



**TWIST  
DRILLS**

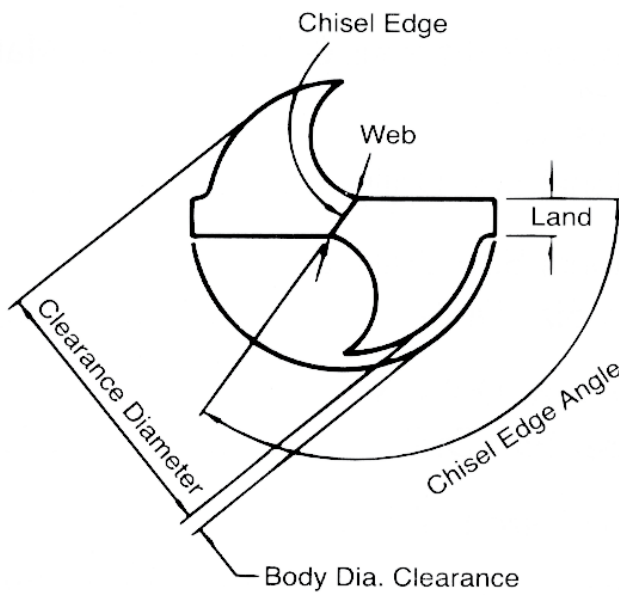
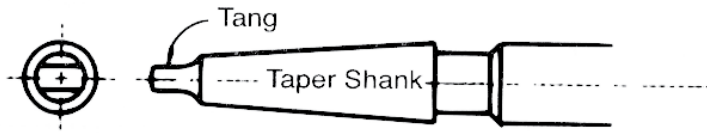
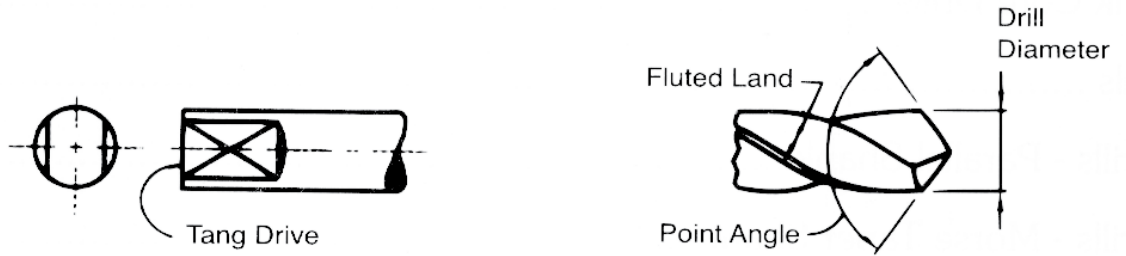
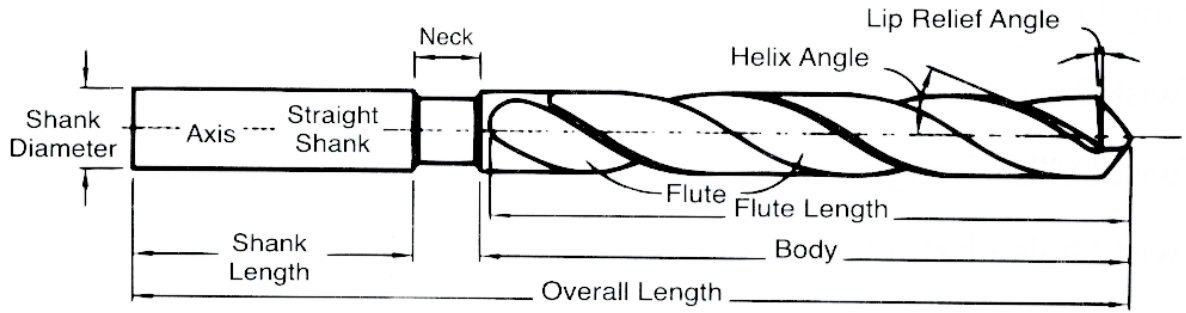


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# DRILL - NOMENCLATURE





## High Speed Steel PARALLEL SHANK TWIST DRILLS Jobber Series

Specifications Conform to  
IS 5101 - 1991  
ISO 235 - 1980  
DIN 338 - 1978  
BS 328 : Part 1 : 1986  
Dimensions in mm / Inch



| Diameters h8 |      |               | Flute Length | Overall Length |
|--------------|------|---------------|--------------|----------------|
| mm           | Inch | Number Series |              |                |
| 0.30         |      |               | 3            | 19             |
| 0.40         | 1/64 |               | 5            | 20             |
| 0.50         |      |               | 6            | 22             |
| 0.60         |      |               | 7            | 24             |
| 0.70         |      |               | 9            | 28             |
| 0.80         | 1/32 | 68,67,66      | 10           | 30             |
| 0.90         |      | 65,64,63      | 11           | 32             |
| 1.00         |      | 62,61,60,59   | 12           | 34             |
| 1.10         |      | 58,57         | 14           | 36             |
| 1.20         | 3/64 | 56            | 16           | 38             |
| 1.30         |      | 55            | 16           | 38             |
| 1.40         |      | 54            | 18           | 40             |
| 1.50         |      |               | 18           | 40             |
| 1.60         | 1/16 | 53,52         | 20           | 43             |
| 1.70         |      |               | 20           | 43             |
| 1.80         |      | 51,50         | 22           | 46             |
| 1.90         |      | 49            | 22           | 46             |
| 2.00         | 5/64 | 48,47         | 24           | 49             |
| 2.10         |      | 46,45         | 24           | 49             |
| 2.20         |      | 44            | 27           | 53             |
| 2.30         |      | 43            | 27           | 53             |
| 2.40         | 3/32 | 42,41         | 30           | 57             |
| 2.50         |      | 40,39         | 30           | 57             |
| 2.60         |      | 38,37         | 30           | 57             |
| 2.70         |      | 36            | 33           | 61             |

| Diameters h8 |       |               | Flute Length | Overall Length |
|--------------|-------|---------------|--------------|----------------|
| mm           | Inch  | Number Series |              |                |
| 2.80         | 7/64  | 35,34         | 33           | 61             |
| 2.90         |       | 33,32         | 33           | 61             |
| 3.00         |       |               | 33           | 61             |
| 3.10         |       | 31            | 36           | 65             |
| 3.20         | 1/8   |               | 36           | 65             |
| 3.30         |       | 30            | 36           | 65             |
| 3.40         |       |               | 39           | 70             |
| 3.50         |       | 29            | 39           | 70             |
| 3.60         | 9/64  | 28            | 39           | 70             |
| 3.70         |       | 27,26         | 39           | 70             |
| 3.80         |       | 25            | 43           | 75             |
| 3.90         |       | 24,23         | 43           | 75             |
| 4.00         | 5/32  | 22,21         | 43           | 75             |
| 4.10         |       | 20            | 43           | 75             |
| 4.20         |       | 19            | 43           | 75             |
| 4.30         |       | 18            | 47           | 80             |
| 4.40         | 11/64 | 17            | 47           | 80             |
| 4.50         |       | 16            | 47           | 80             |
| 4.60         |       | 15,14         | 47           | 80             |
| 4.70         |       | 13            | 47           | 80             |
| 4.80         | 3/16  | 12            | 52           | 86             |
| 4.90         |       | 11,10         | 52           | 86             |
| 5.00         |       | 9             | 52           | 86             |
| 5.10         |       | 9             | 52           | 86             |
| 5.20         | 13/64 | 6,5           | 52           | 86             |

A drill having two flutes and a parallel shank of approximately the same diameter as the cutting end.

Type 'N' Drills shall be supplied unless otherwise specified.





## High Speed Steel PARALLEL SHANK TWIST DRILLS Jobber Series

Specifications Conform to  
 IS 5101 - 1991  
 ISO 235 - 1980  
 DIN 338 - 1978  
 BS328 : Part 1 : 1986  
 Dimensions in mm / Inch



| Diameters h8 |       |                        | Flute Length | Overall Length |
|--------------|-------|------------------------|--------------|----------------|
| mm           | Inch  | Number & Letter series |              |                |
| 5.30         |       |                        | 52           | 86             |
| 5.40         |       | 4,3                    | 57           | 93             |
| 5.50         |       |                        | 57           | 93             |
| 5.60         | 7/32  | 2                      | 57           | 93             |
| 5.70         |       |                        | 57           | 93             |
| 5.80         |       | 1                      | 57           | 93             |
| 5.90         |       | A                      | 57           | 93             |
| 6.00         | 15/64 |                        | 57           | 93             |
| 6.10         |       | B,C                    | 63           | 101            |
| 6.20         |       | D                      | 63           | 101            |
| 6.30         |       |                        | 63           | 101            |
| 6.40         | 1/4   | E                      | 63           | 101            |
| 6.50         |       | F                      | 63           | 101            |
| 6.60         |       | G                      | 63           | 101            |
| 6.70         |       |                        | 63           | 101            |
| 6.80         | 17/64 | H                      | 69           | 109            |
| 6.90         |       | I                      | 69           | 109            |
| 7.00         |       | J                      | 69           | 109            |
| 7.10         | 9/32  | K                      | 69           | 109            |
| 7.20         |       |                        | 69           | 109            |
| 7.30         |       |                        | 69           | 109            |
| 7.40         |       | L                      | 69           | 109            |
| 7.50         |       | M                      | 69           | 109            |
| 7.60         | 19/64 |                        | 75           | 117            |
| 7.70         |       | N                      | 75           | 117            |
| 7.80         |       |                        | 75           | 117            |
| 7.90         | 5/16  |                        | 75           | 117            |
| 8.00         |       | O                      | 75           | 117            |
| 8.10         |       |                        | 75           | 117            |
| 8.20         |       | P                      | 75           | 117            |
| 8.30         | 21/64 |                        | 75           | 117            |
| 8.40         |       | Q                      | 75           | 117            |
| 8.50         |       |                        | 75           | 117            |

| Diameters h8 |       |                        | Flute Length | Overall Length |
|--------------|-------|------------------------|--------------|----------------|
| mm           | Inch  | Number & Letter series |              |                |
| 8.60         |       | R                      | 81           | 125            |
| 8.70         | 11/32 |                        | 81           | 125            |
| 8.80         |       | S                      | 81           | 125            |
| 8.90         |       |                        | 81           | 125            |
| 9.00         |       |                        | 81           | 125            |
| 9.10         | 23/64 | T                      | 81           | 125            |
| 9.20         |       |                        | 81           | 125            |
| 9.30         |       | U                      | 81           | 125            |
| 9.40         |       |                        | 81           | 125            |
| 9.50         |       |                        | 81           | 125            |
| 9.60         | 3/8   | V                      | 87           | 133            |
| 9.70         |       |                        | 87           | 133            |
| 9.80         |       | W                      | 87           | 133            |
| 9.90         | 25/64 |                        | 87           | 133            |
| 10.00        |       |                        | 87           | 133            |
| 10.10        |       | X                      | 87           | 133            |
| 10.20        |       |                        | 87           | 133            |
| 10.30        | 13/32 | Y                      | 87           | 133            |
| 10.40        |       |                        | 87           | 133            |
| 10.50        |       | Z                      | 87           | 133            |
| 10.60        |       | -                      | 87           | 133            |
| 10.70        | 27/64 | -                      | 94           | 142            |
| 10.80        |       | -                      | 94           | 142            |
| 10.90        |       | -                      | 94           | 142            |
| 11.00        |       | -                      | 94           | 142            |
| 11.10        | 7/16  | -                      | 94           | 142            |
| 11.20        |       | -                      | 94           | 142            |
| 11.30        |       | -                      | 94           | 142            |
| 11.40        |       | -                      | 94           | 142            |
| 11.50        | 29/64 | -                      | 94           | 142            |
| 11.60        |       | -                      | 94           | 142            |
| 11.70        |       | -                      | 94           | 142            |
| 11.80        |       | -                      | 94           | 142            |



**High Speed Steel**  
**PARALLEL SHANK TWIST DRILLS**  
**Jobber Series**

Specifications Conform to  
 IS 5101 - 1991  
 ISO 235 - 1980  
 DIN 338 - 1978  
 BS328 : Part 1 : 1986  
 Dimensions in mm / Inch



| Diameters h8 |       | Flute Length | Overall Length |
|--------------|-------|--------------|----------------|
| mm           | Inch  |              |                |
| 11.90        | 15/32 | 101          | 151            |
| 12.00        |       | 101          | 151            |
| 12.10        |       | 101          | 151            |
| 12.20        |       | 101          | 151            |
| 12.30        | 31/64 | 101          | 151            |
| 12.40        |       | 101          | 151            |
| 12.50        |       | 101          | 151            |
| 12.60        |       | 101          | 151            |
| 12.70        | 1/2   | 101          | 151            |
| 12.80        |       | 101          | 151            |
| 12.90        |       | 101          | 151            |
| 13.00        |       | 101          | 151            |
| 13.10        | 33/64 | 101          | 151            |
| 13.20        |       | 101          | 151            |
| 13.30        |       | 108          | 160            |
| 13.40        |       | 108          | 160            |
| 13.50        | 17/32 | 108          | 160            |

| Diameters h8 |       | Flute Length | Overall Length |
|--------------|-------|--------------|----------------|
| mm           | Inch  |              |                |
| 13.60        |       | 108          | 160            |
| 13.70        |       | 108          | 160            |
| 13.80        |       | 108          | 160            |
| 13.90        | 35/64 | 108          | 160            |
| 14.00        |       | 108          | 160            |
| 14.25        | 9/16  | 114          | 169            |
| 14.50        |       | 114          | 169            |
| 14.75        | 37/64 | 114          | 169            |
| 15.00        |       | 114          | 169            |
| 15.25        | 19/32 | 120          | 178            |
| 15.50        | 39/64 | 120          | 178            |
| 15.75        |       | 120          | 178            |
| 16.00        | 5/8   | 120          | 178            |
| 17.00        |       | 125          | 184            |
| 18.00        | 11/16 | 130          | 191            |
| 19.00        |       | 135          | 198            |
| 20.00        | 3/4   | 140          | 205            |



## High Speed Steel PARALLEL SHANK TWIST DRILLS Jobber Series

Specifications Conform to  
ASME B94. 11M-1993  
Dimensions in mm / Inch



| Diameter |                        |      | Flute Length | Overall Length |
|----------|------------------------|------|--------------|----------------|
| Fraction | Number & Letter Series | mm   |              |                |
| -        | -                      | 0.30 | 2.4          | 19             |
| 1/64     | -                      | 0.40 | 5.0          | 19             |
| -        | -                      | 0.50 | 5.0          | 22             |
| -        | -                      | 0.60 | 8.0          | 29             |
| -        | -                      | 0.70 | 10.0         | 32             |
| 1/32     | 68,67,66               | 0.80 | 13.0         | 35             |
| -        | 65,64,63,62            | 0.90 | 16.0         | 38             |
| -        | 61,60,59,58            | 1.00 | 17.0         | 41             |
| 3/64     | 57,56                  | 1.10 | 19.0         | 44             |
| -        | -                      | 1.20 | 22.0         | 48             |
| -        | 55                     | 1.30 | 22.0         | 48             |
| -        | 54                     | 1.40 | 22.0         | 48             |
| -        | 53                     | 1.50 | 22.0         | 48             |
| 1/16     | 52                     | 1.60 | 22.0         | 48             |
| -        | 51                     | 1.70 | 25.0         | 51             |
| -        | 50                     | 1.80 | 25.0         | 51             |
| -        | 49,48                  | 1.90 | 25.0         | 51             |
| 5/64     | 47                     | 2.00 | 25.0         | 51             |
| -        | 46,45,44               | 2.10 | 29.0         | 54             |
| -        | -                      | 2.20 | 32.0         | 57             |
| 3/32     | 43,42                  | 2.30 | 32.0         | 57             |
| -        | 41                     | 2.40 | 35.0         | 60             |
| -        | 40,39                  | 2.50 | 35.0         | 60             |
| -        | 38,37                  | 2.60 | 37.0         | 64             |
| -        | 36                     | 2.70 | 37.0         | 64             |
| 7/64     | 35,34,33               | 2.80 | 38.0         | 67             |
| -        | 32                     | 2.90 | 41.0         | 70             |
| -        | 31                     | 3.00 | 41.0         | 70             |
| -        | -                      | 3.10 | 41.0         | 70             |
| 1/8      | 30                     | 3.20 | 41.0         | 70             |
| -        | -                      | 3.30 | 44           | 73             |
| -        | 29                     | 3.40 | 44           | 73             |
| 9/64     | 28                     | 3.50 | 44           | 73             |

| Diameter |                        |      | Flute Length | Overall Length |
|----------|------------------------|------|--------------|----------------|
| Fraction | Number & Letter Series | mm   |              |                |
| -        | -                      | 3.60 | 48           | 76             |
| -        | 27,26                  | 3.70 | 48           | 76             |
| -        | 25                     | 3.80 | 48           | 76             |
| 5/32     | 24,23,22               | 3.90 | 51           | 79             |
| -        | 21                     | 4.00 | 54           | 83             |
| -        | 20                     | 4.10 | 54           | 83             |
| -        | 19                     | 4.20 | 54           | 83             |
| 11/64    | 18                     | 4.30 | 54           | 83             |
| -        | 17                     | 4.40 | 56           | 86             |
| -        | 16                     | 4.50 | 56           | 86             |
| -        | 15,14                  | 4.60 | 56           | 86             |
| -        | 13                     | 4.70 | 59           | 89             |
| 3/16     | 12,11                  | 4.80 | 59           | 89             |
| -        | 10                     | 4.90 | 62           | 92             |
| -        | 9                      | 5.00 | 62           | 92             |
| 13/64    | 8,7                    | 5.10 | 62           | 92             |
| -        | 6,5                    | 5.20 | 64           | 95             |
| -        | 4                      | 5.30 | 64           | 95             |
| -        | 3                      | 5.40 | 64           | 95             |
| 7/32     | -                      | 5.50 | 64           | 95             |
| -        | 2                      | 5.60 | 67           | 98             |
| -        | -                      | 5.70 | 67           | 98             |
| -        | 1                      | 5.80 | 67           | 98             |
| 15/64    | A                      | 5.90 | 67           | 98             |
| -        | B                      | 6.00 | 70           | 102            |
| -        | C                      | 6.10 | 70           | 102            |
| -        | D                      | 6.20 | 70           | 102            |
| 1/4      | E                      | 6.30 | 70           | 102            |
| -        | -                      | 6.40 | 73           | 105            |
| -        | F                      | 6.50 | 73           | 105            |
| -        | G                      | 6.60 | 73           | 105            |
| 17/64    | -                      | 6.70 | 73           | 105            |
| -        | H                      | 6.80 | 73           | 105            |





## High Speed Steel PARALLEL SHANK TWIST DRILLS Jobber Series

Specifications Conform to  
ASME B94. 11M-1993  
Dimensions in mm / Inch



| Diameter |               |       | Flute Length | Overall Length |
|----------|---------------|-------|--------------|----------------|
| Fraction | Letter Series | mm    |              |                |
| -        | I             | 6.90  | 73           | 105            |
| -        | J             | 7.00  | 73           | 105            |
| 9/32     | K             | 7.10  | 75           | 108            |
| -        | -             | 7.20  | 75           | 108            |
| -        | L             | 7.30  | 75           | 108            |
| -        | -             | 7.40  | 78           | 111            |
| 19/64    | M             | 7.50  | 78           | 111            |
| -        | N             | 7.60  | 78           | 111            |
| -        | -             | 7.70  | 81           | 114            |
| -        | -             | 7.80  | 81           | 114            |
| 19/64    | -             | 7.90  | 81           | 114            |
| -        | O             | 8.00  | 81           | 114            |
| -        | -             | 8.10  | 84           | 117            |
| 21/64    | -             | 8.20  | 84           | 117            |
| -        | P             | 8.30  | 84           | 117            |
| -        | Q             | 8.40  | 87           | 121            |
| -        | -             | 8.50  | 87           | 121            |
| -        | R             | 8.60  | 87           | 121            |
| 11/32    | -             | 8.70  | 87           | 121            |
| -        | S             | 8.80  | 89           | 124            |
| -        | -             | 8.90  | 89           | 124            |
| -        | T             | 9.00  | 89           | 124            |
| 23/64    | -             | 9.10  | 89           | 124            |
| -        | -             | 9.20  | 92           | 127            |
| -        | U             | 9.30  | 92           | 127            |
| -        | -             | 9.40  | 92           | 127            |
| 3/8      | V             | 9.50  | 92           | 127            |
| -        | -             | 9.60  | 95           | 130            |
| -        | -             | 9.70  | 95           | 130            |
| -        | W             | 9.80  | 95           | 130            |
| 25/64    | -             | 9.90  | 95           | 130            |
| -        | X             | 10.00 | 95           | 130            |

| Diameter |               |       | Flute Length | Overall Length |
|----------|---------------|-------|--------------|----------------|
| Fraction | Letter Series | mm    |              |                |
| 13/32    | Y             | 10.20 | 98           | 133            |
| -        | Z             | 10.50 | 98           | 133            |
| 27/64    | -             |       | 100          | 137            |
| -        | -             | 10.80 | 103          | 140            |
| 7/16     | -             | 11.00 | 103          | 140            |
| -        | -             | 11.20 | 106          | 143            |
| 29/64    | -             | 11.50 | 106          | 143            |
| 15/32    | -             | 11.80 | 110          | 146            |
| -        | -             | 12.00 | 111          | 149            |
| 31/64    | -             | 12.20 | 111          | 149            |
| -        | -             | 12.50 | 114          | 152            |
| 1/2      | -             | 12.80 | 114          | 152            |
| -        | -             | 13.00 | 114          | 152            |
| 33/64    | -             | 13.20 | 122          | 168            |
| 17/32    | -             | 13.50 | 122          | 168            |
| 35/64    | -             | 13.80 | 122          | 168            |
| -        | -             | 14.00 | 122          | 168            |
| 9/16     | -             | 14.25 | 122          | 168            |
| 37/64    | -             | 14.50 | 122          | 168            |
| -        | -             | 14.75 | 132          | 181            |
| 19/32    | -             | 15.00 | 132          | 181            |
| -        | -             | 15.25 | 132          | 181            |
| 39/64    | -             | 15.50 | 132          | 181            |
| 5/8      | -             | 15.75 | 132          | 181            |
| -        | -             | 16.00 | 132          | 181            |
| 41/64    | -             | 16.25 | 132          | 181            |
| 21/32    | -             | 16.50 | 132          | 181            |
| -        | -             | 16.75 | 143          | 194            |
| 43/64    | -             | 17.00 | 143          | 194            |
| -        | -             | 17.25 | 143          | 194            |
| 11/16    | -             | 17.50 | 143          | 194            |



## High Speed Steel PARALLEL SHANK TWIST DRILLS Stub Series

Specifications Conform to  
IS 5100 - 1969  
ISO 235 - 1980  
DIN 1897 - 1984  
BS328 : Part 1 : 1986  
Dimensions in mm / Inch



| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 1.00         | -      | 6            | 26             |
| 1.20         | 3/64   | 8            | 30             |
| 1.50         | -      | 9            | 32             |
| -            | 1/16   | 10           | 34             |
| 1.80         | -      | 11           | 36             |
| 2.00         | 5/64   | 12           | 38             |
| 2.20         | -      | 13           | 40             |
| 2.50         | 3/32   | 14           | 43             |
| 2.80         | 7/64   | 16           | 46             |
| 3.00         | -      | 16           | 46             |
| 3.20         | 1/8    | 18           | 49             |
| 3.50         | 9/64   | 20           | 52             |
| 3.80         | -      | 22           | 55             |
| 4.00         | 5/32   | 22           | 55             |
| 4.20         | -      | 22           | 55             |
| 4.50         | 11/64  | 24           | 58             |
| 4.80         | 3/16   | 26           | 62             |
| 5.00         | -      | 26           | 62             |
| 5.20         | 13/64  | 26           | 62             |
| 5.50         | 7/32   | 28           | 66             |
| 5.80         | -      | 28           | 66             |
| 6.00         | 15/64  | 28           | 66             |

| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 6.20         | -      | 31           | 70             |
| 6.50         | 1/4    | 31           | 70             |
| 6.80         | 17/64  | 34           | 74             |
| 7.00         | -      | 34           | 74             |
| 7.20         | 9/32   | 34           | 74             |
| 7.50         | -      | 34           | 74             |
| 7.80         | 19/64  | 37           | 79             |
| 8.00         | 5/16   | 37           | 79             |
| 8.20         | 21/64  | 37           | 79             |
| 8.50         | -      | 37           | 79             |
| 8.80         | 11/32  | 40           | 84             |
| 9.00         | -      | 40           | 84             |
| 9.20         | 23/64  | 40           | 84             |
| 9.50         | -      | 40           | 84             |
| 9.80         | 3/8    | 43           | 89             |
| 10.00        | 25/64  | 43           | 89             |
| 10.20        | 13/32  | 43           | 89             |
| 10.50        | -      | 43           | 89             |
| 10.80        | 27/64  | 47           | 95             |
| 11.00        | -      | 47           | 95             |
| 11.20        | 7/16   | 47           | 95             |
| 11.50        | 29/64  | 47           | 95             |

A shortened form of parallel shank jobber series twist drill, the reduction in length being in the flute length.

