# REFERENCE

## Speeds & Feeds for High Speed Steel Drills

### Recommended Speeds & Coolants

| Materials to be Drilled | Speed | | Coolant |
|---|---|---|---|
| | Feet/Minute | Metres/Minute | |
| Aluminum & Aluminum Alloys | 200 to 300 | 61 to 92 | Soluble Oil. Paraffin. |
| Bakelite - Vulcanite | 100 to 150 | 30 to 46 | Dry. If possible, keep the drill cool with air jet. |
| Brass | 150 to 200 | 46 to 76 | Dry. Soluble Oil. |
| Brass - Leaded | 200 to 300 | 61 to 92 | Dry. Soluble Oil. |
| Bronze - Ordinary | 100 to 200 | 30 to 61 | Soluble Oil. |
| Bronze - High Tensile | 70 to 100 | 22 to 30 | Soluble Oil. |
| Cast Iron - Soft | 100 to 150 | 30 to 46 | Dry. If possible, keep the drill cool with air jet. |
| Cast Iron - Medium | 80 to 90 | 24 to 27 | Soluble Oil. |
| Cast Iron - Hard | 50 to 70 | 15 to 22 | Dry. If possible, keep the drill cool with air jet. |
| Cast Iron - Chilled | 25 to 35 | 8 to 11 | Soluble Oil. |
| Copper | 100 to 200 | 30 to 61 | Soluble Oil. |
| Duralumin | 100 to 200 | 30 to 61 | Dry. Soluble Oil. |
| Magnesium & Magnesium Alloys | 250 to 400 | 76 to 122 | Dry. If possible, keep the drill cool with air jet. |
| Malleable Iron | 70 to 80 | 22 to 24 | Soluble Oil. |
| Mazak | 200 to 300 | 61 to 91 | Soluble Oil. |
| Monel Metal | 40 to 50 | 12 to 15 | Soluble Oil. Sulphurised Oil. |
| Slate, Stone, Marble | 15 to 20 | 5 to 6 | Dry. If possible, keep the drill cool with air jet. |
| Steel - Free Cutting Mild | 100 to 150 | 30 to 46 | Soluble Oil. Sulphurised Oil. |
| Steel - Up to 40 Tons Tensile | 80 to 110 | 24 to 33 | Soluble Oil. Sulphurised Oil. |
| Steel - 40 to 60 Tons Tensile | 45 to 70 | 14 to 22 | Soluble Oil. Sulphurised Oil. |
| Steel - 60 to 80 Tons Tensile | 30 to 45 | 9 to 14 | Soluble Oil. Sulphurised Oil. |
| Steel - Over 80 Tons Tensile | 15 to 25 | 5 to 8 | Soluble Oil. Sulphurised Oil. |
| Steel - Manganese 12%/14% | 10 to 15 | 3 to 5 | Dry. |
| Stainless Steels - Martensitic & Ferritic | 30 to 50 | 9 to 15 | Sulphurised Oil. |
| Stainless Steels - Austensitic & Heat Resisting | 20 to 45 | 6 to 14 | Sulphurised Oil. |
| Stainless Steels - Free Cutting (Ferritic) | 50 to 60 | 15 to 18 | Sulphurised Oil. |
| Stainless Steels - Free Cutting (Austenitic) | 40 to 50 | 12 to 15 | Sulphurised Oil. |
| Wood | 300 to 400 | 92 to 122 | Sulphurised Oil. |

*When selecting a suitable cutting lubricant remember that soluble oil and water emulsions have good cooling properties and are therefore applicable to high speed working. The sulphurised cutting lubricants have good anti-weld properties and are therefore applicable where cutting pressures are high. It may be advantageous to dilute the suphurised oils with paraffin or light mineral oils in order to reduce excessive drill wear at high speeds.*

### Recommended Feeds

| Drill Diameter | | Feed/Revolution | |
|---|---|---|---|
| mm | Inches | mm | Inches |
| 1.59 to 2.38 | 1/16 to 3/32 | 0.04 to 0.06 | 0.0015 to 0.0025 |
| 3.18 to 3.97 | 1/8 to 5/32 | 0.05 to 0.10 | 0.002 to 0.004 |
| 4.76 to 5.56 | 3/16 to 7/32 | 0.08 to 0.15 | 0.003 to 0.006 |
| 6.35 to 7.94 | 1/4 to 5/16 | 0.10 to 0.20 | 0.004 to 0.008 |
| 9.52 to 11.11 | 3/8 to 7/16 | 0.15 to 0.25 | 0.006 to 0.010 |
| 12.70 to 14.29 | 1/2 to 9/16 | 0.20 to 0.30 | 0.008 to 0.012 |
| 15.88 to 17.46 | 5/8 to 11/16 | 0.23 to 0.33 | 0.009 to 0.013 |
| 19.05 to 20.64 | 3/4 to 13/16 | 0.25 to0.36 | 0.010 to 0.014 |
| 22.22 to 23.81 | 7/8 to 15/16 | 0.28 to 0.38 | 0.011 to 0.015 |
| 25.40 to 28.58 | 1 to 1-1/8 | 0.30 to 0.41 | 0.012 to 0.016 |
| 31.75 to 38.10 | 1-1/4 to 1-1/2 | 0.36 to 0.46 | 0.014 to 0.018 |
| Over 38.1 | Over 1-1/2 | 0.46 to 0.50 | *0.016 to 0.020 |

**Or greater according to diameter and local conditions*

*The speeds quoted are only a basic guide. If conditions permit it may be possible to increase the above values. When commencing to drill new work the slowest speed and lightest feed should be used and these should gradually be increased until optimum output per grind is obtained.*