

Material Groups

Recommended Machining Conditions

| ISO | Material | Condition | Tensile Strength [N/mm²] | Hardness HB | Material No. | V m/min | SUMOCHAM Feed vs. Drill Diameter | | | | | | | | | | | |
|-----|--|------------------------------|--------------------------|-------------|--------------|------------|----------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | | | | | | | D=4-4.9 | D=5-5.9 | D=6-7.9 | D=8-9.9 | D=10-11.9 | D=12-13.9 | D=14-15.9 | D=16-19.9 | D=20-25.9 | D=26-32.9 | | |
| | | | | | | | mm/rev | | | | | | | | | | | |
| P | Non-alloy steel and cast steel, free cutting steel | < 0.25 %C | Annealed | 420 | 125 | 1 | 80-110-140 | 0.04 0.06 | 0.07 0.09 | 0.09 0.11 | 0.12 0.17 | 0.15 0.21 | 0.18 0.24 | 0.20 0.27 | 0.23 0.32 | 0.26 0.36 | 0.30 0.40 | |
| | | ≥ 0.25 %C | Annealed | 650 | 190 | 2 | 80-105-130 | | | | | | | | | | | |
| | | < 0.55 %C | Quenched and tempered | 850 | 250 | 3 | 80-100-120 | 0.08 | 0.11 | 0.13 | 0.22 | 0.28 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | |
| | | ≥ 0.55 %C | Annealed | 750 | 220 | 4 | 70-90-110 | 0.04 0.06 | 0.07 0.10 | 0.09 0.12 | 0.12 0.18 | 0.14 0.21 | 0.16 0.24 | 0.18 0.26 | 0.23 0.31 | 0.25 0.35 | 0.30 0.40 | |
| | | ≥ 0.55 %C | Quenched and tempered | 1000 | 300 | 5 | 50-70-90 | | | | | | | | | | | |
| P | Low alloy and cast steel (less than 5% of alloying elements) | Quenched and tempered | Annealed | 600 | 200 | 6 | 80-100-120 | 0.04 | 0.07 | 0.09 | 0.12 | 0.14 | 0.16 | 0.18 | 0.23 | 0.25 | 0.30 | |
| | | | Quenched and tempered | 930 | 275 | 7 | 70-90-110 | 0.08 | 0.13 | 0.15 | 0.25 | 0.28 | 0.32 | 0.35 | 0.40 | 0.45 | 0.50 | |
| | | | Quenched and tempered | 1000 | 300 | 8 | 50-70-90 | 0.04 0.06 | 0.07 0.10 | 0.09 0.12 | 0.12 0.18 | 0.14 0.21 | 0.16 0.24 | 0.18 0.26 | 0.23 0.31 | 0.25 0.35 | 0.30 0.40 | |
| | | | Quenched and tempered | 1200 | 350 | 9 | 40-55-70 | | | | | | | | | | | |
| M | High alloyed steel, cast steel and tool steel | Annealed | 680 | 200 | 10 | 50-70-90 | 0.06 | 0.07 | 0.09 | 0.11 | 0.13 | 0.15 | 0.18 | 0.20 | 0.22 | 0.25 | 0.25 | |
| | | Quenched and tempered | 1100 | 325 | 11 | 40-60-80 | 0.08 | 0.10 | 0.12 | 0.18 | 0.22 | 0.25 | 0.28 | 0.30 | 0.33 | 0.35 | 0.35 | |
| N | Stainless steel and cast steel | Ferritic/martensitic | 680 | 200 | 12 | 40-55-70 | 0.05 | 0.06 | 0.08 | 0.10 | 0.12 | 0.14 | 0.16 | 0.17 | 0.18 | 0.20 | 0.20 | |
| | | Martensitic | 820 | 240 | 13 | | 0.07 | 0.08 | 0.10 | 0.15 | 0.18 | 0.20 | 0.24 | 0.27 | 0.30 | 0.35 | 0.35 | |
| M | Stainless steel and cast steel | Austenitic, duplex | 600 | 180 | 14 | 30-50-70 | 0.05 0.07 | 0.06 0.08 | 0.08 0.10 | 0.10 0.15 | 0.12 0.15 | 0.14 0.17 | 0.16 0.20 | 0.17 0.22 | 0.18 0.24 | 0.17 0.27 | 0.18 0.20 | |