Type 'N' Drills shall be supplied unless otherwise specified.



## High Speed Steel PARALLEL SHANK TWIST DRILLS Stub Series

Specifications Conform to  
IS 5100 - 1969  
ISO 235 - 1980  
DIN 1897 - 1984  
BS328 : Part 1 : 1986  
Dimensions in mm / Inch



| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 11.80        | -      | 47           | 95             |
| 12.00        | 15/32  | 51           | 102            |
| 12.20        | 31/64  | 51           | 102            |
| 12.50        | -      | 51           | 102            |
| 12.80        | 1/2    | 51           | 102            |
| 13.00        | 33/64  | 51           | 102            |
| 13.20        | -      | 51           | 102            |
| 13.50        | 17/32  | 54           | 107            |
| 13.80        | 35/64  | 54           | 107            |
| 14.00        | -      | 54           | 107            |
| 14.25        | 9/16   | 56           | 111            |
| 14.50        | -      | 56           | 111            |
| 14.75        | 37/64  | 56           | 111            |
| 15.00        | -      | 56           | 111            |
| 15.25        | 19/32  | 58           | 115            |
| 15.50        | 39/64  | 58           | 115            |
| 15.75        | 5/8    | 58           | 115            |
| 16.00        | -      | 58           | 115            |
| 16.25        | 41/64  | 60           | 119            |
| 16.50        | -      | 60           | 119            |
| 16.75        | 21/32  | 60           | 119            |
| 17.00        | -      | 60           | 119            |
| 17.25        | 43/64  | 62           | 123            |
| 17.50        | 11/16  | 62           | 123            |
| 17.75        | 45/64  | 62           | 123            |
| 18.00        | -      | 62           | 123            |
| 18.25        | 23/32  | 64           | 127            |
| 18.50        | -      | 64           | 127            |
| 18.75        | 47/64  | 64           | 127            |
| 19.00        | -      | 64           | 127            |

| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 19.25        | 3/4    | 66           | 131            |
| 19.50        | 49/64  | 66           | 131            |
| 19.75        | 25/32  | 66           | 131            |
| 20.00        | -      | 66           | 131            |
| 20.25        | 51/64  | 68           | 136            |
| 20.50        | -      | 68           | 136            |
| 20.75        | 13/16  | 68           | 136            |
| 21.00        | 53/64  | 68           | 136            |
| 21.25        | -      | 70           | 141            |
| 21.50        | 27/32  | 70           | 141            |
| 21.75        | 55/64  | 70           | 141            |
| 22.00        | -      | 70           | 141            |
| 22.25        | 7/8    | 70           | 141            |
| 22.50        | -      | 72           | 146            |
| 22.75        | 57/64  | 72           | 146            |
| 23.00        | 29/32  | 72           | 146            |
| 23.25        | -      | 72           | 146            |
| 23.50        | 59/64  | 72           | 146            |
| 23.75        | 15/16  | 75           | 151            |
| 24.00        | -      | 75           | 151            |
| 24.25        | 61/64  | 75           | 151            |
| 24.50        | 31/32  | 75           | 151            |
| 24.75        | -      | 75           | 151            |
| 25.00        | -      | 75           | 151            |
| 25.25        | 63/64  | 78           | 156            |
| 25.50        | 1      | 78           | 156            |
| 25.75        | -      | 78           | 156            |
| 26.00        | -      | 78           | 156            |
| 26.25        | 1 1/32 | 78           | 156            |
| 26.50        | -      | 78           | 156            |



## High Speed Steel PARALLEL SHANK TWIST DRILLS Stub Series

Specifications Conform to  
 IS 5100 - 1969  
 ISO 235 - 1980  
 DIN 1897 - 1984  
 BS328 : Part 1 : 1986  
 Dimensions in mm / Inch



| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| MM           | Inches |              |                |
| 26.75        | -      | 81           | 162            |
| 27.00        | 1.1/16 | 81           | 162            |
| 27.25        | -      | 81           | 162            |
| 27.50        | -      | 81           | 162            |
| 27.75        | 1.3/32 | 81           | 162            |
| 28.00        | -      | 81           | 162            |
| 28.25        | -      | 84           | 168            |
| 28.50        | 1.1/8  | 84           | 168            |
| 28.75        | -      | 84           | 168            |
| 29.00        | -      | 84           | 168            |
| 29.25        | -      | 84           | 168            |
| 29.50        | 1.5/32 | 84           | 168            |
| 29.75        | -      | 84           | 168            |
| 30.00        | -      | 84           | 168            |
| 30.25        | 1.3/16 | 87           | 174            |
| 30.50        | -      | 87           | 174            |
| 30.75        | -      | 87           | 174            |
| 31.00        | 1.7/32 | 87           | 174            |
| 31.25        | -      | 87           | 174            |

| Diameters h8 |         | Flute Length | Overall Length |
|--------------|---------|--------------|----------------|
| mm           | Inches  |              |                |
| 31.50        | -       | 87           | 174            |
| 31.75        | 1.1/4   | 90           | 180            |
| 32.00        | -       | 90           | 180            |
| 32.50        | 1.9/32  | 90           | 180            |
| 33.00        | -       | 90           | 180            |
| 33.50        | 1.5/16  | 90           | 180            |
| 34.00        | 1.11/32 | 93           | 186            |
| 34.50        | -       | 93           | 186            |
| 35.00        | 1.3/8   | 93           | 186            |
| 35.50        | -       | 93           | 186            |
| 36.00        | 1.13/32 | 96           | 193            |
| 36.50        | 1.7/16  | 96           | 193            |
| 37.00        | -       | 96           | 193            |
| 37.50        | 1.15/32 | 96           | 193            |
| 38.00        | 1.1/2   | 100          | 200            |
| 38.50        | -       | 100          | 200            |
| 39.00        | -       | 100          | 200            |
| 39.50        | -       | 100          | 200            |
| 40.00        | -       | 100          | 200            |



**High Speed Steel  
PARALLEL SHANK TWIST DRILLS  
Long Series**

Specifications Conform to :  
 IS 5102 - 1969  
 ISO 494 - 1975  
 DIN 340 - 1978  
 BS328 : Part 1 : 1986  
 Dimensions in mm / Inch



| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 1.00         | -      | 33           | 56             |
| 1.10         | -      | 37           | 60             |
| 1.20         | 3/64   | 41           | 65             |
| 1.30         | -      | 41           | 65             |
| 1.40         | -      | 45           | 70             |
| 1.50         | -      | 45           | 70             |
| 1.60         | 1/16   | 50           | 76             |
| 1.70         | -      | 50           | 76             |
| 1.80         | -      | 53           | 80             |
| 1.90         | -      | 53           | 80             |
| 2.00         | 5/64   | 56           | 85             |
| 2.10         | -      | 56           | 85             |
| 2.20         | -      | 59           | 90             |
| 2.30         | -      | 59           | 90             |
| 2.40         | 3/32   | 62           | 95             |
| 2.50         | -      | 62           | 95             |
| 2.60         | -      | 62           | 95             |
| 2.70         | -      | 66           | 100            |
| 2.80         | 7/64   | 66           | 100            |
| 2.90         | -      | 66           | 100            |
| 3.00         | -      | 66           | 100            |

| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 3.10         | -      | 69           | 106            |
| 3.20         | 1/8    | 69           | 106            |
| 3.30         | -      | 69           | 106            |
| 3.40         | -      | 73           | 112            |
| 3.50         | -      | 73           | 112            |
| 3.60         | 9/64   | 73           | 112            |
| 3.70         | -      | 73           | 112            |
| 3.80         | -      | 78           | 119            |
| 3.90         | -      | 78           | 119            |
| 4.00         | 5/32   | 78           | 119            |
| 4.10         | -      | 78           | 119            |
| 4.20         | -      | 78           | 119            |
| 4.30         | -      | 82           | 126            |
| 4.40         | 11/64  | 82           | 126            |
| 4.50         | -      | 82           | 126            |
| 4.60         | -      | 82           | 126            |
| 4.70         | -      | 82           | 126            |
| 4.80         | 3/16   | 87           | 132            |
| 4.90         | -      | 87           | 132            |
| 5.00         | -      | 87           | 132            |
| 5.10         | -      | 87           | 132            |

A lengthened form of parallel shank jobber series twist drill, the increase in length being in the flute length.

Type 'N' Drills shall be supplied unless otherwise specified.





## High Speed Steel PARALLEL SHANK TWIST DRILLS Long Series

Specifications Conform to  
IS 5102 - 1969  
ISO 494 - 1975  
DIN 340 - 1978  
BS328 : Part 1 : 1986  
Dimensions in mm / Inch



| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 5.20         | 13/64  | 87           | 132            |
| 5.30         | -      | 87           | 132            |
| 5.40         | -      | 91           | 139            |
| 5.50         | -      | 91           | 139            |
| 5.60         | 7/32   | 91           | 139            |
| 5.70         | -      | 91           | 139            |
| 5.80         | -      | 91           | 139            |
| 5.90         | -      | 91           | 139            |
| 6.00         | 15/64  | 91           | 139            |
| 6.10         | -      | 97           | 148            |
| 6.20         | -      | 97           | 148            |
| 6.30         | -      | 97           | 148            |
| 6.40         | 1/4    | 97           | 148            |
| 6.50         | -      | 97           | 148            |
| 6.60         | -      | 97           | 148            |
| 6.70         | -      | 97           | 148            |
| 6.80         | 17/64  | 102          | 156            |
| 6.90         | -      | 102          | 156            |
| 7.00         | -      | 102          | 156            |
| 7.10         | 9/32   | 102          | 156            |
| 7.20         | -      | 102          | 156            |
| 7.30         | -      | 102          | 156            |
| 7.40         | -      | 102          | 156            |
| 7.50         | -      | 102          | 156            |
| 7.60         | 19/64  | 109          | 165            |
| 7.70         | -      | 109          | 165            |
| 7.80         | -      | 109          | 165            |
| 7.90         | 5/16   | 109          | 165            |
| 8.00         | -      | 109          | 165            |
| 8.10         | -      | 109          | 165            |

| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 8.20         | -      | 109          | 165            |
| 8.30         | 21/64  | 109          | 165            |
| 8.40         | -      | 109          | 165            |
| 8.50         | -      | 109          | 165            |
| 8.60         | -      | 115          | 175            |
| 8.70         | 11/32  | 115          | 175            |
| 8.80         | -      | 115          | 175            |
| 8.90         | -      | 115          | 175            |
| 9.00         | -      | 115          | 175            |
| 9.10         | 23/64  | 115          | 175            |
| 9.20         | -      | 115          | 175            |
| 9.30         | -      | 115          | 175            |
| 9.40         | -      | 115          | 175            |
| 9.50         | -      | 115          | 175            |
| 9.60         | 3/8    | 121          | 184            |
| 9.70         | -      | 121          | 184            |
| 9.80         | -      | 121          | 184            |
| 9.90         | 25/64  | 121          | 184            |
| 10.00        | -      | 121          | 184            |
| 10.10        | -      | 121          | 184            |
| 10.20        | -      | 121          | 184            |
| 10.30        | 13/32  | 121          | 184            |
| 10.40        | -      | 121          | 184            |
| 10.50        | -      | 121          | 184            |
| 10.60        | -      | 121          | 184            |
| 10.70        | 27/64  | 128          | 195            |
| 10.80        | -      | 128          | 195            |
| 10.90        | -      | 128          | 195            |
| 11.00        | -      | 128          | 195            |
| 11.10        | 7/16   | 128          | 195            |



## High Speed Steel PARALLEL SHANK TWIST DRILLS Long Series

Specifications Conform to  
 IS 5102 - 1969  
 ISO 494 - 1975  
 DIN 340 - 1978  
 BS328 : Part 1 : 1986  
 Dimensions in mm / Inch



| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 11.20        | -      | 128          | 195            |
| 11.30        | -      | 128          | 195            |
| 11.40        | -      | 128          | 195            |
| 11.50        | 29/64  | 128          | 195            |
| 11.60        | -      | 128          | 195            |
| 11.70        | -      | 128          | 195            |
| 11.80        | -      | 128          | 195            |
| 11.90        | 15/32  | 134          | 205            |
| 12.00        | -      | 134          | 205            |
| 12.10        | -      | 134          | 205            |
| 12.20        | -      | 134          | 205            |
| 12.30        | 31/64  | 134          | 205            |
| 12.40        | -      | 134          | 205            |
| 12.50        | -      | 134          | 205            |
| 12.60        | -      | 134          | 205            |
| 12.70        | 1/2    | 134          | 205            |
| 12.80        | -      | 134          | 205            |
| 12.90        | -      | 134          | 205            |
| 13.00        | -      | 134          | 205            |
| 13.10        | 33/64  | 134          | 205            |
| 13.20        | -      | 134          | 205            |
| 13.30        | -      | 140          | 214            |
| 13.40        | -      | 140          | 214            |
| 13.50        | 17/32  | 140          | 214            |
| 13.60        | -      | 140          | 214            |
| 13.70        | -      | 140          | 214            |
| 13.80        | -      | 140          | 214            |
| 13.90        | 35/64  | 140          | 214            |
| 14.00        | -      | 140          | 214            |
| 14.25        | 9/16   | 144          | 220            |

| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 14.50        | -      | 144          | 220            |
| 14.75        | 37/64  | 144          | 220            |
| 15.00        | -      | 144          | 220            |
| 15.25        | 19/32  | 149          | 227            |
| 15.50        | 39/64  | 149          | 227            |
| 15.75        | -      | 149          | 227            |
| 16.00        | 5/8    | 149          | 227            |
| 16.25        | 41/64  | 154          | 235            |
| 16.50        | -      | 154          | 235            |
| 16.75        | 21/32  | 154          | 235            |
| 17.00        | -      | 154          | 235            |
| 17.25        | 43/64  | 158          | 241            |
| 17.50        | 11/16  | 158          | 241            |
| 17.75        | 45/64  | 158          | 241            |
| 18.00        | -      | 158          | 241            |
| 18.25        | 23/32  | 162          | 247            |
| 18.50        | -      | 162          | 247            |
| 18.75        | 47/64  | 162          | 247            |
| 19.00        | -      | 162          | 247            |
| 19.25        | 3/4    | 166          | 254            |
| 19.50        | 49/64  | 166          | 254            |
| 19.75        | 25/32  | 166          | 254            |
| 20.00        | -      | 166          | 254            |
| 20.25        | 51/64  | 171          | 261            |
| 20.50        | -      | 171          | 261            |
| 20.75        | 13/16  | 171          | 261            |
| 21.00        | 53/64  | 171          | 261            |
| 21.25        | -      | 176          | 268            |
| 21.50        | 27/32  | 176          | 268            |
| 21.75        | 55/64  | 176          | 268            |



## High Speed Steel PARALLEL SHANK TWIST DRILLS Long Series

Specifications Conform to  
IS 5102 - 1969  
ISO 494 - 1975  
DIN 340 - 1978  
BS328 : Part 1 : 1986  
Dimensions in mm / Inch



| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 22.00        | -      | 176          | 268            |
| 22.25        | 7/8    | 176          | 268            |
| 22.50        | -      | 180          | 275            |
| 22.75        | 57/64  | 180          | 275            |
| 23.00        | 29/32  | 180          | 275            |
| 23.25        | -      | 180          | 275            |
| 23.50        | 59/64  | 180          | 275            |
| 23.75        | 15/16  | 185          | 282            |
| 24.00        | -      | 185          | 282            |
| 24.25        | 61/64  | 185          | 282            |
| 24.50        | 31/32  | 185          | 282            |
| 24.75        | -      | 185          | 282            |
| 25.00        | -      | 185          | 282            |
| 25.25        | 63/64  | 190          | 290            |
| 25.50        | 1      | 190          | 290            |
| 25.75        | -      | 190          | 290            |
| 26.00        | -      | 190          | 290            |
| 26.25        | 1.1/32 | 190          | 290            |
| 26.50        | -      | 190          | 290            |
| 26.75        | -      | 195          | 298            |

| Diameters h8 |        | Flute Length | Overall Length |
|--------------|--------|--------------|----------------|
| mm           | Inches |              |                |
| 27.00        | 1.1/16 | 195          | 298            |
| 27.25        | -      | 195          | 298            |
| 27.50        | -      | 195          | 298            |
| 27.75        | 1.3/32 | 195          | 298            |
| 28.00        | -      | 195          | 298            |
| 28.25        | -      | 201          | 307            |
| 28.50        | 1.1/8  | 201          | 307            |
| 28.75        | -      | 201          | 307            |
| 29.00        | -      | 201          | 307            |
| 29.25        | -      | 201          | 307            |
| 29.50        | 1.5/32 | 201          | 307            |
| 29.75        | -      | 201          | 307            |
| 30.00        | -      | 201          | 307            |
| 30.25        | 1.3/16 | 207          | 316            |
| 30.50        | -      | 207          | 316            |
| 30.75        | -      | 207          | 316            |
| 31.00        | 1.7/32 | 207          | 316            |
| 31.25        | -      | 207          | 316            |
| 31.50        | -      | 207          | 316            |



## High Speed Steel PARALLEL SHANK TWIST DRILLS Extra Long Series

Specifications Conform to  
IS 7823 - 2005.  
ISO 3292 : 1995.  
Dimensions in mm / Inch



| Drill dia h8 | Flute length | Overall Length |
|--------------|--------------|----------------|
| 2            | 80           | 125            |
|              | 100          | 160            |
| 2.5          | 80           | 125            |
|              | 100          | 160            |
| 3            | 100          | 160            |
|              | 150          | 200            |
| 3.5          | 100          | 160            |
|              | 150          | 200            |
| 4            | 100          | 160            |
|              | 150          | 200            |
| 4.5          | 100          | 160            |
|              | 150          | 200            |
|              | 200          | 250            |
| 5            | 150          | 200            |
|              | 200          | 250            |
|              | 250          | 315            |
| 5.5          | 150          | 200            |
|              | 200          | 250            |
|              | 250          | 315            |
| 6            | 150          | 200            |
|              | 200          | 250            |
|              | 250          | 315            |
| 6.5          | 150          | 200            |
|              | 200          | 250            |
|              | 250          | 315            |
| 7            | 150          | 200            |
|              | 200          | 250            |
|              | 250          | 315            |
| 7.5          | 150          | 200            |
|              | 200          | 250            |
|              | 250          | 315            |

| Drill dia h8 | Flute length | Overall Length |
|--------------|--------------|----------------|
| 8            | 200          | 250            |
|              | 250          | 315            |
|              | 300          | 400            |
| 8.5          | 200          | 250            |
|              | 250          | 315            |
|              | 300          | 400            |
| 9            | 200          | 250            |
|              | 250          | 315            |
|              | 300          | 400            |
| 9.5          | 200          | 250            |
|              | 250          | 315            |
|              | 300          | 400            |
| 10           | 200          | 250            |
|              | 250          | 315            |
|              | 300          | 400            |
| 11           | 200          | 250            |
|              | 250          | 315            |
|              | 300          | 400            |
| 12           | 200          | 250            |
|              | 250          | 315            |
|              | 300          | 400            |
| 13           | 200          | 250            |
|              | 250          | 315            |
|              | 300          | 400            |
| 14           | 200          | 250            |
|              | 250          | 315            |
|              | 300          | 400            |

|                        |             |             |                 |                  |                  |                  |
|------------------------|-------------|-------------|-----------------|------------------|------------------|------------------|
| Ranges of Diameters h8 | Ø2 to Ø2.65 | Ø2 to Ø4.75 | Ø2.65 to Ø 7.50 | Ø3.35 to Ø 14.00 | Ø3.75 to Ø 14.00 | Ø4.75 to Ø 14.00 |
|------------------------|-------------|-------------|-----------------|------------------|------------------|------------------|

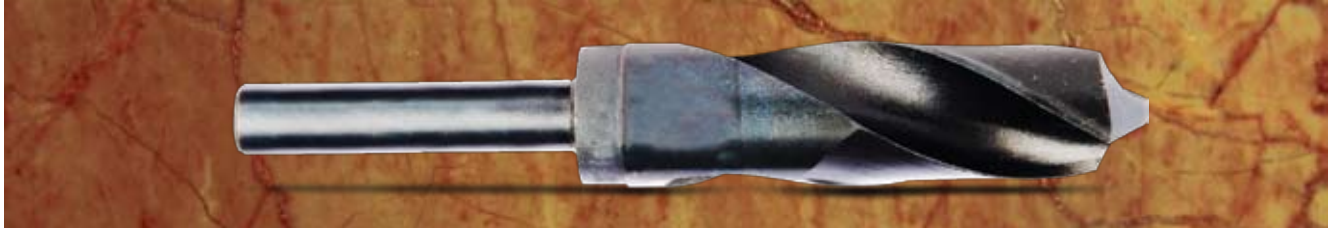
A lengthened form of the Parallel Shank Twist Drill , longer than long series.

Type 'N' Drills shall be supplied unless otherwise specified.



