025              | 0.0030              | 0.0040               |                      |                      |                    |                        |                        |
| Aluminium and Al-alloys                          | -        | ≤ 120 | 225 | 0.0017               | 0.0050              | 0.0080              | 0.0100              | 0.0125               |                      |                      |                    |                        |                        |
| Al wrought alloys                                | -        | ≤ 200 | 225 | 0.0017               | 0.0050              | 0.0080              | 0.0100              | 0.0125               |                      |                      |                    |                        |                        |
| Al cast alloys ≤ 10 % Si                         | -        | ≤ 180 | 180 | 0.0017               | 0.0050              | 0.0080              | 0.0100              | 0.0125               |                      |                      |                    |                        |                        |
| ≤ 24 % Si  | -        | ≤ 180 | 145 | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
| Magnesium alloys                                 | -        | ≤ 120 | 225 | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
| Copper, low-alloyed                              | -        | ≤ 150 | 90  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
| Brass, short-chipping                            | -        | ≤ 180 |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
| long-chipping                                    | -        | ≤ 180 | 115 | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
| Bronze, short-chipping                           | -        | ≤ 180 | 90  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
|  | ≤ 25     | ≤ 255 | 80  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
| Bronze, long-chipping                            | ≤ 25     | ≤ 255 | 70  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
|  | ≤ 32     | ≤ 301 | 55  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
| Duroplastics                                     |          |       | 45  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
| Thermoplastics                                   |          |       | 70  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
| Reinforced plastics - Kevlar                     |          |       |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
| Reinforced plastics - GFK / CFK                  |          |       |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |

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|  | ≤ 32     | ≤ 301 | 70  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
| Free-cutting steels                              | ≤ 25     | ≤ 255 | 90  | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
|  | ≤ 32     | ≤ 301 | 70  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
| Unalloyed heat-treatable steels                  | ≤ 20     | ≤ 220 | 90  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
|  | ≤ 25     | ≤ 255 | 70  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
|  | ≤ 32     | ≤ 301 | 50  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
| Alloyed heat-treatable steels                    | ≤ 32     | ≤ 301 | 45  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
|  | ≤ 43     | ≤ 402 | 30  | 0.0007               | 0.0020              | 0.0030              | 0.0040              | 0.0050               |                      |                      |                    |                        |                        |
| Unalloyed case hardened steels                   | ≤ 25     | ≤ 255 | 90  | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
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| High speed steels                                | ≤ 43     | ≤ 402 | 25  | 0.0007               | 0.0020              | 0.0030              | 0.0040              | 0.0050               |                      |                      |                    |                        |                        |
| Spring steels                                    | ≤ 38     | ≤ 354 | 15  | 0.0005               | 0.0015              | 0.0025              | 0.0030              | 0.0040               |                      |                      |                    |                        |                        |
| Hardened steels                                  | ≤ 48     | ≤ 460 |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
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|  | ≤ 43     | ≤ 402 | 15  | 0.0005               | 0.0015              | 0.0025              | 0.0030              | 0.0040               |                      |                      |                    |                        |                        |
| Aluminium and Al-alloys                          | -        | ≤ 120 | 225 | 0.0017               | 0.0050              | 0.0080              | 0.0100              | 0.0125               |                      |                      |                    |                        |                        |
| Al wrought alloys                                | -        | ≤ 200 | 225 | 0.0017               | 0.0050              | 0.0080              | 0.0100              | 0.0125               |                      |                      |                    |                        |                        |
| Al cast alloys ≤ 10 % Si                         | -        | ≤ 180 | 180 | 0.0017               | 0.0050              | 0.0080              | 0.0100              | 0.0125               |                      |                      |                    |                        |                        |
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| Magnesium alloys                                 | -        | ≤ 120 | 225 | 0.0015               | 0.0040              | 0.0065              | 0.0080              | 0.0100               |                      |                      |                    |                        |                        |
| Copper, low-alloyed                              | -        | ≤ 150 | 90  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
| Brass, short-chipping                            | -        | ≤ 180 |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
| long-chipping                                    | -        | ≤ 180 | 115 | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
| Bronze, short-chipping                           | -        | ≤ 180 | 90  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
|  | ≤ 25     | ≤ 255 | 80  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
| Bronze, long-chipping                            | ≤ 25     | ≤ 255 | 70  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
|  | ≤ 32     | ≤ 301 | 55  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
| Duroplastics                                     |          |       | 45  | 0.0010               | 0.0025              | 0.0040              | 0.0050              | 0.0065               |                      |                      |                    |                        |                        |
| Thermoplastics                                   |          |       | 70  | 0.0012               | 0.0030              | 0.0050              | 0.0065              | 0.0080               |                      |                      |                    |                        |                        |
| Reinforced plastics - Kevlar                     |          |       |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
| Reinforced plastics - GFK / CFK                  |          |       |     |                      |                     |                     |                     |                      |                      |                      |                    |                        |                        |