| K | Gray cast iron (GG) | Ferritic / pearlitic | | 180 | 15 | 90-125-160 | 0.04 0.06 0.08 | 0.10 0.13 0.15 | 0.12 0.15 0.18 | 0.15 0.22 0.30 | 0.20 0.27 0.32 | 0.25 0.30 0.37 | 0.30 0.33 0.42 | 0.36 0.40 0.55 | 0.36 0.40 0.55 | 0.36 0.40 0.55 | 0.36 0.40 0.55 | |
| | | Pearlitic / martensitic | | 260 | 16 | 80-110-140 | | | | | | | | | | | | |
| K | Nodular cast iron (GGG) | Ferritic | | 160 | 17 | 90-135-180 | | | | | | | | | | | | |
| | | Perlitic | | 250 | 18 | 80-110-140 | | | | | | | | | | | | |
| N | Malleable cast iron | Ferritic | | 130 | 19 | 90-125-160 | | | | | | | | | | | | |
| | | Perlitic | | 230 | 20 | 80-110-140 | | | | | | | | | | | | |
| N | Aluminum-wrought alloys | Not hardenable | | 60 | 21 | 90-155-220 | 0.05 0.12 0.20 | 0.10 0.17 0.25 | 0.15 0.22 0.30 | 0.20 0.27 0.40 | 0.25 0.32 0.45 | 0.30 0.37 0.50 | 0.33 0.42 0.55 | 0.36 0.46 0.60 | 0.36 0.46 0.60 | 0.36 0.46 0.60 | 0.36 0.46 0.60 | |
| | | Hardenable | | 100 | 22 | | | | | | | | | | | | | |
| N | Aluminum-cast alloys | Not hardenable | | 75 | 23 | | | | | | | | | | | | | |
| | | Hardenable | | 90 | 24 | | | | | | | | | | | | | |
| N | Copper alloys | High temperature | | 130 | 25 | 80-120-160 | 0.05 0.20 | 0.10 0.25 | 0.15 0.30 | 0.20 0.27 0.35 | 0.25 0.32 0.40 | 0.30 0.37 0.45 | 0.35 0.42 0.50 | 0.40 0.50 0.60 | 0.45 0.57 0.70 | 0.50 0.67 0.75 | 0.50 0.67 0.75 | 0.50 0.67 0.75 |
| | | Free cutting | | 110 | 26 | | | | | | | | | | | | | |
| N | Copper alloys | Brass | | 90 | 27 | | | | | | | | | | | | | |
| | | Electrolytic copper | | 100 | 28 | | | | | | | | | | | | | |
| S | Non-metallic | Duroplastics, fiber plastics | | 70 Shore D | 29 | 90-155-220 | 0.05 0.20 | 0.10 0.25 | 0.15 0.30 | 0.20 0.27 0.35 | 0.25 0.32 0.40 | 0.30 0.37 0.45 | 0.35 0.42 0.50 | 0.40 0.57 0.67 | 0.45 0.60 0.70 | 0.50 0.67 0.75 | 0.50 0.67 0.75 | 0.50 0.67 0.75 |
| | | Hard rubber | | 55 Shore D | 30 | | | | | | | | | | | | | |
| S | High temperature alloys | Annealed | | 200 | 31 | 30-45-60 | 0.03 0.05 | 0.04 0.06 | 0.05 0.07 | 0.06 0.11 | 0.08 0.13 | 0.10 0.15 | 0.11 0.17 | 0.12 0.19 | 0.14 0.21 | 0.16 0.28 | 0.18 0.30 | 0.20 0.32 |

- When using external coolant supply only, reduce cutting speed by 10%.
 - Use internal coolant supply when machining austenitic stainless steel.
 - When using more than 5XD drill ratio, reduce cutting parameters by 10%.

Machining Stainless Steel is not recommended with

As a starting value, the middle of the recommended machining range should be used.
Then, according to the wear results, conditions can be changed to optimize performance.
The data refers to IC908