**High Speed Steel**  
**SILVER AND DEMING DRILLS - 1/2" SHANK**  
 (Size of Shank : 1/2" Dia x 2 1/4" Shank Length)

Specifications Conform to  
 Dimensions in mm / Inch



| Size  | Flute Length | Overall Length |
|-------|--------------|----------------|
| 33/64 | 3            | 6              |
| 17/32 | 3            | 6              |
| 35/64 | 3            | 6              |
| 9/16  | 3            | 6              |
| 37/64 | 3            | 6              |
| 19/32 | 3            | 6              |
| 39/64 | 3            | 6              |
| 5/8   | 3            | 6              |
| 41/64 | 3            | 6              |
| 21/32 | 3            | 6              |
| 43/64 | 3            | 6              |
| 11/16 | 3            | 6              |
| 45/64 | 3            | 6              |
| 23/32 | 3            | 6              |
| 47/64 | 3            | 6              |
| 3/4   | 3            | 6              |
| 49/64 | 3            | 6              |
| 25/32 | 3            | 6              |
| 51/64 | 3            | 6              |
| 13/16 | 3            | 6              |
| 53/64 | 3            | 6              |
| 27/32 | 3            | 6              |
| 55/64 | 3            | 6              |
| 7/8   | 3            | 6              |

| Size    | Flute Length | Overall Length |
|---------|--------------|----------------|
| 57/64   | 3            | 6              |
| 29/32   | 3            | 6              |
| 59/64   | 3            | 6              |
| 15/16   | 3            | 6              |
| 61/64   | 3            | 6              |
| 31/32   | 3            | 6              |
| 63/64   | 3            | 6              |
| 1       | 3            | 6              |
| 1.1/32  | 3            | 6              |
| 1.1/16  | 3            | 6              |
| 1.3/32  | 3            | 6              |
| 1.1/8   | 3            | 6              |
| 1.5/32  | 3            | 6              |
| 1.3/16  | 3            | 6              |
| 1.7/32  | 3            | 6              |
| 1.1/4   | 3            | 6              |
| 1.9/32  | 3            | 6              |
| 1.5/16  | 3            | 6              |
| 1.11/32 | 3            | 6              |
| 1.3/8   | 3            | 6              |
| 1.13/32 | 3            | 6              |
| 1.7/16  | 3            | 6              |
| 1.15/32 | 3            | 6              |
| 1.1/2   | 3            | 6              |





## High Speed Steel

### SILVER AND DEMING DRILLS - 1/2" SHANK (Size of Shank : 1/2" Dia x 2 1/4" Shank Length)

Specifications Conform to  
Dimensions in mm / Inch



| Size  | Flute Length | Overall Length |
|-------|--------------|----------------|
| 13.50 | 3. 1/8       | 6              |
| 14.00 | 3. 1/8       | 6              |
| 14.50 | 3. 1/8       | 6              |
| 15.00 | 3. 1/8       | 6              |
| 15.50 | 3. 1/8       | 6              |
| 16.00 | 3. 1/8       | 6              |
| 16.50 | 3. 1/8       | 6              |
| 17.00 | 3. 1/8       | 6              |
| 17.50 | 3. 1/8       | 6              |
| 18.00 | 3. 1/8       | 6              |
| 18.50 | 3. 1/8       | 6              |
| 19.00 | 3. 1/8       | 6              |
| 19.50 | 3. 1/8       | 6              |
| 20.00 | 3. 1/8       | 6              |
| 20.50 | 3. 1/8       | 6              |
| 21.00 | 3. 1/8       | 6              |
| 21.50 | 3. 1/8       | 6              |

| Size  | Flute Length | Overall Length |
|-------|--------------|----------------|
| 22.00 | 3. 1/8       | 6              |
| 22.50 | 3. 1/8       | 6              |
| 23.00 | 3. 1/8       | 6              |
| 23.50 | 3. 1/8       | 6              |
| 24.00 | 3. 1/8       | 6              |
| 24.50 | 3. 1/8       | 6              |
| 25.00 | 3. 1/8       | 6              |
| 25.50 | 3. 1/8       | 6              |
| 26.00 | 3. 1/8       | 6              |
| 26.50 | 3. 1/8       | 6              |
| 27.00 | 3. 1/8       | 6              |
| 27.50 | 3. 1/8       | 6              |
| 28.00 | 3. 1/8       | 6              |
| 28.50 | 3. 1/8       | 6              |
| 29.00 | 3. 1/8       | 6              |
| 29.50 | 3. 1/8       | 6              |
| 30.00 | 3. 1/8       | 6              |



## High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to  
DRG.No. DES 101400 Issue : 1  
Dated 21.05.1993  
Dimensions in mm  
DIN : 338 : Mar 1978.



| Size  | Flute Length. L <sub>1</sub> | Overall Length. L |
|-------|------------------------------|-------------------|
| 10.50 | 87                           | 133               |
| 11.00 | 94                           | 142               |
| 11.50 | 94                           | 142               |
| 12.00 | 101                          | 151               |
| 12.50 | 101                          | 151               |
| 13.00 | 101                          | 151               |
| 13.50 | 108                          | 160               |

| Size  | Flute Length L <sub>1</sub> | Overall Length L |
|-------|-----------------------------|------------------|
| 13.50 | 108                         | 160              |
| 14.00 | 108                         | 160              |
| 14.50 | 11                          | 169              |
| 15.00 | 114                         | 169              |
| 15.50 | 120                         | 178              |
| 16.00 | 120                         | 178              |
| 25.00 | 3. 1/8                      | 6                |

26° to 32° R.H.Helix & R.H.CUTTING.  
POINT ANGLE 118° ±3° with Std. Web Thickness.  
Other Unspecified details to DIN : 338 (March 1978)

| LENGTH |      | TOLERANCES |                |
|--------|------|------------|----------------|
| OVER   | UPTO | l          | l <sub>1</sub> |
| 30     | 120  | + 3 / - 0  | ± 1.50         |
| 120    | 315  | + 4 / - 0  | ± 2.00         |



## High Speed Steel PARALLEL SHANK TWIST DRILLS

Specifications Conform to :  
Dimensions in mm



| Sl.No. | Size<br>D h8 | l <sub>1</sub> | l <sub>2</sub><br>min | d<br>f <sub>11</sub> | l <sub>3</sub><br>±1.50 |
|--------|--------------|----------------|-----------------------|----------------------|-------------------------|
| 1      | 10.50        | 133            | 87                    | 10                   | 30                      |
| 2      | 11.00        | 142            | 94                    |                      |                         |
| 3      | 11.50        | 142            | 94                    |                      |                         |
| 4      | 12.00        | 151            | 101                   |                      |                         |
| 5      | 12.50        | 151            | 101                   |                      |                         |
| 6      | 13.00        | 151            | 101                   |                      |                         |
| 7      | 13.50        | 160            | 108                   |                      |                         |
| 8      | 14.00        | 160            | 108                   |                      |                         |
| 9      | 14.50        | 169            | 114                   |                      |                         |
| 10     | 15.00        | 169            | 114                   |                      |                         |
| 11     | 15.50        | 178            | 120                   |                      |                         |
| 12     | 16.00        | 178            | 120                   |                      |                         |

| Sl.No. | Size<br>D h8 | l <sub>1</sub> | l <sub>2</sub><br>min | d<br>f <sub>11</sub> | l <sub>3</sub><br>±1.50 |
|--------|--------------|----------------|-----------------------|----------------------|-------------------------|
| 13     | 14.00        | 160            | 108                   | 13                   | 40                      |
| 14     | 14.50        | 169            | 114                   |                      |                         |
| 15     | 15.00        | 169            | 114                   |                      |                         |
| 16     | 15.50        | 178            | 120                   |                      |                         |
| 17     | 16.00        | 178            | 120                   |                      |                         |
| 18     | 16.50        | 184            | 125                   |                      |                         |
| 19     | 17.00        | 184            | 125                   |                      |                         |
| 20     | 17.50        | 192            | 130                   |                      |                         |
| 21     | 18.00        | 192            | 130                   |                      |                         |
| 22     | 18.50        | 199            | 135                   |                      |                         |
| 23     | 19.00        | 199            | 135                   |                      |                         |
| 24     | 19.50        | 206            | 140                   |                      |                         |
| 25     | 20.00        | 206            | 140                   |                      |                         |

### Note :

Upto and including Ø13 to be made out of one piece construction ( Solid )

Over Ø13 to be made out of two piece construction ( Welding ).

| LENGTH |      | TOLERANCES |                |
|--------|------|------------|----------------|
| OVER   | UPTO | l          | l <sub>1</sub> |
| 30     | 120  | + 3 / - 0  | ± 1.50         |
| 120    | 315  | + 4 / - 0  | ± 2.00         |



## HSS PARALLEL SHANK TWIST DRILL WITH REDUCED SHANK (J.S.) ( DIN - 338.)

Specifications Conform to  
DRG.No.DES 106100 Issue :2  
Dated 19.11.1997  
Dimensions in mm



| Sl. No. | Size D h8 | l <sub>1</sub> | l <sub>2</sub> min | d f <sub>11</sub> | l <sub>3</sub> ±1.50 |
|---------|-----------|----------------|--------------------|-------------------|----------------------|
| 1       | 10.50     | 133            | 87                 | 10                | 30                   |
| 2       | 11.00     | 142            | 94                 |                   |                      |
| 3       | 11.50     | 142            | 94                 |                   |                      |
| 4       | 12.00     | 151            | 101                |                   |                      |
| 5       | 12.50     | 151            | 101                |                   |                      |
| 6       | 13.00     | 151            | 101                |                   |                      |
| 7       | 13.50     | 160            | 108                |                   |                      |
| 8       | 14.00     | 160            | 108                |                   |                      |
| 9       | 14.50     | 169            | 114                |                   |                      |
| 10      | 15.00     | 169            | 114                |                   |                      |
| 11      | 15.50     | 178            | 120                |                   |                      |
| 12      | 16.00     | 178            | 120                |                   |                      |

| Sl. No. | Size D h8 | l <sub>1</sub> | l <sub>2</sub> min | d f <sub>11</sub> | l <sub>3</sub> ±1.50 |
|---------|-----------|----------------|--------------------|-------------------|----------------------|
| 13      | 16.50     | 184            | 125                | 13                | 40                   |
| 14      | 17.00     | 184            | 125                |                   |                      |
| 15      | 17.50     | 192            | 130                |                   |                      |
| 16      | 18.00     | 192            | 130                |                   |                      |
| 17      | 18.50     | 199            | 135                |                   |                      |
| 18      | 19.00     | 199            | 135                |                   |                      |
| 19      | 19.50     | 206            | 140                |                   |                      |
| 20      | 20.00     | 206            | 140                |                   |                      |

**Note :**

Upto and including Ø13 to be made out of one piece construction ( Solid ).  
Over Ø13 to be made out of two piece construction ( Welding ).

| LENGTH |      | TOLERANCES |                |
|--------|------|------------|----------------|
| OVER   | UPTO | l          | l <sub>1</sub> |
| 30     | 120  | + 3 / - 0  | ± 1.50         |
| 120    | 315  | + 4 / - 0  | ± 2.00         |



## HSS PARALLEL SHANK TWIST DRILL

Specifications Conform to  
DRG.No.DES 107200 Issue :2  
Dated 28.09.1999  
Dimensions in mm



| Size<br>D h8 | l <sub>1</sub> | l <sub>2</sub><br>min | d<br>f <sub>11</sub> | l <sub>3</sub><br>±1.50 |
|--------------|----------------|-----------------------|----------------------|-------------------------|
| 10.50        | 133            | 87                    | 10                   | 30                      |
| 11.00        | 142            | 94                    |                      |                         |
| 11.50        | 142            | 94                    |                      |                         |
| 12.00        | 151            | 101                   |                      |                         |
| 12.50        | 151            | 101                   |                      |                         |
| 13.00        | 151            | 101                   |                      |                         |
| 13.50        | 160            | 108                   |                      |                         |
| 14.00        | 160            | 108                   |                      |                         |
| 14.50        | 169            | 114                   |                      |                         |
| 15.00        | 169            | 114                   |                      |                         |
| 15.50        | 178            | 120                   |                      |                         |
| 16.00        | 178            | 120                   |                      |                         |

| Size<br>D h8 | l <sub>1</sub> | l <sub>2</sub><br>min | d<br>f <sub>11</sub> | l <sub>3</sub><br>±1.50 |
|--------------|----------------|-----------------------|----------------------|-------------------------|
| 16.50        | 184            | 125                   | 13                   | 35                      |
| 17.00        | 184            | 125                   |                      |                         |
| 17.50        | 191            | 130                   |                      |                         |
| 18.00        | 191            | 130                   |                      |                         |
| 18.50        | 198            | 135                   |                      |                         |
| 19.00        | 198            | 135                   |                      |                         |
| 19.50        | 205            | 140                   |                      |                         |
| 20.00        | 205            | 140                   |                      |                         |
| 22.00        | 205            | 140                   |                      |                         |
| 24.00        | 205            | 140                   |                      |                         |
| 25.00        | 205            | 140                   |                      |                         |

**Note :**

Upto and including Ø13 to be made out of one piece construction ( Solid ).

Over Ø13 to be made out of two piece construction ( Welding ).

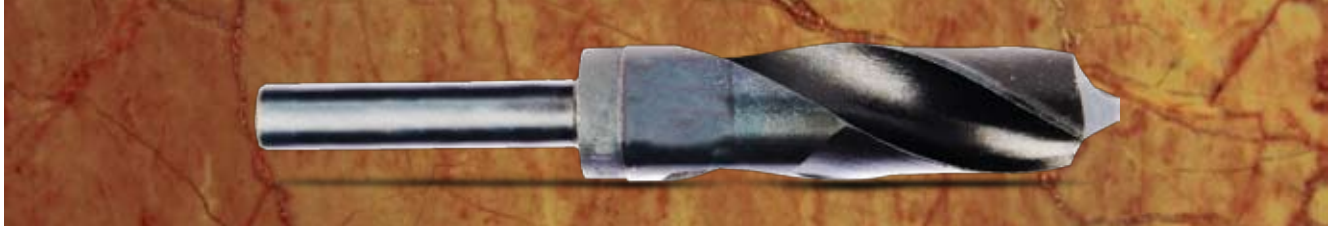
| LENGTH |      | TOLERANCES |                |
|--------|------|------------|----------------|
| OVER   | UPTO | l          | l <sub>1</sub> |
| 30     | 120  | + 3 / - 0  | ± 1.50         |
| 120    | 315  | + 4 / - 0  | ± 2.00         |





**High Speed Steel**  
**SILVER AND DEMING DRILLS - 3/4" SHANK**  
 (Size of Shank : 3/4" Dia x 2 1/4" Shank Length)

Specifications Conform to :  
 Dimensions in Inch



| Size    | Flute Length | Overall Length |
|---------|--------------|----------------|
| 25/32   | 3            | 6              |
| 13/16   | 3            | 6              |
| 27/32   | 3            | 6              |
| 7/8     | 3            | 6              |
| 29/32   | 3            | 6              |
| 15/16   | 3            | 6              |
| 31/32   | 3            | 6              |
| 1       | 3            | 6              |
| 1.1/32  | 3            | 6              |
| 1.1/16  | 3            | 6              |
| 1.3/32  | 3            | 6              |
| 1.1/8   | 3            | 6              |
| 1.5/32  | 3            | 6              |
| 1.3/16  | 3            | 6              |
| 1.7/32  | 3            | 6              |
| 1.1/4   | 3            | 6              |
| 1.9/32  | 3            | 6              |
| 1.5/16  | 3            | 6              |
| 1.11/32 | 3            | 6              |
| 1.3/8   | 3            | 6              |

| Size    | Flute Length | Overall Length |
|---------|--------------|----------------|
| 1.13/32 | 3            | 6              |
| 1.7/16  | 3            | 6              |
| 1.15/32 | 3            | 6              |
| 1.1/2   | 3            | 6              |
| 1.17/32 | 3            | 6              |
| 1.9/16  | 3            | 6              |
| 1.19/32 | 3            | 6              |
| 1.5/8   | 3            | 6              |
| 1.21/32 | 3            | 6              |
| 1.11/16 | 3            | 6              |
| 1.23/32 | 3            | 6              |
| 1.3/4   | 3            | 6              |
| 1.25/32 | 3            | 6              |
| 1.13/16 | 3            | 6              |
| 1.27/32 | 3            | 6              |
| 1.7/8   | 3            | 6              |
| 1.29/32 | 3            | 6              |
| 1.15/16 | 3            | 6              |
| 1.31/32 | 3            | 6              |
| 2       | 3            | 6              |



## High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to  
 IS 5103 - 1969  
 ISO 235 - 1980  
 DIN 345 - 1978  
 BS 328 : Part 1 : 1986  
 Dimensions in mm / Inch



| Diameters h8 |       | Flute Length | Overall Length | Morse Taper No. |
|--------------|-------|--------------|----------------|-----------------|
| mm           | inch  |              |                |                 |
| 3.00         | -     | 33           | 114            | 1               |
| 3.20         | 1/8   | 36           | 117            | 1               |
| 3.50         | 9/64  | 39           | 120            | 1               |
| 3.80         | -     | 43           | 124            | 1               |
| 4.00         | 5/32  | 43           | 124            | 1               |
| 4.20         | -     | 43           | 124            | 1               |
| 4.50         | 11/64 | 47           | 128            | 1               |
| 4.80         | 3/16  | 52           | 133            | 1               |
| 5.00         | -     | 52           | 133            | 1               |
| 5.20         | 13/64 | 52           | 133            | 1               |
| 5.50         | 7/32  | 57           | 138            | 1               |
| 5.80         | -     | 57           | 138            | 1               |
| 6.00         | 15/64 | 57           | 138            | 1               |
| 6.20         | -     | 63           | 144            | 1               |
| 6.50         | 1/4   | 63           | 144            | 1               |
| 6.80         | 17/64 | 69           | 150            | 1               |
| 7.00         | -     | 69           | 150            | 1               |
| 7.20         | 9/32  | 69           | 150            | 1               |
| 7.50         | -     | 69           | 150            | 1               |
| 7.80         | 19/64 | 75           | 156            | 1               |
| 8.00         | 5/16  | 75           | 156            | 1               |

| Diameters h8 |       | Flute Length | Overall Length | Morse Taper No. |
|--------------|-------|--------------|----------------|-----------------|
| mm           | inch  |              |                |                 |
| 8.20         | 21/64 | 75           | 156            | 1               |
| 8.50         | -     | 75           | 156            | 1               |
| 8.80         | 11/32 | 81           | 162            | 1               |
| 9.00         | -     | 81           | 162            | 1               |
| 9.20         | 23/64 | 81           | 162            | 1               |
| 9.50         | -     | 81           | 162            | 1               |
| 9.80         | 3/8   | 87           | 168            | 1               |
| 10.00        | 25/64 | 87           | 168            | 1               |
| 10.20        | 13/32 | 87           | 168            | 1               |
| 10.50        | -     | 87           | 168            | 1               |
| 10.80        | 27/64 | 94           | 175            | 1               |
| 11.00        | -     | 94           | 175            | 1               |
| 11.20        | 7/16  | 94           | 175            | 1               |
| 11.50        | 29/64 | 94           | 175            | 1               |
| 11.80        | -     | 94           | 175            | 1               |
| 12.00        | 15/32 | 101          | 182            | 1               |
| 12.20        | 31/64 | 101          | 182            | 1               |
| 12.50        | -     | 101          | 182            | 1               |
| 12.80        | 1/2   | 101          | 182            | 1               |
| 13.00        | 33/64 | 101          | 182            | 1               |
| 13.20        | -     | 101          | 182            | 1               |

A drill having two helical flutes and a standard Morse Taper Shank.

Type 'N' Drills shall be supplied unless otherwise specified.



## High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to  
 IS 5103 - 1969  
 ISO 235 - 1980  
 DIN 345 - 1978  
 BS 328 : Part 1 : 1986  
 Dimensions in mm / Inch



| Diameters h8 |       | Flute Length | Overall Length | Morse Taper No. |
|--------------|-------|--------------|----------------|-----------------|
| mm           | inch  |              |                |                 |
| 13.50        | 17/32 | 108          | 189            | 1               |
| 13.80        | 35/64 | 108          | 189            | 1               |
| 14.00        | -     | 108          | 189            | 1               |
| 14.25        | 9/16  | 114          | 212            | 2               |
| 14.50        | -     | 114          | 212            | 2               |
| 14.75        | 37/64 | 114          | 212            | 2               |
| 15.00        | -     | 114          | 212            | 2               |
| 15.25        | 19/32 | 120          | 218            | 2               |
| 15.50        | 39/64 | 120          | 218            | 2               |
| 15.75        | -     | 120          | 218            | 2               |
| 16.00        | 5/8   | 120          | 218            | 2               |
| 16.25        | 41/64 | 125          | 223            | 2               |
| 16.50        | -     | 125          | 223            | 2               |
| 16.75        | 21/32 | 125          | 223            | 2               |
| 17.00        | -     | 125          | 223            | 2               |
| 17.25        | 43/64 | 130          | 228            | 2               |
| 17.50        | 11/16 | 130          | 228            | 2               |
| 17.75        | -     | 130          | 228            | 2               |
| 18.00        | 45/64 | 130          | 228            | 2               |
| 18.25        | 23/32 | 135          | 233            | 2               |
| 18.50        | -     | 135          | 233            | 2               |
| 18.75        | 47/64 | 135          | 233            | 2               |
| 19.00        | -     | 135          | 233            | 2               |
| 19.25        | 3/4   | 140          | 238            | 2               |
| 19.50        | 49/64 | 140          | 238            | 2               |
| 19.75        | 25/32 | 140          | 238            | 2               |
| 20.00        | -     | 140          | 238            | 2               |
| 20.25        | 51/64 | 145          | 243            | 2               |
| 20.50        | -     | 145          | 243            | 2               |
| 20.75        | 13/16 | 145          | 243            | 2               |

| Diameters h8 |        | Flute Length | Overall Length | Morse Taper No. |
|--------------|--------|--------------|----------------|-----------------|
| mm           | inch   |              |                |                 |
| 21.00        | 53/64  | 145          | 243            | 2               |
| 21.25        | -      | 150          | 248            | 2               |
| 21.50        | 27/32  | 150          | 248            | 2               |
| 21.75        | 55/64  | 150          | 248            | 2               |
| 22.00        | -      | 150          | 248            | 2               |
| 22.25        | 7/8    | 150          | 248            | 2               |
| 22.50        | 57/64  | 155          | 253            | 2               |
| 22.75        | -      | 155          | 253            | 2               |
| 23.00        | 29/32  | 155          | 253            | 2               |
| 23.25        | -      | 155          | 253            | 3               |
| 23.50        | 59/64  | 155          | 253            | 3               |
| 23.75        | 15/16  | 160          | 281            | 3               |
| 24.00        | -      | 160          | 281            | 3               |
| 24.25        | 61/64  | 160          | 281            | 3               |
| 24.50        | 31/32  | 160          | 281            | 3               |
| 24.75        | -      | 160          | 281            | 3               |
| 25.00        | -      | 160          | 281            | 3               |
| 25.25        | 63/64  | 165          | 286            | 3               |
| 25.50        | 1      | 165          | 286            | 3               |
| 25.75        | 1.1/64 | 165          | 286            | 3               |
| 26.00        | -      | 165          | 286            | 3               |
| 26.25        | 1.1/32 | 165          | 286            | 3               |
| 26.50        | -      | 165          | 286            | 3               |
| 26.75        | 1.3/64 | 170          | 291            | 3               |
| 27.00        | 1.1/16 | 170          | 291            | 3               |
| 27.25        | -      | 170          | 291            | 3               |
| 27.50        | 1.5/64 | 170          | 291            | 3               |
| 27.75        | 1.3/32 | 170          | 291            | 3               |
| 28.00        | -      | 170          | 291            | 3               |
| 28.25        | 1.7/64 | 175          | 296            | 3               |



