## Cutting Conditions

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### • SG-ESR Drills L7574P

| Work Material / Drilling Condition | Structural Steels Carbon Steels SS400, S50C (~200HB) | | Alloy Steels SCM Pre-Hardended Steels SCM440 NAK HPM (20~30HRC) | | Mold Steels Hardended Steels SKD61 NAK HPM (30~40HRC) | | Stainless Steels SUS304 SUS316 | | Cast Irons FC250 FCD400 | | Aluminium Alloys Copper Alloys A5052 C1100 | | Nickel Alloys Titanium Alloys (30~40HRC) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dia. of Drill mm | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min |
| 2 | 5700 | 300 | 4600 | 200 | 3200 | 120 | 1600 | 55 | 6300 | 410 | 9700 | 630 | 800 | 23 |
| 3 | 4200 | 380 | 3400 | 260 | 2100 | 120 | 1100 | 60 | 4700 | 530 | 7200 | 820 | 530 | 25 |
| 5 | 2500 | 360 | 2000 | 240 | 1250 | 120 | 760 | 75 | 2800 | 500 | 4300 | 770 | 320 | 23 |
| 8 | 1600 | 310 | 1300 | 210 | 800 | 115 | 480 | 80 | 1800 | 440 | 2700 | 660 | 200 | 22 |
| 10 | 1300 | 280 | 1000 | 190 | 650 | 110 | 380 | 80 | 1400 | 390 | 2200 | 610 | 160 | 22 |
| 12 | 1100 | 260 | 850 | 180 | 530 | 105 | 320 | 80 | 1200 | 360 | 1800 | 560 | 130 | 21 |
| 16 | 800 | 240 | 640 | 160 | 400 | 100 | 240 | 70 | 880 | 330 | 1400 | 500 | 100 | 20 |
| 20 | 640 | 220 | 510 | 150 | 320 | 90 | 190 | 60 | 700 | 300 | 1100 | 460 | 80 | 19 |
| 25 | 510 | 200 | 410 | 140 | 250 | 80 | 150 | 50 | 560 | 270 | 870 | 420 | 64 | 18 |
| 32 | 400 | 150 | 320 | 110 | 200 | 65 | 120 | 45 | 440 | 210 | 680 | 330 | 50 | 15 |

**Warnings on using the drilling condition tables**

1) Adjust drilling condition according to the rigidity of machine or work clamp state.
2) The table values are for drilling with water soluble cutting fluid.
3) Provide suffice amount cutting fluid to the cutting point and in the flute.
4) Reduce RPM and feed speeds by 20% for holes deeper than 3D.
5) When for hole depth more then 3xD deep, add step feed. However, a work material and drilling condition to chip removal may be worse. In that case, add A even if drilling depth 3xD is as follows.
6) When for stainless drilling, add step feeding.
7) In step feed, return to the entrance hole.
8) Step feed interval is about 0.5~1xD. In small diameter, about 0.2~0.5xD.
9) Use a collet chuck, milling chuck.

## Cutting Conditions

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### Standard Drilling Condition for Coated HSS Drills

### • AG-SUS Drill Regular L6594P

| Work Material / Drilling Condition | Austenitic Stainless Steels SUS304, SUS316 | | Austenitic Stainless Steels SUS304N | | Martensitic Stainless Steels SUS420, SUS440 | | Ferritic Stainless Steels SUS405, SUS430 | | Structural Steels Low Carbon Steels SS400, S15C | |
|---|---|---|---|---|---|---|---|---|---|---|
| Drill Dia. (mm) | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min |
| 1 | 4800 | 100 | 3800 | 70 | 5700 | 110 | 6400 | 130 | 11000 | 220 |
| 2 | 2400 | 110 | 1900 | 80 | 2900 | 130 | 3200 | 140 | 5600 | 250 |
| 3 | 1600 | 120 | 1300 | 90 | 1900 | 140 | 2100 | 160 | 3700 | 280 |
| 5 | 960 | 120 | 760 | 80 | 1100 | 140 | 1300 | 160 | 2200 | 280 |
| 8 | 600 | 120 | 480 | 80 | 720 | 140 | 800 | 160 | 1400 | 280 |
| 10 | 480 | 120 | 380 | 80 | 570 | 140 | 640 | 160 | 1100 | 280 |
| 12 | 400 | 120 | 320 | 80 | 480 | 140 | 530 | 160 | 930 | 280 |
| 16 | 300 | 110 | 240 | 80 | 360 | 130 | 400 | 140 | 700 | 250 |
| 20 | 240 | 100 | 190 | 70 | 290 | 120 | 320 | 130 | 560 | 220 |

1) The table values are for drillig with water soluble cutting fluid.
2) In horizontal machine or in drilling of deep hole which depth is over 3 times of drill diamter, use step feed.
3) Reduce rotation and feed by 20% of table values in drilling rolled surface or surface as forged.
4) Adjust drilling condition when unusual vibration, different sound occur by cutting.

### • G Non-Step Straight Shank Long Drills L6550P

| Work Material / Drilling Condition | Structural Steels Carbon Steels | | Alloy Steels Pre-Hardended Steels | | Mold Steels Stainless Steels Hardended Steels (~40HRC) | | Cast Irons FC, FCD | | Aluminium Alloys Nonferrous Metals | |
|---|---|---|---|---|---|---|---|---|---|---|
| Drill Dia. (mm) | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min | Rotation $min^{-1}$ | Feed mm/min |
| 1 | 3600 | 70 | 2100 | 30 | 1400 | 20 | 3600 | 72 | 12000 | 280 |
| 2 | 2100 | 80 | 1300 | 40 | 860 | 25 | 2100 | 100 | 7300 | 330 |
| 3 | 1800 | 110 | 1070 | 50 | 720 | 30 | 1800 | 130 | 5400 | 430 |
| 5 | 1300 | 130 | 770 | 60 | 520 | 40 | 1300 | 160 | 3200 | 400 |
| 8 | 900 | 150 | 540 | 65 | 360 | 40 | 900 | 180 | 2000 | 340 |
| 10 | 720 | 150 | 430 | 65 | 290 | 40 | 720 | 180 | 1600 | 310 |
| 13 | 550 | 140 | 330 | 65 | 220 | 40 | 550 | 170 | 1200 | 260 |

Attention on using drilling condition tables

1) Utilize the standard drilling condition shown in the catalogs just as the general guide, when starting operation.
2) Adjust drilling condition when unusual vibration, different sound occur by cutting.
3) When using low speed machines, use the maximum speed and adjust the feed rate.