## High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to  
 IS 5103 - 1969  
 ISO 235 - 1980  
 DIN 345 - 1978  
 BS 328 : Part 1 : 1986  
 Dimensions in mm / Inch



| Diameters h8 |         | Flute Length | Overall Length | Morse Taper No. |
|--------------|---------|--------------|----------------|-----------------|
| mm           | inch    |              |                |                 |
| 28.50        | 1.1/8   | 175          | 296            | 3               |
| 28.75        | -       | 175          | 296            | 3               |
| 29.00        | 1.9/64  | 175          | 296            | 3               |
| 29.25        | -       | 175          | 296            | 3               |
| 29.50        | 1.5/32  | 175          | 296            | 3               |
| 29.75        | 1.11/64 | 175          | 296            | 3               |
| 30.00        | -       | 175          | 296            | 3               |
| 30.25        | 1.3/16  | 180          | 301            | 3               |
| 30.50        | 1 13/64 | 180          | 301            | 3               |
| 30.75        | -       | 180          | 301            | 3               |
| 31.00        | 1.7/32  | 180          | 301            | 3               |
| 31.25        | 1.15/64 | 180          | 301            | 3               |
| 31.50        | -       | 180          | 301            | 3               |
| 31.75        | 1.1/4   | 185          | 306            | 3               |
| 32.00        | -       | 185          | 334            | 4               |
| 32.50        | 1.9/32  | 185          | 334            | 4               |
| 33.00        | -       | 185          | 334            | 4               |
| 33.50        | 1.5/16  | 185          | 334            | 4               |
| 34.00        | 1.11/32 | 190          | 339            | 4               |
| 34.50        | -       | 190          | 339            | 4               |
| 35.00        | 1.3/8   | 190          | 339            | 4               |
| 35.50        | -       | 190          | 339            | 4               |
| 36.00        | 1.13/32 | 195          | 344            | 4               |
| 36.50        | 1.7/16  | 195          | 344            | 4               |
| 37.00        | -       | 195          | 344            | 4               |
| 37.50        | 1.15/32 | 195          | 344            | 4               |
| 38.00        | 1.1/2   | 200          | 349            | 4               |
| 38.50        | -       | 200          | 349            | 4               |
| 39.00        | 1.17/32 | 200          | 349            | 4               |
| 39.50        | 1.9/16  | 200          | 349            | 4               |
| 40.00        | -       | 200          | 349            | 4               |

| Diameters h8 |           | Flute Length | Overall Length | Morse Taper No. |
|--------------|-----------|--------------|----------------|-----------------|
| mm           | inch      |              |                |                 |
| 40.50        | 1.19/32   | 205          | 354            | 4               |
| 41.00        | -         | 205          | 354            | 4               |
| 41.50        | 1.5/8     | 205          | 354            | 4               |
| 42.00        | 1.21/32   | 205          | 354            | 4               |
| 42.50        | -         | 205          | 354            | 4               |
| 43.00        | 1.11/16   | 210          | 359            | 4               |
| 43.50        | 1.23/32   | 210          | 359            | 4               |
| 44.00        | -         | 210          | 359            | 4               |
| 44.50        | 1.3/4     | 210          | 359            | 4               |
| 45.00        | -         | 210          | 359            | 4               |
| 45.50        | 1.25/32   | 215          | 364            | 4               |
| 46.00        | 1.13/16   | 215          | 364            | 4               |
| 46.50        | -         | 215          | 364            | 4               |
| 47.00        | 1.27/32   | 215          | 364            | 4               |
| 47.50        | -         | 215          | 364            | 4               |
| 48.00        | 1.7/8     | 220          | 369            | 4               |
| 48.50        | 1.29/32   | 220          | 369            | 4               |
| 49.00        | 1.15/16   | 220          | 369            | 4               |
| 49.50        | -         | 220          | 369            | 4               |
| 50.00        | -         | 220          | 369            | 4               |
| 50.50        | 1.31/32,2 | 225          | 374            | 4               |
| 51.00        | -         | 225          | 412            | 5               |
| 52.00        | 2.1/16    | 225          | 412            | 5               |
| 53.00        | -         | 225          | 412            | 5               |
| 54.00        | 2.1/8     | 230          | 417            | 5               |
| 55.00        | -         | 230          | 417            | 5               |
| 56.00        | 2.3/16    | 230          | 417            | 5               |
| 57.00        | 2.1/4     | 235          | 422            | 5               |
| 58.00        | -         | 235          | 422            | 5               |
| 59.00        | 2.5/16    | 235          | 422            | 5               |
| 60.00        | -         | 235          | 422            | 5               |



## High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to  
 IS 5103 - 1969  
 ISO 235 - 1980  
 DIN 345 - 1978  
 BS 328 : Part 1 : 1986  
 Dimensions in mm / Inch



| Diameter h8 |         | Flute Length | Overall Length | Morse Taper No. |
|-------------|---------|--------------|----------------|-----------------|
| mm          | inch    |              |                |                 |
| 61.00       | 2.3/8   | 240          | 427            | 5               |
| 62.00       | 2.7/16  | 240          | 427            | 5               |
| 63.00       | -       | 240          | 427            | 5               |
| 64.00       | 2.1/2   | 245          | 432            | 5               |
| 65.00       | 2.9/16  | 245          | 432            | 5               |
| 66.00       | -       | 245          | 432            | 5               |
| 67.00       | 2.5/8   | 245          | 432            | 5               |
| 68.00       | 2.11/16 | 250          | 437            | 5               |
| 69.00       | -       | 250          | 437            | 5               |
| 70.00       | 2.3/4   | 250          | 437            | 5               |
| 71.00       | -       | 250          | 437            | 5               |
| 72.00       | 2.13/16 | 255          | 442            | 5               |
| 73.00       | 2.7/8   | 255          | 442            | 5               |
| 74.00       | -       | 255          | 442            | 5               |
| 75.00       | 2.15/16 | 255          | 442            | 5               |
| 76.00       | 3       | 260          | 447            | 5               |
| 77.00       | -       | 260          | 514            | 6               |
| 78.00       | 3.1/16  | 260          | 514            | 6               |
| 79.00       | 3.1/18  | 260          | 514            | 6               |
| 80.00       | -       | 260          | 514            | 6               |
| 81.00       | 3.3/16  | 265          | 519            | 6               |

| Diameter h8 |         | Flute Length | Overall Length | Morse Taper No. |
|-------------|---------|--------------|----------------|-----------------|
| mm          | inch    |              |                |                 |
| 82.00       | -       | 265          | 519            | 6               |
| 83.00       | 3.1/4   | 265          | 519            | 6               |
| 84.00       | 3.5/16  | 265          | 519            | 6               |
| 85.00       | -       | 265          | 519            | 6               |
| 86.00       | 3.3/8   | 270          | 524            | 6               |
| 87.00       | 3.7/16  | 270          | 524            | 6               |
| 88.00       | -       | 270          | 524            | 6               |
| 89.00       | 3.1/2   | 270          | 524            | 6               |
| 90.00       | -       | 270          | 524            | 6               |
| 91.00       | 3.9/16  | 275          | 529            | 6               |
| 92.00       | 3.5/8   | 275          | 529            | 6               |
| 93.00       | -       | 275          | 529            | 6               |
| 94.00       | 3.11/16 | 275          | 529            | 6               |
| 95.00       | -       | 275          | 529            | 6               |
| 96.00       | 3.3/4   | 280          | 534            | 6               |
| 97.00       | 3.13/16 | 280          | 534            | 6               |
| 98.00       | 3.7/8   | 280          | 534            | 6               |
| 99.00       | -       | 280          | 534            | 6               |
| 100.00      | -       | 280          | 534            | 6               |
| 101.00      | 3.15/16 | 285          | 539            | 6               |
| 102.00      | 4       | 285          | 539            | 6               |





## High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to  
ASME B94.11M - 1993  
Dimensions in mm / Inch



| Diameter h8 |      | REGULAR SHANK |                |                 |
|-------------|------|---------------|----------------|-----------------|
| Fraction    | mm   | Flute Length  | Overall Length | Morse Taper No. |
| 1/8         | 3.00 | 48            | 130            | 1               |
| -           | 3.20 | 54            | 137            | 1               |
| 9/64        | 3.50 | 54            | 137            | 1               |
| 5/32        | 3.80 | 54            | 137            | 1               |
| -           | 4.00 | 64            | 146            | 1               |
| 11/64       | 4.20 | 64            | 146            | 1               |
| 3/16        | 4.50 | 64            | 146            | 1               |
| -           | 4.80 | 70            | 152            | 1               |
| -           | 5.00 | 70            | 152            | 1               |
| 13/64       | 5.20 | 70            | 152            | 1               |
| 7/32        | 5.50 | 70            | 152            | 1               |
| -           | 5.80 | 73            | 156            | 1               |
| 15/64       | 6.00 | 73            | 156            | 1               |
| 1/4         | 6.20 | 73            | 156            | 1               |
| -           | 6.50 | 76            | 159            | 1               |
| 17/64       | 6.80 | 76            | 159            | 1               |
| 9/32        | 7.00 | 76            | 159            | 1               |
| -           | 7.20 | 79            | 162            | 1               |
| 19/64       | 7.50 | 79            | 162            | 1               |
| 5/16        | 7.80 | 79            | 162            | 1               |
| -           | 8.00 | 83            | 165            | 1               |

| Diameter h8 |       | REGULAR SHANK |                |                 |
|-------------|-------|---------------|----------------|-----------------|
| Fraction    | mm    | Flute Length  | Overall Length | Morse Taper No. |
| 21/64       | 8.20  | 83            | 165            | 1               |
| 11/32       | 8.50  | 83            | 165            | 1               |
| -           | 8.80  | 89            | 171            | 1               |
| -           | 9.00  | 89            | 171            | 1               |
| 23/64       | 9.20  | 89            | 171            | 1               |
| 3/8         | 9.50  | 89            | 171            | 1               |
| -           | 9.80  | 92            | 178            | 1               |
| 25/64       | 10.00 | 92            | 178            | 1               |
| 13/32       | 10.20 | 92            | 178            | 1               |
| -           | 10.50 | 98            | 184            | 1               |
| 27/64       | 10.80 | 98            | 184            | 1               |
| 7/16        | 11.00 | 98            | 184            | 1               |
| -           | 11.20 | 105           | 190            | 1               |
| 29/64       | 11.50 | 105           | 190            | 1               |
| 15/32       | 11.80 | 105           | 190            | 1               |
| -           | 12.00 | 111           | 210            | 2               |
| 31/64       | 12.20 | 111           | 210            | 2               |
| 1/2         | 12.50 | 111           | 210            | 2               |
| -           | 12.80 | 117           | 216            | 2               |
| 33/64       | 13.00 | 117           | 216            | 2               |
| -           | 13.20 | 117           | 216            | 2               |



## High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to  
ASME B94.11M - 1993  
Dimensions in mm / Inch



| Diameter h8 |       | REGULAR SHANK |                |                 |
|-------------|-------|---------------|----------------|-----------------|
| Fraction    | mm    | Flute Length  | Overall Length | Morse Taper No. |
| 17/32       | 13.50 | 117           | 216            | 2               |
| 35/64       | 13.80 | 124           | 222            | 2               |
| -           | 14.00 | 124           | 222            | 2               |
| 9/16        | 14.25 | 124           | 222            | 2               |
| -           | 14.50 | 124           | 222            | 2               |
| 37/64       | 14.75 | 124           | 222            | 2               |
| 19/32       | 15.00 | 124           | 222            | 2               |
| -           | 15.25 | 124           | 222            | 2               |
| 39/64       | 15.50 | 124           | 222            | 2               |
| 5/8         | 15.75 | 124           | 222            | 2               |
| -           | 16.00 | 130           | 229            | 2               |
| 41/64       | 16.25 | 130           | 229            | 2               |
| 21/32       | 16.50 | 130           | 229            | 2               |
| -           | 16.75 | 137           | 235            | 2               |
| 43/64       | 17.00 | 137           | 235            | 2               |
| 11/16       | 17.25 | 137           | 235            | 2               |
| -           | 17.50 | 143           | 241            | 2               |
| 45/64       | 18.00 | 143           | 241            | 2               |
| 23/32       | -     | 143           | 241            | 2               |
| 47/64       | 18.50 | 149           | 248            | 2               |
| 3/4         | 19.00 | 149           | 248            | 2               |
| 49/64       | 19.50 | 152           | 251            | 2               |
| 25/32       | -     | 152           | 251            | 2               |
| 51/64       | 20.00 | 156           | 273            | 3               |
| 13/16       | 20.50 | 156           | 273            | 3               |
| 53/64       | 21.00 | 156           | 273            | 3               |
| 27/32       | 21.50 | 156           | 273            | 3               |
| 55/64       | 22.00 | 156           | 273            | 3               |
| 7/8,57/64   | 22.50 | 156           | 273            | 3               |

| Diameter h8    |       | REGULAR SHANK |                |                 |
|----------------|-------|---------------|----------------|-----------------|
| Fraction       | mm    | Flute Length  | Overall Length | Morse Taper No. |
| 29/32          | 23.00 | 156           | 273            | 3               |
| 59/64,15/16    | 23.50 | 156           | 273            | 3               |
| 61/64          | 24.00 | 162           | 279            | 3               |
| 31/32          | 24.50 | 162           | 279            | 3               |
| 63/64, 1       | 25.00 | 162           | 279            | 3               |
| 1.1/64         | 25.50 | 165           | 283            | 3               |
| 1.1/32         | 26.00 | 165           | 283            | 3               |
| 1.3/64         | 26.50 | 165           | 283            | 3               |
| 1.1/16         | 27.00 | 168           | 286            | 3               |
| 1.5/64,1.3/32  | 27.50 | 175           | 318            | 4               |
| 1.7/64         | 28.00 | 181           | 324            | 4               |
| 1.1/8          | 28.50 | 181           | 324            | 4               |
| 1.9/64,1.5/32  | 29.00 | 184           | 327            | 4               |
| 1.11/64        | 29.50 | 187           | 330            | 4               |
| 1.3/16         | 30.00 | 187           | 330            | 3               |
| 1.13/64,1.7/32 | 30.50 | 190           | 353            | 4               |
| 1.15/64        | 31.00 | 200           | 343            | 4               |
| 1.1/4          | 31.50 | 200           | 343            | 4               |
| 1.17/64        | 32.00 | 216           | 359            | 4               |
| 1.9/32         | 32.50 | 216           | 359            | 4               |
| 1.19/64,1.5/16 | 33.00 | 219           | 362            | 4               |
| 1.21/64        | 33.50 | 222           | 365            | 4               |
| 1.11/32        | 34.00 | 222           | 365            | 4               |



## High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to  
ASME B94.11M - 1993  
Dimensions in mm / Inch



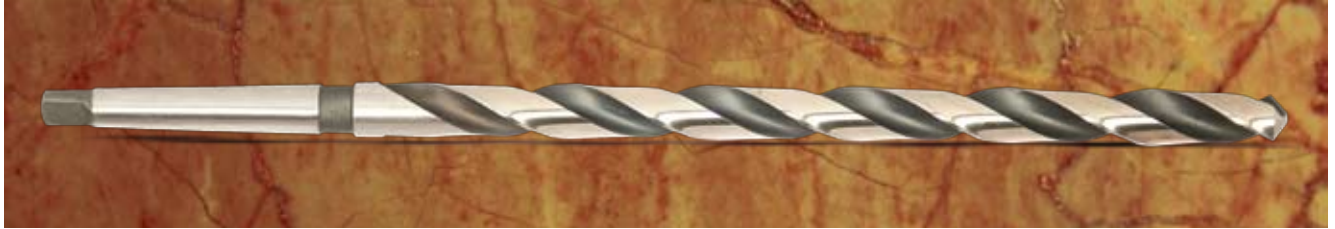
| Diameter h8    |       | REGULAR SHANK |                |                 |
|----------------|-------|---------------|----------------|-----------------|
| Fraction       | mm    | Flute Length  | Overall Length | Morse Taper No. |
| 1.23/64, 1.3/8 | 34.50 | 225           | 368            | 4               |
| 1.25/64        | 35.00 | 229           | 371            | 4               |
| 1.13/32        | 35.50 | 229           | 371            | 4               |
| 1.27/64        | 36.00 | 232           | 375            | 4               |
| 1.7/16         | 36.50 | 232           | 375            | 4               |
|                | 37.00 | 235           | 378            | 4               |
| 1.31/64        | 37.50 | 238           | 381            | 4               |
| 1.1/2          | 38.00 | 238           | 381            | 4               |
| 1.17/32        | -     | 238           | 416            | 5               |
| 1.9/16         | 39.00 | 244           | 422            | 5               |
| 1.19/32        | 40.00 | 251           | 429            | 5               |
| 1.5/8          | 41.00 | 254           | 432            | 5               |
| 1.21/32        | 42.00 | 257           | 435            | 5               |
| 1.11/16        | 43.00 | 257           | 435            | 5               |
| 1.23/32, 1.3/4 | 44.00 | 257           | 435            | 5               |
| 1.25/32        | 45.00 | 257           | 435            | 5               |
| 1.13/16        | 46.00 | 257           | 435            | 5               |
| 1.27/32        | -     | 257           | 435            | 5               |
| 1.7/8          | 47.00 | 264           | 441            | 5               |
| 1.29/32        | 48.00 | 264           | 441            | 5               |
| 1.15/16        | 49.00 | 264           | 441            | 5               |
| 1.31/32        | 50.00 | 264           | 441            | 5               |
| 2, 2.1/32      | 51.00 | 264           | 441            | 5               |
| 2.1/16         | 52.00 | 260           | 441            | 5               |
| 2.3/32         | 53.00 | 260           | 441            | 5               |
| 2.1/8          | 54.00 | 260           | 441            | 5               |

| Diameter h8    |       | REGULAR SHANK |                |                 |
|----------------|-------|---------------|----------------|-----------------|
| Fraction       | mm    | Flute Length  | Overall Length | Morse Taper No. |
| 2.5/32, 2.3/16 | 55.00 | 260           | 441            | 5               |
| 2.7/32         | 56.00 | 257           | 441            | 5               |
| 2.1/4          | 57.00 | 257           | 441            | 5               |
| -              | 58.00 | 257           | 441            | 5               |
| 2.5/16         | 59.00 | 257           | 441            | 5               |
| 2.3/8          | 60.00 | 257           | 441            | 5               |
| -              | 61.00 | 286           | 476            | 5               |
| 2.7/16         | 62.00 | 286           | 476            | 5               |
| 2.1/2          | 63.00 | 286           | 476            | 5               |
| -              | 64.00 | 302           | 495            | 5               |
| 2.9/16         | 65.00 | 302           | 324            | 5               |
| 2.5/8          | 66.00 | 302           | 495            | 5               |
| -              | 67.00 | 324           | 518            | 5               |
| 2.11/16        | 68.00 | 324           | 518            | 5               |
| 2.3/4          | 69.00 | 324           | 518            | 5               |
| -              | 70.00 | 340           | 537            | 5               |
| 2.13/16        | 71.00 | 340           | 537            | 5               |
| -              | 72.00 | 340           | 537            | 5               |
| 2.7/8          | 73.00 | 340           | 537            | 5               |
| -              | 74.00 | 356           | 552            | 5               |
| 2.15/16        | 75.00 | 356           | 552            | 5               |
| 3              | 76.00 | 356           | 552            | 5               |
| -              | 77.00 | 371           | 622            | 6               |
|                | 78.00 | 371           | 622            | 6               |
| 3.1/8          | -     | 371           | 622            | 6               |
| 3.1/4          | -     | 394           | 648            | 6               |



**High Speed Steel  
TAPER SHANK TWIST DRILLS  
Long Series**

Specifications Conform to  
IS 8305: 1976  
DIN 341: 1978  
Dimensions in mm



| Diameter h8 | Flute Length | Overall Length | Morse Taper |
|-------------|--------------|----------------|-------------|
| 5.00        | 74           | 155            | 1           |
| 5.10        | 74           | 155            | 1           |
| 5.20        | 74           | 155            | 1           |
| 5.30        | 74           | 155            | 1           |
| 5.40        | 80           | 161            | 1           |
| 5.50        | 80           | 161            | 1           |
| 5.60        | 80           | 161            | 1           |
| 5.70        | 80           | 161            | 1           |
| 5.80        | 80           | 161            | 1           |
| 5.90        | 80           | 161            | 1           |
| 6.00        | 80           | 161            | 1           |
| 6.10        | 86           | 167            | 1           |
| 6.20        | 86           | 167            | 1           |
| 6.30        | 86           | 167            | 1           |
| 6.40        | 86           | 167            | 1           |
| 6.50        | 86           | 167            | 1           |
| 6.60        | 86           | 167            | 1           |
| 6.70        | 86           | 167            | 1           |
| 6.80        | 93           | 174            | 1           |
| 6.90        | 93           | 174            | 1           |
| 7.00        | 93           | 174            | 1           |
| 7.10        | 93           | 174            | 1           |

| Diameter h8 | Flute Length | Overall Length | Morse Taper |
|-------------|--------------|----------------|-------------|
| 7.20        | 93           | 174            | 1           |
| 7.30        | 93           | 174            | 1           |
| 7.40        | 93           | 174            | 1           |
| 7.50        | 93           | 174            | 1           |
| 7.60        | 100          | 181            | 1           |
| 7.70        | 100          | 181            | 1           |
| 7.80        | 100          | 181            | 1           |
| 7.90        | 100          | 181            | 1           |
| 8.00        | 100          | 181            | 1           |
| 8.10        | 100          | 181            | 1           |
| 8.20        | 100          | 181            | 1           |
| 8.30        | 100          | 181            | 1           |
| 8.40        | 100          | 181            | 1           |
| 8.50        | 100          | 181            | 1           |
| 8.60        | 107          | 188            | 1           |
| 8.70        | 107          | 188            | 1           |
| 8.80        | 107          | 188            | 1           |
| 8.90        | 107          | 188            | 1           |
| 9.00        | 107          | 188            | 1           |
| 9.10        | 107          | 188            | 1           |
| 9.20        | 107          | 188            | 1           |
| 9.30        | 107          | 188            | 1           |

A lengthened form of Taper Shank Twist Drill, the increase in length being in the flute length

Type 'N' Drills shall be supplied unless otherwise specified.



## High Speed Steel TAPER SHANK TWIST DRILLS Long Series

Specifications Conform to  
IS 8305: 1976  
DIN 341: 1978  
Dimensions in mm



| Diameter h8 | Flute Length | Overall Length | Morse Taper No. |
|-------------|--------------|----------------|-----------------|
| 9.40        | 107          | 188            | 1               |
| 9.50        | 107          | 188            | 1               |
| 9.60        | 116          | 197            | 1               |
| 9.70        | 116          | 197            | 1               |
| 9.80        | 116          | 197            | 1               |
| 9.90        | 116          | 197            | 1               |
| 10.00       | 116          | 197            | 1               |
| 10.10       | 116          | 197            | 1               |
| 10.20       | 116          | 197            | 1               |
| 10.30       | 116          | 197            | 1               |
| 10.40       | 116          | 197            | 1               |
| 10.50       | 116          | 197            | 1               |
| 10.60       | 116          | 197            | 1               |
| 10.70       | 125          | 206            | 1               |
| 10.80       | 125          | 206            | 1               |
| 10.90       | 125          | 206            | 1               |
| 11.00       | 125          | 206            | 1               |
| 11.10       | 125          | 206            | 1               |
| 11.20       | 125          | 206            | 1               |
| 11.30       | 125          | 206            | 1               |
| 11.40       | 125          | 206            | 1               |
| 11.50       | 125          | 206            | 1               |
| 11.60       | 125          | 206            | 1               |
| 11.70       | 125          | 206            | 1               |
| 11.80       | 125          | 206            | 1               |
| 11.90       | 134          | 215            | 1               |
| 12.00       | 134          | 215            | 1               |
| 12.10       | 134          | 215            | 1               |
| 12.20       | 134          | 215            | 1               |
| 12.30       | 134          | 215            | 1               |
| 12.40       | 134          | 215            | 1               |

| Diameter h8 | Flute Length | Overall Length | Morse Taper No. |
|-------------|--------------|----------------|-----------------|
| 12.50       | 134          | 215            | 1               |
| 12.60       | 134          | 215            | 1               |
| 12.70       | 134          | 215            | 1               |
| 12.80       | 134          | 215            | 1               |
| 12.90       | 134          | 215            | 1               |
| 13.00       | 134          | 215            | 1               |
| 13.10       | 134          | 215            | 1               |
| 13.20       | 134          | 215            | 1               |
| 13.30       | 142          | 223            | 1               |
| 13.40       | 142          | 223            | 1               |
| 13.50       | 142          | 223            | 1               |
| 13.60       | 142          | 223            | 1               |
| 13.70       | 142          | 223            | 1               |
| 13.80       | 142          | 223            | 1               |
| 13.90       | 142          | 223            | 1               |
| 14.00       | 142          | 223            | 1               |
| 14.25       | 147          | 245            | 2               |
| 14.50       | 147          | 245            | 2               |
| 14.75       | 147          | 245            | 2               |
| 15.00       | 147          | 245            | 2               |
| 15.25       | 153          | 251            | 2               |
| 15.50       | 153          | 251            | 2               |
| 15.75       | 153          | 251            | 2               |
| 16.00       | 153          | 251            | 2               |
| 16.25       | 159          | 257            | 2               |
| 16.50       | 159          | 257            | 2               |
| 16.75       | 159          | 257            | 2               |
| 17.00       | 159          | 257            | 2               |
| 17.25       | 165          | 263            | 2               |
| 17.50       | 165          | 263            | 2               |
| 17.75       | 165          | 263            | 2               |



## High Speed Steel TAPER SHANK TWIST DRILLS Long Series

Specifications Conform to  
IS 8305: 1976  
DIN 341: 1978  
Dimensions in mm



| Diameter h8 | Flute Length | Overall Length | Morse Taper |
|-------------|--------------|----------------|-------------|
| 18.00       | 165          | 263            | 2           |
| 18.25       | 171          | 269            | 2           |
| 18.26       | 171          | 269            | 2           |
| 18.27       | 171          | 269            | 2           |
| 18.28       | 171          | 269            | 2           |
| 19.25       | 177          | 275            | 2           |
| 19.50       | 177          | 275            | 2           |
| 19.75       | 177          | 275            | 2           |
| 20.00       | 177          | 275            | 2           |
| 20.25       | 184          | 282            | 2           |
| 20.50       | 184          | 282            | 2           |
| 20.75       | 184          | 282            | 2           |
| 21.00       | 184          | 282            | 2           |
| 21.25       | 191          | 289            | 2           |
| 21.50       | 191          | 289            | 2           |
| 21.75       | 191          | 289            | 2           |
| 22.00       | 191          | 289            | 2           |
| 22.25       | 191          | 289            | 2           |
| 22.50       | 198          | 296            | 2           |
| 22.75       | 198          | 296            | 2           |
| 23.00       | 198          | 296            | 2           |
| 23.25       | 198          | 319            | 3           |
| 23.50       | 198          | 319            | 3           |
| 23.75       | 206          | 327            | 3           |
| 24.00       | 206          | 327            | 3           |
| 24.25       | 206          | 327            | 3           |
| 24.50       | 206          | 327            | 3           |
| 24.75       | 206          | 327            | 3           |
| 25.00       | 206          | 327            | 3           |
| 25.25       | 214          | 335            | 3           |

| Diameter h8 | Flute Length | Overall Length | Morse Taper |
|-------------|--------------|----------------|-------------|
| 25.50       | 214          | 335            | 3           |
| 25.75       | 214          | 335            | 3           |
| 26.00       | 214          | 335            | 3           |
| 26.25       | 214          | 335            | 3           |
| 26.50       | 214          | 335            | 3           |
| 26.75       | 222          | 343            | 3           |
| 27.00       | 222          | 343            | 3           |
| 27.25       | 222          | 343            | 3           |
| 27.50       | 222          | 343            | 3           |
| 27.75       | 222          | 343            | 3           |
| 28.00       | 222          | 343            | 3           |
| 28.25       | 230          | 351            | 3           |
| 28.50       | 230          | 351            | 3           |
| 28.75       | 230          | 351            | 3           |
| 29.00       | 230          | 351            | 3           |
| 29.25       | 230          | 351            | 3           |
| 29.50       | 230          | 351            | 3           |
| 29.75       | 230          | 351            | 3           |
| 30.00       | 230          | 351            | 3           |
| 30.25       | 239          | 360            | 3           |
| 30.50       | 239          | 360            | 3           |
| 30.75       | 239          | 360            | 3           |
| 31.00       | 239          | 360            | 3           |
| 31.25       | 239          | 360            | 3           |
| 31.50       | 239          | 360            | 3           |
| 31.75       | 248          | 369            | 3           |
| 32.00       | 248          | 397            | 4           |
| 32.50       | 248          | 397            | 4           |
| 33.00       | 248          | 397            | 4           |
| 33.50       | 248          | 397            | 4           |





## High Speed Steel TAPER SHANK TWIST DRILLS Long Series

Specifications Conform to  
IS 8305: 1976  
DIN 341: 1978  
Dimensions in mm



| Diameter h8 | Flute Length | Overall Length | Morse Taper |
|-------------|--------------|----------------|-------------|
| 34.00       | 257          | 406            | 4           |
| 34.25       | 257          | 406            | 4           |
| 34.50       | 257          | 406            | 4           |
| 35.00       | 257          | 406            | 4           |
| 35.50       | 257          | 406            | 4           |
| 36.00       | 267          | 416            | 4           |
| 36.50       | 267          | 416            | 4           |
| 36.75       | 267          | 416            | 4           |
| 37.00       | 267          | 416            | 4           |
| 37.50       | 267          | 416            | 4           |
| 38.00       | 277          | 426            | 4           |
| 38.50       | 277          | 426            | 4           |
| 39.00       | 277          | 426            | 4           |
| 39.50       | 277          | 426            | 4           |
| 40.00       | 277          | 426            | 4           |
| 40.50       | 287          | 436            | 4           |
| 41.00       | 287          | 436            | 4           |
| 41.50       | 287          | 436            | 4           |

| Diameter h8 | Flute Length | Overall Length | Morse Taper |
|-------------|--------------|----------------|-------------|
| 42.00       | 287          | 436            | 4           |
| 42.50       | 287          | 436            | 4           |
| 43.00       | 298          | 447            | 4           |
| 43.50       | 298          | 447            | 4           |
| 44.00       | 298          | 447            | 4           |
| 44.50       | 298          | 447            | 4           |
| 45.00       | 298          | 447            | 4           |
| 45.50       | 310          | 459            | 4           |
| 46.00       | 310          | 459            | 4           |
| 46.50       | 310          | 459            | 4           |
| 47.00       | 310          | 459            | 4           |
| 47.50       | 310          | 459            | 4           |
| 48.00       | 321          | 470            | 4           |
| 48.50       | 321          | 470            | 4           |
| 49.00       | 321          | 470            | 4           |
| 49.50       | 321          | 470            | 4           |
| 50.0        | 321          | 470            | 4           |



## High Speed Steel TAPER SHANK TWIST DRILLS EXTRA LONG SERIES

Specifications Conform to  
IS 7822 : 2005.  
ISO 3291:1995  
Dimensions in mm



| Drill dia h8 | Flute length | Overall Length | Morse Taper no. |
|--------------|--------------|----------------|-----------------|
| 6            | 110          | 200            | 1               |
|              | 160          | 250            |                 |
|              | 225          | 315            |                 |
| 6.5          | 110          | 200            | 1               |
|              | 160          | 250            |                 |
|              | 225          | 315            |                 |
| 7            | 110          | 200            | 1               |
|              | 160          | 250            |                 |
|              | 225          | 315            |                 |
| 7.5          | 110          | 200            | 1               |
|              | 160          | 250            |                 |
|              | 225          | 315            |                 |
| 8            | 110          | 200            | 1               |
|              | 160          | 250            |                 |
|              | 225          | 315            |                 |
| 8.5          | 110          | 200            | 1               |
|              | 160          | 250            |                 |
|              | 225          | 315            |                 |
| 9            | 110          | 200            | 1               |
|              | 160          | 250            |                 |
|              | 225          | 315            |                 |
| 9.5          | 110          | 200            | 1               |
|              | 160          | 250            |                 |
|              | 225          | 315            |                 |
| 10           | 160          | 250            | 1               |
|              | 225          | 315            |                 |
|              | 310          | 400            |                 |
| 11           | 160          | 250            | 1               |
|              | 225          | 315            |                 |
|              | 310          | 400            |                 |
| 12           | 160          | 250            | 1               |
|              | 225          | 315            |                 |
|              | 310          | 400            |                 |
| 13           | 160          | 250            | 1               |
|              | 225          | 315            |                 |
|              | 310          | 400            |                 |
| 14           | 160          | 250            | 1               |
|              | 225          | 315            |                 |
|              | 310          | 400            |                 |
| 15           | 215          | 315            | 2               |
|              | 300          | 400            |                 |
|              | 400          | 500            |                 |
| 16           | 215          | 315            | 2               |
|              | 300          | 400            |                 |
|              | 400          | 500            |                 |
| 17           | 215          | 315            | 2               |
|              | 300          | 400            |                 |
|              | 400          | 500            |                 |

| Drill dia h8 | Flute length | Overall Length | Morse Taper no. |
|--------------|--------------|----------------|-----------------|
| 18           | 215          | 315            | 2               |
|              | 300          | 400            |                 |
|              | 400          | 500            |                 |
| 19           | 215          | 315            | 2               |
|              | 300          | 400            |                 |
|              | 400          | 500            |                 |
| 20           | 215          | 315            | 2               |
|              | 300          | 400            |                 |
|              | 400          | 500            |                 |
| 21           | 215          | 315            | 2               |
|              | 300          | 400            |                 |
|              | 400          | 500            |                 |
| 22           | 215          | 315            | 2               |
|              | 300          | 400            |                 |
|              | 400          | 500            |                 |
| 23           | 215          | 315            | 2               |
|              | 300          | 400            |                 |
|              | 400          | 500            |                 |
| 24           | 275          | 400            | 3               |
|              | 375          | 500            |                 |
|              | 505          | 630            |                 |
| 25           | 275          | 400            | 3               |
|              | 375          | 500            |                 |
|              | 505          | 630            |                 |
| 28           | 275          | 400            | 3               |
|              | 375          | 500            |                 |
|              | 505          | 630            |                 |
| 30           | 275          | 400            | 3               |
|              | 375          | 500            |                 |
|              | 505          | 630            |                 |
| 32           | 250          | 400            | 4               |
|              | 350          | 500            |                 |
|              | 480          | 630            |                 |
| 35           | 250          | 400            | 4               |
|              | 350          | 500            |                 |
|              | 480          | 630            |                 |
| 38           | 250          | 400            | 4               |
|              | 350          | 500            |                 |
|              | 480          | 630            |                 |
| 40           | 250          | 400            | 4               |
|              | 350          | 500            |                 |
|              | 480          | 630            |                 |
| 42           | 350          | 500            | 4               |
|              | 480          | 630            |                 |
|              | 350          | 500            |                 |
| 45           | 350          | 500            | 4               |
|              | 480          | 630            |                 |
|              | 350          | 500            |                 |
| 48           | 350          | 500            | 4               |
|              | 480          | 630            |                 |
|              | 350          | 500            |                 |
| 50           | 350          | 500            | 4               |
|              | 480          | 630            |                 |

A lengthened form of the Morse Taper Shank Twist Drill, longer than long series.  
Type 'N' Drills shall be supplied unless otherwise specified.



## High Speed Steel TAPER SHANK CORE DRILLS

Specifications Conform to  
 IS 5366 - 1978  
 ISO 7079 - 1981  
 DIN 343 - 1981  
 BS 328 : 1959  
 Dimensions in mm / Inch



| Diameter h8 |             | Flute Length | Over all Length | Morse Taper No. |
|-------------|-------------|--------------|-----------------|-----------------|
| mm          | inch        |              |                 |                 |
| 7.00        | 9/32        | 69           | 150             | 1               |
| 8.00        | 5/16        | 75           | 156             | 1               |
| 9.00        | 11/32       | 81           | 162             | 1               |
| 10.00       | 3/8,13/32   | 87           | 168             | 1               |
| 11.00       | 7/16        | 94           | 175             | 1               |
| 12.00       | 15/32       | 101          | 182             | 1               |
| 13.00       | 1/2         | 101          | 182             | 1               |
| 14.00       | 17/32       | 108          | 189             | 1               |
| 15.00       | 9/16        | 114          | 212             | 2               |
| 16.00       | 19/32,5/8   | 120          | 218             | 2               |
| 17.00       | 21/32       | 125          | 223             | 2               |
| 18.00       | 11/16       | 130          | 228             | 2               |
| 19.00       | 23/32       | 135          | 233             | 2               |
| 20.00       | 3/4, 25/32  | 140          | 338             | 2               |
| 21.00       | 13/16       | 145          | 243             | 2               |
| 22.00       | 27/32,7/8   | 150          | 248             | 2               |
| 23.00       | 29/32       | 155          | 253             | 2               |
| 24.00       | -           | 160          | 281             | 3               |
| 25.00       | 15/16,31/32 | 160          | 281             | 3               |
| 26.00       | 1,1/32      | 165          | 286             | 3               |
| 27.00       | 1.1/16      | 170          | 291             | 3               |
| 28.00       | 1.3/32      | 170          | 291             | 3               |

| Diameter h8 |               | Flute Length | Over all Length | Morse Taper No. |
|-------------|---------------|--------------|-----------------|-----------------|
| mm          | inch          |              |                 |                 |
| 29.00       | 1.1/8,1.5/32  | 175          | 296             | 3               |
| 30.00       | -             | 175          | 296             | 3               |
| 31.00       | 1.3/16,1.7/32 | 180          | 301             | 3               |
| -           | 1.1/4         | 185          | 306             | 3               |
| 32.00       | 1.9/32        | 185          | 334             | 4               |
| 33.00       | 1.5/16        | 185          | 334             | 4               |
| 34.00       | 1.11/32       | 190          | 339             | 4               |
| 35.00       | 1.3/8         | 190          | 339             | 4               |
| 36.00       | 1.13/32       | 195          | 344             | 4               |
| 37.00       | -             | 195          | 344             | 4               |
| 38.00       | 1.1/2         | 200          | 349             | 4               |
| 39.00       | -             | 200          | 349             | 4               |
| 40.00       | 1.9/16        | 200          | 349             | 4               |
| 41.00       | 1.5/8         | 205          | 354             | 4               |
| 42.00       | -             | 205          | 354             | 4               |
| 43.00       | 1.11/16       | 210          | 359             | 4               |
| 44.00       | 1.3/4         | 210          | 359             | 4               |
| 45.00       | -             | 210          | 359             | 4               |
| 46.00       | 1.13/16       | 215          | 364             | 4               |
| 47.00       | -             | 215          | 364             | 4               |
| 48.00       | 1.7/8         | 220          | 369             | 4               |
| 49.00       | 1.15/16       | 220          | 369             | 4               |

A drill having three or more helical flutes and a Standard Morse Taper Shank designed for opening out or enlarging holes.



## High Speed Steel TAPER SHANK CORE DRILLS

Specifications Conform to :  
 IS 5366 - 1978  
 ISO 7079 - 1981  
 DIN 343 - 1981  
 BS 328 : 1959  
 Dimensions in mm / Inch



| Diameter h8 |        | Flute Length | Overall Length | Morse Taper No. |
|-------------|--------|--------------|----------------|-----------------|
| mm          | inch   |              |                |                 |
| 50.00       | -      | 220          | 369            | 4               |
| 50.50       | 2      | 225          | 374            | 4               |
| 51.00       | -      | 225          | 412            | 5               |
| 52.00       | 2.1/16 | 225          | 412            | 5               |
| 53.00       | -      | 225          | 412            | 5               |
| 54.00       | 2.1/8  | 230          | 417            | 5               |
| 55.00       | -      | 230          | 417            | 5               |
| 56.00       | 2.3/16 | 230          | 417            | 5               |
| 57.00       | 2.1/4  | 235          | 422            | 5               |
| 58.00       | -      | 235          | 422            | 5               |
| 59.00       | 2.5/16 | 235          | 422            | 5               |
| 60.00       | -      | 235          | 422            | 5               |
| 61.00       | 2.3/8  | 240          | 427            | 5               |
| 62.00       | 2.7/16 | 240          | 427            | 5               |
| 63.00       | -      | 240          | 427            | 5               |
| 64.00       | 2.1/2  | 245          | 432            | 5               |

| Diameter h8 |         | Flute Length | Overall Length | Morse Taper No. |
|-------------|---------|--------------|----------------|-----------------|
| mm          | inch    |              |                |                 |
| 65.00       | 2.9/16  | 245          | 432            | 5               |
| 66.00       | -       | 245          | 432            | 5               |
| 67.00       | 2.5/8   | 245          | 432            | 5               |
| 68.00       | 2.11/16 | 250          | 437            | 5               |
| 69.00       | -       | 250          | 437            | 5               |
| 70.0        | 2.3/4   | 250          | 437            | 5               |
| 71.00       | -       | 250          | 437            | 5               |
| 72.00       | 2.13/16 | 255          | 442            | 5               |
| 73.00       | 2.7/8   | 255          | 442            | 5               |
| 74.00       | -       | 255          | 442            | 5               |
| 75.00       | 2.15/16 | 255          | 442            | 5               |
| 76.00       | 3       | 260          | 447            | 5               |
| 77.00       | -       | 260          | 514            | 6               |
| 78.00       | 3.1/16  | 260          | 514            | 6               |
| 79.00       | 3.1/8   | 260          | 514            | 6               |
| 80.00       | -       | 260          | 514            | 6               |

ISO 7079 : 1981 Specifies the Diameter ranges over 7.5 to 50mm.  
 DIN 343 : 1981 Specifies the Diameter ranges over 8.5 to 50mm.

- 1) Taper Shank Core drills upto and including 20mm dia are supplied with 3 flutes, over 20mm dia to 75mm dia are supplied with 4 flutes and over 75mm dia are supplied with 6 flutes.  
 (For DIN Specification, the No. of flutes shall be 3 for sizes upto & incl. 50mm dia.)
- 2) Type 'N' Drills shall be supplied unless otherwise specified.



**High Speed Steel  
CENTRE DRILLS - Type 'A'**

Specifications Conform to :  
IS 6708 - 1977  
ISO 866 - 1975  
DIN 333 - 1986  
Dimensions in mm



| Pilot Dia<br>k12 | Body Dia<br>h9 | Overall Length |         | Pilot Length |         |
|------------------|----------------|----------------|---------|--------------|---------|
|                  |                | Maximum        | Minimum | Maximum      | Minimum |
| 1.00             | 3.15           | 33.50          | 29.50   | 1.90         | 1.30    |
| 1.25             | 3.15           | 33.50          | 29.50   | 2.20         | 1.60    |
| 1.60             | 4.00           | 37.50          | 33.50   | 2.80         | 2.00    |
| 2.00             | 5.00           | 42.00          | 38.00   | 3.30         | 2.50    |
| 2.50             | 6.30           | 47.00          | 43.00   | 4.10         | 3.10    |
| 3.15             | 8.00           | 52.00          | 48.00   | 4.90         | 3.90    |
| 4.00             | 10.00          | 59.00          | 53.00   | 6.20         | 5.00    |
| 5.00             | 12.50          | 66.00          | 60.00   | 7.50         | 6.30    |
| 6.30             | 16.00          | 74.00          | 68.00   | 9.20         | 8.00    |
| 8.00             | 20.00          | 83.00          | 77.00   | 11.50        | 10.10   |
| 10.00            | 25.00          | 103.00         | 97.00   | 14.20        | 12.80   |

Type - 'A' Centre Drill for centre holes without protecting chamfer.



**High Speed Steel  
CENTRE DRILLS**

Specifications Conform to :  
BS 328 : Part 2 : 1950  
Dimensions in inch



| B.S.No. | Body Dia | Pilot Dia | Pilot Length |       | OAL   | Tolerance on   |
|---------|----------|-----------|--------------|-------|-------|----------------|
|         |          |           | Max          | Min   |       | Overall Length |
| 1       | 1/8      | 3/64      | 5/64         | 1/16  | 1.1/2 | ± 1/32         |
| 2       | 3/16     | 1/16      | 3/32         | 5/64  | 1.3/4 | ± 1/32         |
| 3       | 1/4      | 3/32      | 5/32         | 1/8   | 2     | ± 1/16         |
| 4       | 5/16     | 1/8       | 3/16         | 5/32  | 2.1/4 | ± 1/16         |
| 5       | 7/16     | 3/16      | 9/32         | 1/4   | 2.1/2 | ± 3/32         |
| 6       | 5/8      | 1/4       | 3/8          | 5/16  | 3     | ± 3/32         |
| 7       | 3/4      | 5/16      | 15/32        | 13/32 | 3.1/2 | ± 3/32         |



**High Speed Steel  
CENTRE DRILLS - Type 'B'**

Specifications Conform to :  
 IS 6709 - 1977  
 ISO 2540 - 1972  
 DIN 333 - 1986  
 Dimensions in mm



| Pilot Dia   | Body Dia   | Overall Length |         | Pilot Length |         |
|-------------|------------|----------------|---------|--------------|---------|
|             |            | Maximum        | Minimum | Maximum      | Minimum |
| k12<br>1.60 | h9<br>6.30 | 47.00          | 43.00   | 2.80         | 2.00    |
| 2.00        | 8.00       | 52.00          | 48.00   | 3.30         | 2.50    |
| 2.50        | 10.00      | 59.00          | 53.00   | 4.10         | 3.10    |
| 3.15        | 11.20      | 63.00          | 57.00   | 4.90         | 3.90    |
| 4.00        | 14.00      | 70.00          | 64.00   | 6.20         | 5.00    |
| 5.00        | 18.00      | 78.00          | 72.00   | 7.50         | 6.30    |
| 6.30        | 20.00      | 83.00          | 77.00   | 9.20         | 8.00    |
| 8.00        | 25.00      | 103.00         | 97.00   | 11.50        | 10.10   |

Type - 'B' Centre Drills for centre holes with protecting chamfers.





## High Speed Steel CENTRE DRILLS - Type 'R'

Specifications Conform to :  
IS 6710 - 1977  
ISO 2541 - 1972  
DIN 333 - 1986  
Dimensions in mm



| Pilot Dia<br>k12 | Body Dia<br>h9 | Overall Length |         | Pilot<br>Length | Radius  |         |
|------------------|----------------|----------------|---------|-----------------|---------|---------|
|                  |                | Maximum        | Minimum |                 | Maximum | Minimum |
| 1.00             | 3.15           | 33.50          | 29.50   | 3.00            | 3.15    | 2.50    |
| 1.25             | 3.15           | 33.50          | 29.50   | 3.35            | 4.00    | 3.15    |
| 1.60             | 4.00           | 37.50          | 33.50   | 4.25            | 5.00    | 4.00    |
| 2.00             | 5.00           | 42.00          | 38.00   | 5.30            | 6.30    | 5.00    |
| 2.50             | 6.30           | 47.00          | 43.00   | 6.70            | 8.00    | 6.30    |
| 3.15             | 8.00           | 52.00          | 48.00   | 8.50            | 10.00   | 8.00    |
| 4.00             | 10.00          | 59.00          | 53.00   | 10.60           | 12.50   | 10.00   |
| 5.00             | 12.50          | 66.00          | 60.00   | 13.20           | 16.00   | 12.50   |
| 6.30             | 16.00          | 74.00          | 68.00   | 17.00           | 20.00   | 16.00   |
| 8.00             | 20.00          | 83.00          | 77.00   | 21.20           | 25.00   | 20.00   |
| 10.00            | 25.00          | 103.00         | 97.00   | 26.50           | 31.50   | 25.00   |

Type - 'R' Centre Drills for centre holes with radius form.



**COMBINED DRILLS AND  
COUNTERSINKS**

Specifications Conform to :  
ASME B94.11M - 1993  
Dimensions in inch.



**PLAIN TYPE**

| Size | Body Diameter | Drill Diameter | Overall Length |
|------|---------------|----------------|----------------|
| 1    | 1/8           | 3/64           | 1.1/4          |
| 2    | 3/16          | 5/64           | 1.7/8          |
| 3    | 1/4           | 7/64           | 2              |
| 4    | 5/16          | 1/8            | 2.1/8          |
| 5    | 7/16          | 3/16           | 2.3/4          |
| 6    | 1/2           | 7/32           | 3              |
| 7    | 5/8           | 1/4            | 3.1/4          |
| 8    | 3/4           | 5/16           | 3.1/2          |



**BELL TYPE**

| Size | Body Diameter | Drill Diameter | Overall Length |
|------|---------------|----------------|----------------|
| 13   | 1/4           | 3/32           | 2              |
| 14   | 5/16          | 7/64           | 2.1/8          |
| 15   | 7/16          | 5/32           | 2.3/4          |
| 16   | 1/2           | 3/16           | 3              |
| 17   | 5/8           | 7/32           | 3.1/4          |
| 18   | 3/4           | 1/4            | 3.1/2          |



## High Speed Steel SUBLAND TWIST DRILLS WITH PARALLEL SHANK

Specifications Conform to :  
IS 12692 : 1989  
Dimensions in mm



### For Medium Series Type - A Countersinks

| Body Dia<br>h8 | Small Dia<br>h9 | Step<br>Length | Flute<br>Length | Overall<br>Length | Suitable for<br>Countersunk<br>Head Screws |
|----------------|-----------------|----------------|-----------------|-------------------|--|
| 13.00          | 6.60            | 15.00          | 101.00          | 151.00            | M6 x 1                                     |
| 17.20          | 9.00            | 19.00          | 130.00          | 191.00            | M8 x 1.25                                  |

### For Fine Series Type - A Countersinks

| Body Dia<br>h8 | Small Dia<br>h9 | Step<br>Length | Flute<br>Length | Overall<br>Length | Suitable for<br>Countersunk<br>Head Screws |
|----------------|-----------------|----------------|-----------------|-------------------|--|
| 11.50          | 6.40            | 15.00          | 94.00           | 142.00            | M6 x 0.75                                  |
| 15.00          | 8.40            | 19.00          | 114.00          | 169.00            | M8 x 0.75                                  |
| 19.00          | 10.50           | 23.00          | 135.00          | 198.00            | M10 x 0.75                                 |

Tool Type 'N' Subland Drills shall be supplied Unless otherwise Specified.



## High Speed Steel SUBLAND TWIST DRILLS WITH PARALLEL SHANK

Specifications Conform to :  
IS 12691 : 1989  
Dimensions in mm



| Body Dia<br>h <sub>8</sub> | Small Dia<br>h <sub>9</sub> | Step<br>Length | Flute<br>Length | Overall<br>Length | Suitable for<br>screw threads |
|----------------------------|-----------------------------|----------------|-----------------|-------------------|-------------------------------|
| 9.00                       | 6.80                        | 21.00          | 81.00           | 125.00            | M8 x 1.25                     |
| 11.00                      | 8.50                        | 25.50          | 94.00           | 142.00            | M10 x 1.50                    |
| 14.00                      | 10.20                       | 30.00          | 108.00          | 160.00            | M12 x 1.75                    |
| 15.50                      | 12.00                       | 34.50          | 120.00          | 178.00            | M14 x 2.0                     |

**Note :** For fine pitch threads, subland twist drills shall be manufactured to the same dimensions of 'd' 'L' 'l<sub>1</sub>' and 'l<sub>2</sub>'. They can be ordered as special tools and diameter 'd<sub>1</sub>' must be specified in such cases as given in IS : 10952 - 1984

Tool Type 'N' subland drills shall be supplied unless otherwise specified



**High Speed Steel**  
**SUBLAND TWIST DRILLS WITH**  
**PARALLEL SHANK**

Specifications Conform to :  
 IS 12689 : 1989  
 Dimensions in mm



| Body Dia<br>h <sub>8</sub> | Small Dia<br>h <sub>9</sub> | Step<br>Length | Flute<br>Length | Overall<br>Length | Suitable for<br>Cheese<br>Head Screws |
|----------------------------|-----------------------------|----------------|-----------------|-------------------|---------------------------------------|
| 11.00                      | 6.60                        | 15.00          | 94.00           | 142.00            | M6 x 1                                |
| 15.00                      | 9.00                        | 19.00          | 114.00          | 169.00            | M8 x 1.25                             |
| 18.00                      | 11.00                       | 23.00          | 130.00          | 191.00            | M10 x 1.50                            |

Tool Type 'N' Subland Drills shall be supplied Unless otherwise Specified.



**High Speed Steel**  
**SUBLAND TWIST DRILLS WITH**  
**MORSE TAPER SHANK**

Specifications Conform to :  
 IS 12688 : 1989  
 Dimensions in mm

for Clearance holes and countersinks for Countersunk head Screws



| Body Dia<br>h <sub>8</sub> | Small Dia<br>h <sub>9</sub> | Step<br>Length | Flute<br>Length | Overall<br>Length | Morse<br>Taper No. | Suitable for<br>Countersunk<br>Head Screws |
|----------------------------|-----------------------------|----------------|-----------------|-------------------|--------------------|--|
| 13.00                      | 6.60                        | 15.00          | 101.00          | 182.00            | 1                  | M6 x 1                                     |
| 17.20                      | 9.00                        | 19.00          | 130.00          | 228.00            | 2                  | M8 x 1.25                                  |
| 21.50                      | 11.00                       | 23.00          | 150.00          | 248.00            | 2                  | M10 x 1.50                                 |
| 25.00                      | 13.50                       | 27.00          | 160.00          | 281.00            | 3                  | M12 x 1.75                                 |
| 28.00                      | 15.50                       | 31.00          | 170.00          | 291.00            | 3                  | M14 x 2.0                                  |

Tool Type 'N' subland drills shall be supplied unless otherwise Specified.





## High Speed Steel SUBLAND TWIST DRILLS WITH MORSE TAPER SHANK

Specifications Conform to :  
IS 12687 : 1989  
Dimensions in mm

for holes prior to tapping Screws threads



| Big Dia<br>h <sub>8</sub> | Small Dia<br>h <sub>9</sub> | Step<br>Length | Flute<br>Length | Overall<br>Length | Morse<br>Taper No. | Suitable for<br>Screw<br>Threads |
|---------------------------|-----------------------------|----------------|-----------------|-------------------|--------------------|----------------------------------|
| 9.00                      | 6.80                        | 21.00          | 81.00           | 162               | 1                  | M8 x 1.25                        |
| 11.00                     | 8.50                        | 25.50          | 94.00           | 175               | 1                  | M10 x 1.50                       |
| 14.00                     | 10.20                       | 30.00          | 108.00          | 189               | 1                  | M12 x 1.75                       |
| 16.00                     | 12.00                       | 34.50          | 120.00          | 218               | 2                  | M14 x 2.00                       |
| 18.00                     | 14.00                       | 38.50          | 130.00          | 228               | 2                  | M16 x 2.00                       |
| 20.00                     | 15.50                       | 43.50          | 140.00          | 238               | 2                  | M18 x 2.50                       |
| 22.00                     | 17.50                       | 47.50          | 150.00          | 248               | 2                  | M20 x 2.50                       |
| 24.00                     | 19.50                       | 51.50          | 160.00          | 281               | 3                  | M22 x 2.50                       |
| 26.00                     | 21.00                       | 56.50          | 165.00          | 286               | 3                  | M24 x 3.00                       |
| 30.00                     | 24.00                       | 62.50          | 175.00          | 296               | 3                  | M27 x 3.00                       |
| 33.00                     | 26.50                       | 70.00          | 185.00          | 334               | 4                  | M30 x 3.50                       |

**Note :** For fine pitch threads, subland twist drills shall be manufactured to the same dimensions of 'd' 'L' 'l<sub>1</sub>' and 'l<sub>2</sub>' and Morse Taper Number as given in the above table. But can be ordered as a special tool with diameter 'd<sub>1</sub>' specified according to IS : 10952 - 1984.

Tool Type 'N' subland drills shall be supplied unless otherwise specified.





## High Speed Steel SUBLAND TWIST DRILLS WITH MORSE TAPER SHANK

Specifications Conform to:  
IS 12690 : 1989  
Dimensions in mm

For Clearance holes and counterbores for slotted cheese head Screws



| Big Dia<br>h8 | Small Dia<br>h9 | Step<br>Length | Flute<br>Length | Overall<br>Length | Morse<br>Taper No. | Suitable for<br>Slotted Cheese<br>head screws |
|---------------|-----------------|----------------|-----------------|-------------------|--------------------|---|
| 11.00         | 6.60            | 15.00          | 94.00           | 175               | 1                  | M6 x 1.00                                     |
| 15.00         | 9.00            | 19.00          | 114.00          | 212               | 2                  | M8 x 1.25                                     |
| 18.00         | 11.00           | 23.00          | 130.00          | 228               | 2                  | M10 x 1.50                                    |
| 20.00         | 13.50           | 27.00          | 140.00          | 238               | 2                  | M12 x 1.75                                    |
| 24.00         | 15.50           | 31.00          | 160.00          | 281               | 3                  | M14 x 2.00                                    |
| 26.00         | 17.50           | 35.00          | 165.00          | 286               | 3                  | M16 x 2.00                                    |
| 30.00         | 20.00           | 39.00          | 175.00          | 296               | 3                  | M18 x 2.50                                    |
| 33.00         | 22.00           | 43.00          | 185.00          | 334               | 4                  | M20 x 2.50                                    |

Tool Type 'N' subland drills shall be supplied unless otherwise Specified.



## TECHNICAL INFORMATION

1. High Speed Steels used for Cutting tools.
2. Technical calculations Drilling.
3. Helix Angle for Twist Drills
4. Recommended "Tool Types" & Point Angles for various materials.
5. Peripheral Speeds for HSS Twist Drills -  
( Ferrous materials & Non - ferrous materials.)
6. Drilling Speeds for Thermo Plastics.
7. Table of Cutting Speeds - Fractional Size Drills
8. Table of Cutting Speeds - Metric Size Drills
9. Table of Cutting Speeds - Number Size Drills
10. Feeds for HSS Twist Drills.
11. Types of Drill Points.
12. Cutting Fluids
13. Decimal Equivalentents
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## HIGH SPEED STEELS USED FOR CUTTING TOOLS

Specifications Conform to :  
IS 12690 : 1989  
Dimensions in mm

For Clearance holes and counterbores for slotted cheese head Screws

Depending on the application, cutting tools are manufactured using different grades of HSS. Non-Cobalt and Cobalt grades are widely in use and material made by Powder route is also gaining increased adaptation. The Work material, its hardness, the machine tool used, part configuration, finish required on the components and volume of components to be produced are a few requirements that influence selection of different grades of HSS for Manufacture of Cutting Tools. Chemical Composition of some grades of High Speed Steels normally used is given below : -

| Hss Grades | CHEMICAL COMPOSITION % |      |      |      |       |      |
|------------|------------------------|------|------|------|-------|------|
|            | C                      | Cr   | Mo   | W    | Co    | V    |
| M2         | 0.90                   | 4.20 | 5.00 | 6.40 | -     | 1.80 |
| M7         | 1.02                   | 3.80 | 8.60 | 1.80 | -     | 1.90 |
| M15        | 1.55                   | 4.50 | 3.00 | 6.50 | 5.00  | 5.00 |
| M35        | 0.93                   | 4.20 | 5.00 | 6.40 | 4.80  | 1.80 |
| M42        | 1.08                   | 3.80 | 9.40 | 1.50 | 8.00  | 1.20 |
| ASP2017    | 0.80                   | 4.20 | 3.00 | 3.00 | 8.00  | 1.00 |
| ASP 2030   | 1.28                   | 4.20 | 5.00 | 6.40 | 8.50  | 3.10 |
| ASP 2060   | 2.30                   | 4.20 | 7.00 | 6.50 | 10.50 | 6.50 |

**C** - Carbon

**Cr** - Chromium

**Mo** - Molybdenum

**W** - Tungsten

**Co** - Cobalt

**V** - Vanadium



## TECHNICAL CALCULATIONS - DRILLING

$$\text{Cutting Speed } V_c = \pi DN / 1000 \text{ (m / min.)}$$

$$\text{Feed Rate } V_f = f \times N \text{ (mm / min.)}$$

$$\text{Feed Force } F_f = 0.5 \times a_p \times f \times K_{CFZ} \times \sin K_f \text{ (N)}$$

$$\text{Torque } M_c = \frac{D \times F \times K_{CFZ} \times a_p}{2000} \left(1 - \frac{a_p}{D}\right) \text{ (NM)}$$

$$\text{Power Reqmnt. } P = \frac{a_p \times F \times K_{CFZ} \times V_c}{60 \times 10^3} \left(1 - \frac{a_p}{D}\right) \text{ (KW)}$$

Where, D = Drill Diameter (mm)

N = Spindle Speed (rpm)

$K_{CFZ}$  = Specific Cutting force for (N/mm<sup>2</sup>) |

$a_p$  = Cutting Depth (mm)

F = Feed per Revolution (mm/rev.)

$K_f$  = Tool Cutting Angle (Degrees)



## HELIX ANGLES FOR TWIST DRILL

| DIAMETER |                | HELIX ANGLES |           |           |
|----------|----------------|--------------|-----------|-----------|
| OVER     | Upto and Incl. | Type - N     | Type - H  | Type - S  |
| 0.70     | 1.00           | 20° - 26°    | 10° - 13° | 30° - 35° |
| 1.00     | 3.00           | 22° - 28°    | 11° - 14° | 31° - 36° |
| 3.00     | 8.00           | 24° - 30°    | 12° - 15° | 33° - 38° |
| 8.00     | 20.00          | 26° - 32°    | 12° - 16° | 36° - 41° |

| DIAMETER |                | HELIX ANGLES |           |           |
|----------|----------------|--------------|-----------|-----------|
| OVER     | Upto and Incl. | Type - N     | Type - H  | Type - S  |
| 20.00    | 35.00          | 27° - 34°    | 13° - 18° | 38° - 43° |
| 35.00    | 50.00          | 28° - 35°    | 13° - 18° | 39° - 44° |
| 50.00    | 80.00          | 29° - 37°    | -         | -         |

The helix angle which corresponds to the rake of the single point tool, depends upon materials and hole to be drilled. The drills are made in three types for Normal (N), Hard(H) and Soft (S) work piece materials. These type designations are based on the material to be cut and design requirements of drills. The range of helix angles for the three types of drills is given above.



## RECOMMENDED 'TOOL TYPES' AND POINT ANGLES FOR VARIOUS MATERIALS.

Ref : 185099

| Material of work piece   | Tensile Strength ( MPa)   | Brinell Hardness HB | Tool Type* | Point Angle ± 3° |
|--------------------------|---------------------------|---------------------|------------|------------------|
| Steel and cast steel     | 400 to 700                | 115 to 205          | N          | 118°             |
| (alloyed and un alloyed) | 700 to 1200               | 205 to 350          | N          | 130°             |
| Stainless steels         |                           |                     | N          | 140°             |
| Austenitic Steels        |                           |                     | H          | 140°             |
| Cast Iron                |                           | 140 to 200          | N          | 118°             |
|                          |                           | 200 to 240          | N          | 118°             |
|                          |                           | Over 240            | N (H)      | 118°             |
| Malleable Cast iron      |                           |                     | N          | 118°             |
| Brass                    | with copper up to 58%     |                     | H (N)      | 118°             |
|                          | with copper above 58%     |                     | N          | 118°             |
| German Silver            |                           |                     | N          | 118°             |
| Copper                   | Up to 30mm Drill Diameter |                     | S (N)      | 140°             |
|                          | Over 30mm Drill Diameter  |                     | N          | 140°             |
| Aluminium                | Long Chip Type            |                     | S (N)      | 140°             |
| Alloys                   | Short Chip Type           |                     | N          | 140°             |
| Magnesium Alloys Nickel  |                           |                     | H (N)      | 140°             |
| Zinc Alloys              |                           |                     | S (N)      | 118°             |
| White Metal              |                           |                     | S (N)      | 118°             |
| Moulded                  | Thickness ≤ Drill Dia     |                     | H          | 80°              |
| Plastics                 | Thickness > Drill Dia     |                     | S          | 80°              |
| Laminated Plastics       |                           |                     | H (N)      | 80°              |
| Celluloid                |                           |                     | S (N)      | 140°             |
| Hard rubber and thin     |                           |                     |            |                  |
| Plastic Materials        |                           |                     | H (N)      | 80°              |
| Marble Slate & Carbon    |                           |                     | H          | 80°              |

**Note :** The twist drills are made in three 'tool types', namely, Normal (N), Hard (H) and Soft (S) depending upon the material to be drilled.

\* 'Tool Types' within brackets are non - preferred.



## PERIPHERAL SPEEDS FOR HSS TWIST DRILLS (FERROUS MATERIALS)

| TYPE OF STEEL<br>B.S.970 EN Series No.   | Cutting Speed, Vc |              |
|--|-------------------|--------------|
|  | Feet / min.       | Meters /min. |
| <b>NON - ALLOY STEELS</b><br>(a) Up to 0.40% Carbon<br>Content 2, 3, 4, 5, 6, 7, 8 & 32.   | 80 - 100          | 24 - 30      |
| (b) 0.40% to 0.70% Carbon Content 9, 10, 43  | 60 - 80           | 18 - 24      |
| (c) Over 0.70% Carbon Content 42, 44   | 40 - 60           | 12 - 18      |
| <b>ALLOY STEELS</b><br>(a) Tensile Strength up to 60 Tons / Sq.Inch (94.50kg/Sq.mm) 11(T), 12, 13, 14, 15, 16 (RST), 17(RST) 18, 19(RST), 20(T), 21, 22, 23(ST), 24(ST), 25(T), 27(T), 29(RST), 31, 33, 34, 35, 37, 38, 39, 40(RST), 41, 51, 52, 53, 100(RST), 110(RST), 111(RST), 160(RST). | 50 - 70           | 15 - 21      |
| (b) Tensile Strength 60 - 80 Tons/Sq.Inch (94.50 to 126 Kg / Sq.mm) 11(V), 16(UV), 17(UV), 18(UVW), 19(UV), 20(V), 23(UV), 24(UVWX), 25(UVWX), 6(UVWX), 27(UVW), 28(UVW), 9((UVW), 40(U), 100(UV), 110(UVW), 111(U), 160(U).   | 30 - 50           | 9 - 15       |
| (c) Tensile Over 80 Tons/Sq.Inch (126 Kg/Sq.mm) 19(W), 24(YZ), 25(Y,Z), 26(YZ), 28(Y), 29(Z)   | 15 - 30           | 4.50 - 9     |
| <b>MARTENSITIC STAINLESS STEEL</b> (Magnetic ) 56, 57.   | 40 - 60           | 12 - 18      |
| <b>AUSTENITIC STAINLESS STEEL AND IRONS</b><br>(Non Magnetic) 54, 55, 58   | 20 - 40           | 6 - 12       |
| <b>12 / 14 % MANGANESE STEEL</b>   | 10 - 12           | 3.0 - 3.50   |
| <b>GREY CAST - IRON</b>  | 80 - 100          | 24 - 30      |
| <b>ALLOYED CAST IRON</b>   | 50 - 70           | 15 - 21      |

## PERIPHERAL SPEEDS FOR HSS TWIST DRILLS (NON-FERROUS MATERIALS)

| NON - FERROUS MATERIALS        | Cutting Speed, Vc |            |
|--------------------------------|-------------------|------------|
|                                | Feet/Min          | Meters/Min |
| Aluminium and Aluminium Alloys | 100 - 200         | 30 - 60    |
| Brass                          | 100 - 150         | 30 - 46    |
| Brass, Leaded                  | 100 - 200         | 30 - 61    |
| Bronze Ordinary                | 100 - 200         | 30 - 60    |
| Bronze, High Tensile           | 70 - 100          | 21 - 30    |
| Copper                         | 100 - 150         | 30 - 46    |

| NON - FERROUS MATERIALS        | Cutting Speed, Vc |            |
|--------------------------------|-------------------|------------|
|                                | Feet/Min          | Meters/Min |
| Magnesium and Magnesium Alloys | 200 - 300         | 60 - 90    |
| Monel Metal                    | 20 - 50           | 6 - 15     |
| Nickel                         | 30 - 50           | 9 - 15     |
| Nimonic Alloys                 | 10 - 20           | 3 - 6      |
| Zinc Base Alloys (mazak)       | 150 - 250         | 45 - 75    |

The peripheral speeds in these two tables is a suggested basis. In many instances, due to good operating conditions it may be practicable to increase them substantially.



## DRILLING SPEEDS FOR THERMOPLASTICS

| Material                | Type of Helix* | Included Point Angle | Cutting Speed 'Vc' in M/Min          |                              |
|-------------------------|----------------|----------------------|--------------------------------------|------------------------------|
|                         |                |                      | Shallow holes upto 3 times Drill Dia | Deep holes 6 times Drill Dia |
| Cellulose Acetate       | Quick          | 140°                 | 45                                   | 30                           |
| Cellulose Nitrate       | Standard       | 130°                 | 45                                   | 24                           |
| Polystyrene             | Quick          | 140°                 | 6                                    | 6                            |
| High Impact Polystyrene | Quick          | 140°                 | 45                                   | 27                           |
| Perspex                 | Slow           | 60°                  | 27                                   | 6                            |
| Ethyl Cellulose         | Quick          | 140°                 | 18                                   | 6                            |
| Nylon                   | Quick          | 140°                 | 45                                   | 30                           |
| Vulcanised Fibre        | Quick          | 118°                 | 60                                   | 45                           |
| P.V.C.                  | Quick          | 140°                 | 6                                    | 6                            |
| P.V.C. with Filter      | Quick          | 140°                 | 45                                   | 30                           |

\*This table applies when using drills upto 12mm dia. Above this diameter standard helix drills can usually be used.

### TABLE OF CUTTING SPEEDS - FRACTIONAL SIZE DRILLS

| CUTTING SPEED 'Vc' |                        |        |        |        |        |
|--------------------|------------------------|--------|--------|--------|--------|
| Ft/min             | 50                     | 60     | 70     | 80     | 100    |
| M/min              | 15                     | 18     | 21     | 24     | 30     |
| Drill Dia. 'Inch'  | REVOLUTIONS PER MINUTE |        |        |        |        |
| 1/64"              | 12,224                 | 14,656 | 17,088 | 19,520 | 24,448 |
| 1/32"              | 6,112                  | 7,328  | 8,544  | 9,760  | 12,224 |
| 3/64"              | 4,064                  | 4,896  | 5,696  | 6,528  | 8,160  |
| 1/16"              | 3,056                  | 3,664  | 4,272  | 4,880  | 6,112  |
| 5/64"              | 2,448                  | 2,928  | 3,424  | 3,904  | 4,896  |
| 3/32"              | 2,032                  | 2,448  | 2,848  | 3,264  | 4,080  |
| 1/8"               | 1,528                  | 1,832  | 2,136  | 2,440  | 3,056  |
| 5/32"              | 1,224                  | 1,464  | 1,712  | 1,952  | 2,448  |
| 3/16"              | 1,016                  | 1,224  | 1,424  | 1,632  | 2,040  |
| 7/32"              | 872                    | 1,048  | 1,224  | 1,400  | 1,744  |
| 1/4"               | 764                    | 916    | 1,068  | 1,220  | 1,528  |
| 5/16"              | 612                    | 732    | 856    | 976    | 1,224  |
| 3/8"               | 508                    | 612    | 712    | 816    | 1,020  |
| 7/16"              | 436                    | 524    | 612    | 700    | 872    |
| 1/2"               | 382                    | 458    | 534    | 670    | 764    |
| 9/16"              | 340                    | 408    | 476    | 544    | 680    |
| 5/8"               | 306                    | 366    | 428    | 488    | 612    |
| 11/16"             | 278                    | 334    | 388    | 444    | 556    |





## TABLE OF CUTTING SPEEDS - FRACTIONAL SIZE DRILLS

| CUTTING SPEED 'Vc' |                        |     |     |     |     |
|--------------------|------------------------|-----|-----|-----|-----|
| Ft/min             | 50                     | 60  | 70  | 80  | 100 |
| M/min              | 15                     | 18  | 21  | 24  | 30  |
| Drill Dia. 'Inch'  | REVELUTIONS PER MINUTE |     |     |     |     |
| 3/4"               | 254                    | 306 | 356 | 408 | 510 |
| 13/16"             | 234                    | 282 | 330 | 376 | 470 |
| 7/8"               | 218                    | 262 | 306 | 350 | 436 |
| 15/16"             | 204                    | 244 | 286 | 326 | 408 |
| 1"                 | 191                    | 229 | 267 | 305 | 382 |
| 1.1/8"             | 170                    | 204 | 238 | 272 | 340 |
| 1.1/4"             | 153                    | 183 | 214 | 244 | 306 |
| 1.1/2"             | 127                    | 153 | 178 | 204 | 255 |
| 1.3/4"             | 109                    | 131 | 153 | 175 | 218 |
| 2"                 | 95                     | 114 | 133 | 152 | 191 |
| 2.1/4"             | 85                     | 102 | 119 | 136 | 170 |
| 2.1/2"             | 76                     | 92  | 107 | 122 | 153 |
| 2.3/4"             | 69                     | 83  | 97  | 111 | 139 |
| 3"                 | 64                     | 76  | 89  | 102 | 127 |
| 4"                 | 48                     | 57  | 67  | 76  | 96  |

R.P.M. for Cutting Speeds not given. Can be obtained by simple addition or subtraction,  
**E.g. :** 150 ft/Min = 100 + 50 = 1,146 R.P.M. (for 1/2" Dia.)  
 30 ft / Min = 80 - 50 = 7,296 R.P.M. (for 1/64" Dia.)

| CUTTING SPEED 'Vc' |                        |        |        |        |        |
|--------------------|------------------------|--------|--------|--------|--------|
| Ft/min             | 50                     | 60     | 70     | 80     | 100    |
| M/min              | 15                     | 18     | 21     | 24     | 30     |
| Drill Dia. 'mm'    | REVELUTIONS PER MINUTE |        |        |        |        |
| 0.50               | 9,695                  | 11,634 | 13,573 | 15,512 | 19,390 |
| 1.00               | 4,847                  | 5,817  | 6,786  | 7,756  | 9,695  |
| 1.50               | 3,327                  | 3,884  | 4,532  | 5,179  | 6,474  |
| 2.00               | 2,427                  | 2,912  | 3,397  | 3,883  | 4,854  |
| 2.50               | 1,941                  | 2,329  | 2,717  | 3,105  | 3,882  |
| 3.00               | 1,617                  | 1,940  | 2,264  | 2,587  | 3,234  |
| 4.00               | 1,213                  | 1,455  | 1,698  | 1,940  | 2,425  |
| 5.00               | 970                    | 1,164  | 1,359  | 1,553  | 1,941  |
| 6.00               | 808                    | 970    | 1,132  | 1,294  | 1,617  |
| 7.00               | 693                    | 832    | 970    | 1,109  | 1,386  |
| 8.00               | 606                    | 728    | 849    | 970    | 1,213  |
| 9.00               | 539                    | 647    | 755    | 862    | 1,078  |
| 10.00              | 485                    | 582    | 679    | 776    | 970    |
| 11.00              | 441                    | 529    | 617    | 706    | 882    |
| 12.00              | 404                    | 485    | 566    | 647    | 808    |
| 13.00              | 373                    | 448    | 522    | 597    | 746    |
| 14.00              | 346                    | 416    | 485    | 554    | 693    |
| 15.00              | 323                    | 388    | 453    | 517    | 647    |
| 16.00              | 303                    | 364    | 424    | 485    | 606    |
| 17.00              | 285                    | 342    | 399    | 456    | 571    |
| 18.00              | 269                    | 323    | 377    | 431    | 539    |
| 19.00              | 255                    | 306    | 357    | 408    | 511    |



## TABLE OF CUTTING SPEEDS - METRIC SIZE DRILLS

| CUTTING SPEED 'Vc'  |                        |        |        |        |        |
|---------------------|------------------------|--------|--------|--------|--------|
| Ft/min              | 50                     | 60     | 70     | 80     | 100    |
| M/min               | 15                     | 18     | 21     | 24     | 30     |
| Drill Dia. No. Size | REVOLUTIONS PER MINUTE |        |        |        |        |
| 1                   | 838                    | 1,005  | 1,173  | 1,340  | 1,675  |
| 2                   | 864                    | 1,037  | 1,210  | 1,382  | 1,728  |
| 4                   | 914                    | 1,097  | 1,280  | 1,462  | 1,828  |
| 6                   | 936                    | 1,123  | 1,310  | 1,498  | 1,872  |
| 8                   | 960                    | 1,151  | 1,343  | 1,535  | 1,919  |
| 10                  | 987                    | 1,184  | 1,382  | 1,579  | 1,974  |
| 12                  | 1,010                  | 1,213  | 1,415  | 1,617  | 2,021  |
| 14                  | 1,050                  | 1,259  | 1,469  | 1,679  | 2,099  |
| 16                  | 1,079                  | 1,295  | 1,511  | 1,726  | 2,158  |
| 18                  | 1,130                  | 1,356  | 1,582  | 1,808  | 2,260  |
| 20                  | 1,186                  | 1,423  | 1,600  | 1,898  | 2,372  |
| 22                  | 1,217                  | 1,460  | 1,703  | 1,946  | 2,433  |
| 24                  | 1,257                  | 1,508  | 1,759  | 2,010  | 2,513  |
| 26                  | 1,299                  | 1,559  | 1,819  | 2,078  | 2,598  |
| 28                  | 1,360                  | 1,631  | 1,903  | 2,175  | 2,719  |
| 30                  | 1,487                  | 1,784  | 2,081  | 2,378  | 2,973  |
| 32                  | 1,647                  | 1,976  | 2,305  | 2,634  | 3,293  |
| 34                  | 1,721                  | 2,065  | 2,409  | 2,753  | 3,442  |
| 36                  | 1,794                  | 2,152  | 2,511  | 2,870  | 3,587  |
| 38                  | 1,882                  | 2,258  | 2,634  | 3,010  | 3,763  |
| 40                  | 1,949                  | 2,339  | 2,729  | 3,118  | 3,898  |
| 42                  | 2,043                  | 2,451  | 2,860  | 3,268  | 4,085  |
| 44                  | 2,221                  | 2,665  | 3,109  | 3,554  | 4,442  |
| 46                  | 2,358                  | 2,830  | 3,301  | 3,773  | 4,716  |
| 48                  | 2,513                  | 3,016  | 3,518  | 4,021  | 5,026  |
| 50                  | 2,729                  | 3,609  | 3,820  | 4,366  | 5,457  |
| 52                  | 3,008                  | 4,211  | 4,211  | 4,812  | 6,015  |
| 54                  | 3,473                  | 4,167  | 4,862  | 5,556  | 6,945  |
| 56                  | 4,108                  | 4,929  | 5,751  | 6,257  | 8,215  |
| 58                  | 4,547                  | 5,456  | 6,367  | 7,275  | 9,095  |
| 60                  | 4,775                  | 5,729  | 6,684  | 7,639  | 9,549  |
| 62                  | 5,025                  | 6,030  | 7,035  | 8,040  | 10,050 |
| 64                  | 5,305                  | 6,366  | 7,427  | 8,488  | 10,610 |
| 66                  | 5,790                  | 6,948  | 8,106  | 9,264  | 11,580 |
| 68                  | 6,160                  | 7,392  | 8,624  | 9,856  | 12,320 |
| 70                  | 6,820                  | 8,184  | 9,548  | 10,912 | 13,640 |
| 72                  | 7,640                  | 9,168  | 10,696 | 12,224 | 15,280 |
| 74                  | 8,510                  | 10,212 | 11,914 | 13,616 | 17,020 |
| 76                  | 9,550                  | 11,460 | 13,370 | 15,280 | 19,100 |
| 78                  | 11,935                 | 14,322 | 16,709 | 19,096 | 23,870 |
| 80                  | 14,150                 | 16,980 | 19,810 | 22,640 | 28,300 |



## FEEDS FOR HSS TWIST DRILLS

| FOR GENERAL PURPOSE   |                   |                   |              |
|-----------------------|-------------------|-------------------|--------------|
| Drill Diameter Inches | Feed / Rev Inches | Drill Diameter mm | Feed mm/Rev  |
| 1/16 - 3/32           | 0.0015 - 0.0025   | 1.6 - 3.0         | 0.04 - 0.06  |
| 1/8 - 5/32            | 0.002 - 0.004     | 3.0 - 4.0         | 0.05 - 0.10  |
| 3/16 - 7/32           | 0.003 - 0.006     | 4.0 - 5.50        | 0.075-0.15   |
| 1/4 - 5/16            | 0.004 - 0.008     | 5.50 - 8.0        | 0.10 - 0.20  |
| 3/8 - 7/16            | 0.006 - 0.010     | 8.0 - 11.0        | 0.15 - 0.25  |
| 1/2 - 9/16            | 0.008 - 0.012     | 11.0 - 14.5       | 0.20 - 0.30  |
| 5/8 - 11/16           | 0.009 - 0.013     | 14.5 - 17.5       | 0.23 - 0.33  |
| 3/4 - 13/16           | 0.010 - 0.014     | 17.5 - 20.5       | 0.25 - 0.36  |
| 7/8 - 15/16           | 0.011 - 0.015     | 20.5 - 24.0       | 0.28 - 0.38  |
| 1 - 1 1/8             | 0.012 - 0.016     | 24.0 - 28.5       | 0.30 - 0.40  |
| 1-1/4 - 1-1/2         | 0.014 - 0.018     | 28.5 - 38.0       | 0.35 - 0.45  |
| Over 1-1/2            | 0.016 - 0.020*    | Over 38.0         | 0.40 - 0.50* |

| FOR AUSTENITIC STAINLESS STEEL AND NIMONIC ALLOYS |                   |                   |              |
|---|-------------------|-------------------|--------------|
| Drill Diameter Inches                             | Feed / Rev Inches | Drill Diameter mm | Feed mm/Rev  |
| 1/16 - 3/32                                       | 0.002 - 0.0035    | 1.6 - 3.0         | 0.05 - 0.09  |
| 1/8 - 5/32  | 0.0025 - 0.006    | 3.0 - 4.0         | 0.06 - 0.15  |
| 3/16 - 7/32                                       | 0.004 - 0.009     | 4.0 - 5.50        | 0.10-0.23    |
| 1/4 - 5/16  | 0.005 - 0.012     | 5.50 - 8.0        | 0.125 - 0.30 |
| 3/8 - 7/16  | 0.0075 - 0.015    | 8.0 - 11.0        | 0.19 - 0.38  |
| 1/2 - 9/16  | 0.010 - 0.018     | 11.0 - 14.5       | 0.25 - 0.45  |
| 5/8 - 11/16                                       | 0.011 - 0.020     | 14.5 - 17.5       | 0.28 - 0.50  |
| 3/4 - 13/16                                       | 0.0125 - 0.021    | 17.5 - 20.5       | 0.31 - 0.53  |
| 7/8 - 15/16                                       | 0.0135 - 0.022    | 20.5 - 24.0       | 0.34 - 0.56  |
| 1 - 1 1/8   | 0.015 - 0.024     | 24.0 - 28.5       | 0.38 - 0.60  |
| 1-1/4 - 1-1/2                                     | 0.0175 - 0.027    | 28.5 - 38.0       | 0.44 - 0.68  |
| Over 1-1/2  | 0.020 - 0.030     | Over 38.0         | 0.50 - 0.750 |

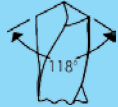

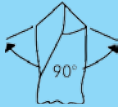


\* Or greater according to the work & working Conditions

**Note :** - On New Work, commence at the slowest appropriate speed and lightest feed, and gradually increase until Optimum output per grind is obtained.



# TYPES OF DRILL POINTS

## FOR VARIOUS APPLICATIONS

|   |  |
|---|--|
|    | <p>118° Point - General Purpose Point for most materials where work hardening or chip formation does not present a problem.</p>                          |
|    | <p>135° Point - A greater point angle is used for tough or hard materials such as highly alloyed steels.</p>   |
|    | <p>90° Point - A Smaller point angle is used for soft and highly ductile materials such as plastics and non ferrous metals.</p>                          |
|   | <p>Standard Point with 45° Chamfer - A corner chamfer is used to reduce the burr in soft materials or reduce corner breakdown in abrasive materials.</p> |
|  | <p>Split or Crankshaft Point - This type is used to reduce thrust when hand drilling tough materials or to make self centering for NC equipment.</p>     |

| <h3>CUTTING FLUIDS</h3>                       |   |
|---|---|
| Hard Tool and Alloy Steel                     | Soluble Oil Compound or neat cutting oil  |
| Low Carbon Steel                              | Soluble Oil   |
| Copper, brass or bronze                       | Soluble Oil or dry.   |
| Aluminium and magnesium alloys                | Soluble Oil or neat cutting oil specially produced for light alloys.                            |
| Cast Iron                                     | Dry or Compressed Air.  |
| Stainless Steel, Nimonic alloys, Monal metals | Soluble Oils can be used but Sulphurised or chlorinated mineral or fatty oils are most suitable |
| Zinc base alloys (MAZAK)                      | Soluble Oil.  |



# DECIMAL EQUIVALENTS

| Frac. | mm     | Inch   |
|-------|--------|--------|
|       | 0.32   | 0.0126 |
|       | 0.35   | 0.0138 |
|       | 0.38   | 0.0150 |
| 1/64  | 0.397  | 0.0156 |
|       | 0.40   | 0.0157 |
|       | 0.42   | 0.0165 |
|       | 0.45   | 0.0177 |
|       | 0.48   | 0.0189 |
|       | 0.50   | 0.0197 |
|       | 0.52   | 0.0205 |
|       | 0.55   | 0.0217 |
|       | 0.58   | 0.0228 |
|       | 0.60   | 0.0236 |
|       | 0.62   | 0.0244 |
|       | 0.65   | 0.0256 |
|       | 0.68   | 0.0268 |
|       | 0.70   | 0.0276 |
|       | 0.72   | 0.0283 |
|       | 0.75   | 0.0295 |
|       | 0.78   | 0.0307 |
| 1/32  | 0.7920 | 0.0312 |
|       | 0.80   | 0.0315 |
|       | 0.82   | 0.0323 |
|       | 0.85   | 0.0335 |
|       | 0.88   | 0.0346 |
|       | 0.90   | 0.0354 |
|       | 0.92   | 0.0362 |
|       | 0.94   | 0.0370 |
|       | 0.98   | 0.0386 |
|       | 1.00   | 0.0394 |
|       | 1.05   | 0.0413 |
|       | 1.10   | 0.0433 |
|       | 1.15   | 0.0453 |
| 3/64  | 1.191  | 0.0469 |
|       | 1.20   | 0.0472 |
|       | 1.25   | 0.0492 |
|       | 1.30   | 0.0512 |
|       | 1.35   | 0.0531 |
|       | 1.40   | 0.0551 |
|       | 1.45   | 0.0571 |
|       | 1.50   | 0.0591 |
|       | 1.55   | 0.0610 |
| 1/16  | 1.588  | 0.0625 |
|       | 1.60   | 0.0630 |
|       | 1.65   | 0.0650 |
|       | 1.70   | 0.0669 |
|       | 1.75   | 0.0689 |
|       | 1.80   | 0.0709 |
|       | 1.85   | 0.0728 |
|       | 1.90   | 0.0748 |
|       | 1.95   | 0.0768 |
| 5/64  | 1.984  | 0.0781 |
|       | 2.00   | 0.0787 |
|       | 2.05   | 0.0807 |
|       | 2.10   | 0.0827 |
|       | 2.15   | 0.0846 |
|       | 2.20   | 0.0866 |

| Frac. | mm    | Inch   |
|-------|-------|--------|
|       | 2.25  | 0.0886 |
|       | 2.30  | 0.0906 |
|       | 2.35  | 0.0925 |
| 3/32  | 2.381 | 0.0937 |
|       | 2.40  | 0.0945 |
|       | 2.45  | 0.0965 |
|       | 2.50  | 0.0984 |
|       | 2.55  | 0.1004 |
|       | 2.60  | 0.1024 |
|       | 2.65  | 0.1043 |
|       | 2.70  | 0.1063 |
|       | 2.75  | 0.1083 |
| 7/64  | 2.778 | 0.1094 |
|       | 2.80  | 0.1102 |
|       | 2.85  | 0.1122 |
|       | 2.90  | 0.1142 |
|       | 2.95  | 0.1161 |
|       | 3.00  | 0.1181 |
|       | 3.10  | 0.1220 |
| 1/8   | 3.175 | 0.1250 |
|       | 3.20  | 0.1260 |
|       | 3.30  | 0.1299 |
|       | 3.40  | 0.1339 |
|       | 3.50  | 0.1378 |
| 9/64  | 3.572 | 0.1406 |
|       | 3.60  | 0.1417 |
|       | 3.70  | 0.1457 |
|       | 3.80  | 0.1496 |
|       | 3.90  | 0.1535 |
| 5/32  | 3.969 | 0.1562 |
|       | 4.00  | 0.1575 |
|       | 4.10  | 0.1614 |
|       | 4.20  | 0.1654 |
|       | 4.30  | 0.1693 |
| 11/64 | 4.366 | 0.1719 |
|       | 4.40  | 0.1732 |
|       | 4.50  | 0.1772 |
|       | 4.60  | 0.1811 |
|       | 4.70  | 0.1850 |
| 3/16  | 4.762 | 0.1875 |
|       | 4.80  | 0.1890 |
|       | 4.90  | 0.1929 |
|       | 5.00  | 0.1969 |
|       | 5.10  | 0.2008 |
| 13/64 | 5.159 | 0.2031 |
|       | 5.20  | 0.2047 |
|       | 5.30  | 0.2087 |
|       | 5.40  | 0.2126 |
|       | 5.50  | 0.2165 |
| 7/32  | 5.556 | 0.2188 |
|       | 5.60  | 0.2205 |
|       | 5.70  | 0.2244 |
|       | 5.80  | 0.2283 |
|       | 5.90  | 0.2323 |
| 15/64 | 5.953 | 0.2344 |
|       | 6.00  | 0.2362 |
|       | 6.10  | 0.2402 |



# DECIMAL EQUIVALENTS

| Frac. | mm     | Inch   |
|-------|--------|--------|
|       | 6.20   | 0.2441 |
|       | 6.30   | 0.2480 |
| 1/4   | 6.35   | 0.2500 |
|       | 6.40   | 0.2520 |
|       | 6.50   | 0.2559 |
|       | 6.60   | 0.2598 |
|       | 6.70   | 0.2638 |
| 17/64 | 6.747  | 0.2656 |
|       | 6.80   | 0.2677 |
|       | 6.90   | 0.2717 |
|       | 7.00   | 0.2756 |
|       | 7.10   | 0.2795 |
| 9/32  | 7.144  | 0.2812 |
|       | 7.20   | 0.2835 |
|       | 7.30   | 0.2874 |
|       | 7.40   | 0.2913 |
|       | 7.50   | 0.2953 |
| 19/64 | 7.541  | 0.2969 |
|       | 7.60   | 0.2992 |
|       | 7.70   | 0.3031 |
|       | 7.80   | 0.3071 |
|       | 7.90   | 0.3110 |
| 5/16  | 7.938  | 0.3125 |
|       | 8.00   | 0.3150 |
|       | 8.10   | 0.3189 |
|       | 8.20   | 0.3228 |
|       | 8.30   | 0.3268 |
| 21/64 | 8.334  | 0.3281 |
|       | 8.40   | 0.3307 |
|       | 8.50   | 0.3346 |
|       | 8.60   | 0.3386 |
|       | 8.70   | 0.3425 |
| 11/32 | 8.731  | 0.3438 |
|       | 8.80   | 0.3456 |
|       | 8.90   | 0.3504 |
|       | 9.00   | 0.3543 |
|       | 9.10   | 0.3583 |
| 23/64 | 9.128  | 0.3594 |
|       | 9.20   | 0.3622 |
|       | 9.30   | 0.3661 |
|       | 9.40   | 0.3701 |
|       | 9.50   | 0.3740 |
| 3/8   | 9.525  | 0.3750 |
|       | 9.60   | 0.3780 |
|       | 9.70   | 0.3819 |
|       | 9.80   | 0.3858 |
|       | 9.90   | 0.3898 |
| 25/64 | 9.922  | 0.3906 |
|       | 10.00  | 0.3937 |
|       | 10.10  | 0.3976 |
|       | 10.20  | 0.4016 |
|       | 10.30  | 0.4055 |
| 13/32 | 10.319 | 0.4062 |
|       | 10.40  | 0.4094 |
|       | 10.50  | 0.4134 |
|       | 10.60  | 0.4173 |
|       | 10.70  | 0.4213 |
| 27/64 | 10.716 | 0.4219 |

| Frac. | mm     | Inch   |
|-------|--------|--------|
|       | 10.80  | 0.4252 |
|       | 10.90  | 0.4291 |
|       | 11.00  | 0.4331 |
|       | 11.10  | 0.4370 |
| 7/16  | 11.112 | 0.4375 |
|       | 11.20  | 0.4409 |
|       | 11.30  | 0.4449 |
|       | 11.40  | 0.4488 |
|       | 11.50  | 0.4528 |
| 29/64 | 11.509 | 0.4531 |
|       | 11.60  | 0.4567 |
|       | 11.70  | 0.4606 |
|       | 11.80  | 0.4646 |
|       | 11.90  | 0.4685 |
| 15/32 | 11.906 | 0.4688 |
|       | 12.00  | 0.4724 |
|       | 12.10  | 0.4764 |
|       | 12.20  | 0.4803 |
|       | 12.30  | 0.4843 |
| 31/64 | 12.303 | 0.4844 |
|       | 12.40  | 0.4882 |
|       | 12.50  | 0.4921 |
|       | 12.60  | 0.4961 |
| 1/2   | 12.70  | 0.5000 |
|       | 12.80  | 0.5039 |
|       | 12.90  | 0.5079 |
|       | 13.00  | 0.5118 |
| 33/64 | 13.097 | 0.5156 |
|       | 13.10  | 0.5157 |
|       | 13.20  | 0.5197 |
|       | 13.30  | 0.5236 |
|       | 13.40  | 0.5276 |
| 17/32 | 13.494 | 0.5312 |
|       | 13.50  | 0.5315 |
|       | 13.60  | 0.5354 |
|       | 13.70  | 0.5394 |
|       | 13.80  | 0.5433 |
| 35/64 | 13.891 | 0.5469 |
|       | 13.90  | 0.5472 |
|       | 14.00  | 0.5512 |
|       | 14.25  | 0.5610 |
| 9/16  | 14.288 | 0.5625 |
|       | 14.50  | 0.5709 |
| 37/64 | 14.684 | 0.5781 |
|       | 14.75  | 0.5807 |
|       | 15.00  | 0.5906 |
| 19/32 | 15.081 | 0.5938 |
|       | 15.25  | 0.6004 |
| 39/64 | 15.478 | 0.6094 |
|       | 15.50  | 0.6102 |
|       | 15.75  | 0.6201 |
| 5/8   | 15.875 | 0.6250 |
|       | 16.00  | 0.6229 |
|       | 16.25  | 0.6398 |
| 41/64 | 16.272 | 0.6406 |
|       | 16.50  | 0.6496 |
| 21/32 | 16.669 | 0.6562 |





# DECIMAL EQUIVALENTS

| Frac. | mm     | Inch   |
|-------|--------|--------|
|       | 16.75  | 0.6594 |
|       | 17.00  | 0.6693 |
| 43/64 | 17.066 | 0.6719 |
|       | 17.25  | 0.6791 |
| 11/16 | 17.462 | 0.6875 |
|       | 17.50  | 0.6890 |
|       | 17.75  | 0.6988 |
| 45/64 | 17.859 | 0.7031 |
|       | 18.00  | 0.7087 |
|       | 18.25  | 0.7185 |
| 23/32 | 18.256 | 0.7188 |
|       | 18.50  | 0.7283 |
| 47/64 | 18.653 | 0.7344 |
|       | 18.75  | 0.7382 |
|       | 19.00  | 0.7480 |
| 3/4   | 19.050 | 0.7500 |
|       | 19.25  | 0.7579 |
| 49/64 | 19.44  | 0.7656 |
|       | 19.50  | 0.7677 |
|       | 19.75  | 0.7776 |
| 25/32 | 19.844 | 0.7812 |
|       | 20.00  | 0.7874 |
| 51/64 | 20.241 | 0.7969 |
|       | 20.25  | 0.7972 |
|       | 20.50  | 0.8071 |
| 13/16 | 20.638 | 0.8125 |
|       | 20.75  | 0.8169 |
|       | 21.00  | 0.8268 |
| 53/64 | 21.034 | 0.8281 |
|       | 21.25  | 0.8366 |
| 27/32 | 21.431 | 0.8438 |
|       | 21.50  | 0.8465 |
|       | 21.75  | 0.8563 |
| 55/64 | 21.828 | 0.8594 |
|       | 22.00  | 0.8661 |
| 7/8   | 22.225 | 0.8750 |
|       | 22.25  | 0.8760 |
|       | 22.50  | 0.8858 |
| 57/64 | 22.622 | 0.8906 |
|       | 22.75  | 0.8957 |
|       | 23.00  | 0.9055 |
| 29/32 | 23.019 | 0.9062 |
|       | 23.25  | 0.9154 |
| 59/64 | 23.416 | 0.9219 |
|       | 23.50  | 0.9252 |
|       | 23.75  | 0.9350 |
| 15/16 | 23.812 | 0.9375 |
|       | 24.00  | 0.9449 |
| 61/64 | 24.209 | 0.9531 |
|       | 24.25  | 0.9547 |
|       | 24.50  | 0.9646 |
| 31/32 | 24.606 | 0.9688 |
|       | 24.75  | 0.9744 |
|       | 25.00  | 0.9843 |
| 63/64 | 25.003 | 0.9844 |
| 1     | 25.40  | 1.0000 |
|       | 25.50  | 1.0039 |

| Frac.     | mm     | Inch   |
|-----------|--------|--------|
| 1 - 1/64  | 25.797 | 1.0156 |
|           | 26.000 | 1.0236 |
| 1 - 1/32  | 26.194 | 1.0312 |
|           | 26.500 | 1.0433 |
| 1 - 3/64  | 26.591 | 1.0469 |
| 1 - 1/16  | 26.988 | 1.0625 |
|           | 27.000 | 1.0630 |
| 1 - 5/64  | 27.384 | 1.0781 |
|           | 27.500 | 1.0827 |
| 1 - 3/32  | 27.781 | 1.0938 |
|           | 28.000 | 1.1024 |
| 1 - 7/64  | 28.178 | 1.1094 |
|           | 28.500 | 1.1220 |
| 1 - 1/8   | 28.575 | 1.1250 |
| 1 - 9/64  | 28.972 | 1.1406 |
|           | 29.000 | 1.1417 |
| 1 - 5/32  | 29.369 | 1.1562 |
|           | 29.500 | 1.1614 |
| 1 - 11/64 | 29.766 | 1.1719 |
|           | 30.000 | 1.1811 |
| 1 - 3/16  | 30.162 | 1.1875 |
|           | 30.500 | 1.2008 |
| 1 - 13/64 | 30.559 | 1.2031 |
| 1 - 7/32  | 30.956 | 1.2188 |
|           | 31.000 | 1.2205 |
| 1 - 15/64 | 31.353 | 1.2344 |
|           | 31.500 | 1.2402 |
| 1 - 1/4   | 31.750 | 1.2500 |
|           | 32.000 | 1.2598 |
| 1 - 17/64 | 32.147 | 1.2656 |
|           | 32.500 | 1.2795 |
| 1 - 9/32  | 32.544 | 1.2812 |
| 1 - 19/64 | 33.941 | 1.2969 |
|           | 33.000 | 1.2992 |
| 1 - 5/16  | 33.338 | 1.3125 |
|           | 33.500 | 1.3189 |
| 1 - 21/64 | 33.734 | 1.3281 |
|           | 34.000 | 1.3386 |
| 1 - 11/32 | 34.131 | 1.3438 |
|           | 34.500 | 1.3583 |
| 1 - 23/64 | 34.528 | 1.3594 |
| 1 - 3/8   | 34.925 | 1.3750 |
|           | 35.000 | 1.3780 |
| 1 - 25/64 | 35.322 | 1.3906 |
|           | 35.500 | 1.3976 |
| 1 - 13/32 | 35.719 | 1.4062 |
|           | 36.000 | 1.4173 |
| 1 - 27/64 | 36.116 | 1.4290 |
|           | 36.500 | 1.4370 |
| 1 - 7/16  | 36.512 | 1.4375 |
| 1 - 29/64 | 36.909 | 1.4531 |
|           | 37.000 | 1.4567 |
| 1 - 15/32 | 37.306 | 1.4688 |
|           | 37.500 | 1.4764 |
| 1 - 31/64 | 37.703 | 1.4844 |
|           | 38.000 | 1.4961 |
| 1 - 1/2   | 38.100 | 1.5000 |



# DECIMAL EQUIVALENTS

| Frac.     | mm     | Inch   |
|-----------|--------|--------|
| 1-33/64   | 38.497 | 1.5156 |
|           | 38.50  | 1.5157 |
| 1-17/32   | 38.894 | 1.5312 |
|           | 39.0   | 1.5354 |
| 1-35/64   | 39.291 | 1.5469 |
|           | 39.50  | 1.5551 |
| 1-9/16    | 39.688 | 1.5625 |
|           | 40.00  | 1.5748 |
| 1-37/64   | 40.084 | 1.5781 |
| 1-19/32   | 40.481 | 1.5938 |
|           | 40.50  | 1.5945 |
| 1-39/64   | 40.878 | 1.6094 |
|           | 41.00  | 1.6142 |
| 1-5/8     | 41.275 | 1.6250 |
|           | 41.50  | 1.6339 |
| 1-41/64   | 41.672 | 1.6406 |
|           | 42.00  | 1.6535 |
| 1 - 21/32 | 42.069 | 1.6562 |
| 1-43/64   | 42.466 | 1.6719 |
|           | 42.50  | 1.6732 |
| 1-11/16   | 42.862 | 1.6875 |
|           | 43.00  | 1.6929 |
| 1-45/64   | 43.259 | 1.7031 |
|           | 43.50  | 1.7126 |
| 1-23/32   | 43.656 | 1.7188 |
|           | 44.00  | 1.7223 |
| 1-47/64   | 44.053 | 1.7344 |
| 1-3/4     | 44.450 | 1.7500 |
|           | 44.50  | 1.7520 |
| 1-49/64   | 44.847 | 1.7656 |
|           | 45.00  | 1.7717 |
| 1-25/32   | 45.244 | 1.7812 |
|           | 45.50  | 1.7913 |
| 1-51/64   | 45.641 | 1.7969 |
|           | 46.00  | 1.8110 |
| 1 - 13/16 | 46.038 | 1.8125 |
| 1 - 53/64 | 46.434 | 1.8281 |
|           | 46.50  | 1.8307 |
| 1 - 27/32 | 46.831 | 1.8438 |
|           | 47.00  | 1.8504 |
| 1-55/64   | 47.228 | 1.8594 |
|           | 47.50  | 1.8701 |
| 1- 7/8    | 47.625 | 1.8750 |
|           | 48.00  | 1.8898 |
| 1 - 57/64 | 48.022 | 1.8906 |
| 1 - 29/32 | 48.419 | 1.9062 |
|           | 48.50  | 1.9094 |
| 1- 59/64  | 48.816 | 1.9219 |
|           | 49.00  | 1.9291 |
| 1- 15/16  | 49.212 | 1.9375 |
|           | 49.50  | 1.9488 |
| 1- 61/64  | 49.609 | 1.9531 |
|           | 50.00  | 1.9685 |
| 1-31/32   | 50.006 | 1.9688 |
| 1-63/64   | 50.403 | 1.9844 |
|           | 50.50  | 1.9882 |
| 2         | 50.800 | 2.0000 |

| Frac.     | mm     | Inch   |
|-----------|--------|--------|
|           | 51.00  | 2.0079 |
| 2 - 1/32  | 51.594 | 2.0312 |
|           | 52.00  | 2.0472 |
| 2 - 1/16  | 52.388 | 2.0625 |
|           | 53.00  | 2.0866 |
| 2 - 3/32  | 53.181 | 2.0938 |
| 2 - 1/8   | 53.975 | 2.1250 |
|           | 54.00  | 2.1260 |
| 2 - 5/32  | 54.769 | 2.1562 |
|           | 55.00  | 2.1654 |
| 2 - 3/16  | 55.562 | 2.1875 |
|           | 56.00  | 2.2047 |
| 2 - 7/32  | 56.356 | 2.2188 |
|           | 57.00  | 2.2441 |
| 2 - 1/4   | 57.150 | 2.2500 |
| 2-9/32    | 57.944 | 2.2812 |
|           | 58.00  | 2.2835 |
| 2 - 5/16  | 58.738 | 2.3125 |
|           | 59.00  | 2.3228 |
| 2 - 11/32 | 59.531 | 2.3438 |
|           | 60.00  | 2.3622 |
| 2 - 3/8   | 60.325 | 2.3750 |
|           | 61.00  | 2.4016 |
| 2 - 13/32 | 61.119 | 2.4062 |
| 2 - 7/16  | 61.912 | 2.4375 |
|           | 62.00  | 2.4409 |
| 2 - 15/32 | 62.706 | 2.4688 |
|           | 63.00  | 2.4803 |
| 2 - 1/2   | 63.50  | 2.5000 |
|           | 64.00  | 2.5197 |
| 2-17/32   | 64.294 | 2.5312 |
|           | 65.00  | 2.5591 |
| 2 - 9/16  | 65.088 | 2.5625 |
| 2 - 19/32 | 65.881 | 2.5938 |
|           | 66.00  | 2.5984 |
| 2 - 5/8   | 66.675 | 2.6250 |
|           | 67.00  | 2.6378 |
| 2 - 21/32 | 67.469 | 2.6562 |
|           | 68.00  | 2.6772 |
| 2 - 11/16 | 68.262 | 2.6875 |
|           | 69.00  | 2.7165 |
| 2 - 23/32 | 69.056 | 2.7188 |
| 2 - 3/4   | 69.850 | 2.7500 |
|           | 70.00  | 2.7559 |
| 2 - 25/32 | 70.644 | 2.7812 |
|           | 71.00  | 2.7953 |
| 2 - 13/16 | 71.438 | 2.8125 |
|           | 72.00  | 2.8346 |
| 2 - 27/32 | 72.231 | 2.8438 |
|           | 73.00  | 2.8740 |
| 2 - 7/8   | 73.025 | 2.8750 |
| 2 - 29/32 | 73.819 | 2.9062 |
|           | 74.00  | 2.9134 |
| 2-15/16   | 74.612 | 2.9375 |
|           | 75.00  | 2.9528 |
| 2- 31/32  | 75.406 | 2.9688 |
|           | 76.00  | 2.9921 |



# DECIMAL EQUIVALENTS

| Frac.     | mm     | Inch   |
|-----------|--------|--------|
| 3         | 76.200 | 3.0000 |
| 3 - 1/32  | 76.994 | 3.0312 |
|           | 77.00  | 3.0315 |
| 3 - 1/16  | 77.788 | 3.0625 |
|           | 78.00  | 3.0709 |
| 3 - 3/32  | 78.581 | 3.0938 |
|           | 79.00  | 3.1102 |
| 3 - 1/8   | 79.375 | 3.1250 |
|           | 80.00  | 3.1496 |
| 3 - 5/32  | 80.169 | 3.1562 |
| 3 - 3/16  | 80.962 | 3.1875 |
|           | 81.00  | 3.1890 |
| 3 - 7/32  | 81.756 | 3.2188 |
|           | 82.00  | 3.2283 |
| 3 - 1/4   | 82.550 | 3.2500 |
|           | 83.00  | 3.2677 |
| 3 - 9/32  | 83.344 | 3.2812 |
|           | 84.00  | 3.3071 |
| 3 - 5/16  | 84.138 | 3.3125 |
| 3 - 11/32 | 84.931 | 3.3438 |
|           | 85.00  | 3.3465 |
| 3 - 3/8   | 85.725 | 3.3750 |
|           | 86.00  | 3.3858 |
| 3 - 13/32 | 86.519 | 3.4062 |
|           | 87.00  | 3.4252 |
| 3 - 7/16  | 87.312 | 3.4375 |
|           | 88.00  | 3.4646 |
| 3 - 15/32 | 88.106 | 3.4688 |
| 3 - 1/2   | 88.90  | 3.5000 |
|           | 89.00  | 3.5039 |
|           | 90.00  | 3.5433 |
| 3 - 9/16  | 90.488 | 3.5625 |
|           | 91.00  | 3.5827 |
|           | 92.00  | 3.6220 |
| 3 - 5/8   | 92.075 | 3.6250 |

| Frac.     | mm      | Inch    |
|-----------|---------|---------|
|           | 93.00   | 3.6614  |
| 3 - 11/16 | 93.662  | 3.6875  |
|           | 94.00   | 3.7008  |
|           | 95.00   | 3.7402  |
| 3 - 3/4   | 95.250  | 3.7500  |
|           | 96.00   | 3.7795  |
| 3 - 13/16 | 96.838  | 3.8125  |
|           | 97.00   | 3.8189  |
|           | 98.00   | 3.8583  |
| 3 - 7/8   | 98.425  | 3.8750  |
|           | 99.00   | 3.8976  |
|           | 100.00  | 3.9370  |
| 3 - 15/16 | 100.012 | 3.9375  |
| 4         | 101.600 | 4.0000  |
| 4 - 1/4   | 107.950 | 4.2500  |
| 4 - 1/2   | 114.300 | 4.5000  |
| 4 - 3/4   | 120.650 | 4.7500  |
| 5         | 127.000 | 5.0000  |
| 5 - 1/4   | 133.350 | 5.2500  |
| 5 - 1/2   | 139.70  | 5.5000  |
| 5 - 3/4   | 146.050 | 5.7500  |
| 6         | 152.400 | 6.0000  |
| 6 - 1/2   | 165.100 | 6.5000  |
| 7         | 177.800 | 7.0000  |
| 7 - 1/2   | 190.500 | 7.5000  |
| 8         | 203.200 | 8.0000  |
| 8 - 1/2   | 215.900 | 8.5000  |
| 9         | 228.600 | 9.0000  |
| 9 - 1/2   | 241.300 | 9.5000  |
| 10        | 254.000 | 10.0000 |
| 10 - 1/2  | 266.700 | 10.5000 |
| 11        | 279.400 | 11.0000 |
| 11 - 1/2  | 292.100 | 11.5000 |
| 12        | 304.800 | 12.0000 |



## DECIMAL AND METRIC EQUIVALENTS FOR GAUGE AND LETTER SIZE DRILLS

| Drill Gauge and Letter Size | Decimal Equivalent "Inch" | Metric Equivalent "mm" |
|-----------------------------|---------------------------|------------------------|
| 68                          | 0.0310                    | 0.787                  |
| 67                          | 0.0320                    | 0.813                  |
| 66                          | 0.0330                    | 0.838                  |
| 65                          | 0.0350                    | 0.889                  |
| 64                          | 0.0360                    | 0.914                  |
| 63                          | 0.0370                    | 0.940                  |
| 62                          | 0.0380                    | 0.965                  |
| 61                          | 0.0390                    | 0.991                  |
| 60                          | 0.0400                    | 1.016                  |
| 59                          | 0.0410                    | 1.041                  |
| 58                          | 0.0420                    | 1.067                  |
| 57                          | 0.0430                    | 1.092                  |
| 56                          | 0.0465                    | 1.181                  |
| 55                          | 0.0520                    | 1.321                  |
| 54                          | 0.0550                    | 1.397                  |
| 53                          | 0.0595                    | 1.511                  |
| 52                          | 0.0635                    | 1.613                  |
| 51                          | 0.0670                    | 1.702                  |
| 50                          | 0.0700                    | 1.778                  |
| 49                          | 0.0730                    | 1.854                  |
| 48                          | 0.0760                    | 1.930                  |
| 47                          | 0.0785                    | 1.994                  |
| 46                          | 0.0810                    | 2.057                  |
| 45                          | 0.0820                    | 2.083                  |
| 44                          | 0.0860                    | 2.184                  |
| 43                          | 0.0890                    | 2.261                  |
| 42                          | 0.0935                    | 2.375                  |
| 41                          | 0.0960                    | 2.438                  |
| 40                          | 0.0980                    | 2.489                  |
| 39                          | 0.0995                    | 2.527                  |
| 38                          | 0.1015                    | 2.578                  |
| 37                          | 0.1040                    | 2.642                  |
| 36                          | 0.1065                    | 2.705                  |
| 35                          | 0.1100                    | 2.794                  |
| 34                          | 0.1110                    | 2.819                  |
| 33                          | 0.1130                    | 2.870                  |
| 32                          | 0.1160                    | 2.946                  |
| 31                          | 0.1200                    | 3.048                  |
| 30                          | 0.1285                    | 3.264                  |
| 29                          | 0.1360                    | 3.454                  |
| 28                          | 0.1405                    | 3.569                  |
| 27                          | 0.1440                    | 3.658                  |
| 26                          | 0.1470                    | 3.734                  |
| 25                          | 0.1495                    | 3.797                  |
| 24                          | 0.1520                    | 3.861                  |
| 23                          | 0.1540                    | 3.912                  |
| 22                          | 0.1570                    | 3.988                  |

| Drill Gauge and Letter Size | Decimal Equivalent Inch | Metric Equivalent "mm" |
|-----------------------------|-------------------------|------------------------|
| 21                          | 0.1590                  | 4.039                  |
| 20                          | 0.1610                  | 4.089                  |
| 19                          | 0.1660                  | 4.216                  |
| 18                          | 0.1695                  | 4.305                  |
| 17                          | 0.1730                  | 4.394                  |
| 16                          | 0.1770                  | 4.496                  |
| 15                          | 0.1800                  | 4.572                  |
| 14                          | 0.1820                  | 4.623                  |
| 13                          | 0.1850                  | 4.699                  |
| 12                          | 0.1890                  | 4.801                  |
| 11                          | 0.1910                  | 4.851                  |
| 10                          | 0.1935                  | 4.915                  |
| 9                           | 0.1960                  | 4.978                  |
| 8                           | 0.1990                  | 5.055                  |
| 7                           | 0.2010                  | 5.105                  |
| 6                           | 0.2040                  | 5.182                  |
| 5                           | 0.2055                  | 5.220                  |
| 4                           | 0.2090                  | 5.309                  |
| 3                           | 0.2130                  | 5.410                  |
| 2                           | 0.2210                  | 5.613                  |
| 1                           | 0.2280                  | 5.791                  |
| A                           | 0.2340                  | 5.944                  |
| B                           | 0.2380                  | 6.045                  |
| C                           | 0.2420                  | 6.147                  |
| D                           | 0.2460                  | 6.248                  |
| E                           | 0.2500                  | 6.350                  |
| F                           | 0.2570                  | 6.528                  |
| G                           | 0.2610                  | 6.629                  |
| H                           | 0.2660                  | 6.756                  |
| I                           | 0.2720                  | 6.909                  |
| J                           | 0.2770                  | 7.036                  |
| K                           | 0.2810                  | 7.137                  |
| L                           | 0.2900                  | 7.366                  |
| M                           | 0.2950                  | 7.493                  |
| N                           | 0.3020                  | 7.671                  |
| O                           | 0.3160                  | 8.026                  |
| P                           | 0.3230                  | 8.204                  |
| Q                           | 0.3320                  | 8.433                  |
| R                           | 0.3390                  | 8.611                  |
| S                           | 0.3480                  | 8.839                  |
| T                           | 0.3580                  | 9.093                  |
| U                           | 0.3680                  | 9.347                  |
| V                           | 0.3770                  | 9.576                  |
| W                           | 0.3860                  | 9.804                  |
| X                           | 0.3970                  | 10.084                 |
| Y                           | 0.4040                  | 10.262                 |
| Z                           | 0.4130                  | 10.490                 |



## STANDARD TOLERANCES AND DEVIATIONS

Ref : IS 919

| Diameter Steps in mm |     | Values of deviations in microns ( 1 micron = 0.001mm ) |      |      |      |     |      |     |     |     |      |      |      |      |      |      |
|----------------------|-----|--|------|------|------|-----|------|-----|-----|-----|------|------|------|------|------|------|
| Over                 | To  | d9   | d11  | e8   | e9   | f7  | f11  | g6  | h6  | h8  | h9   | h11  | h12  | h13  | h16* | i6   |
| -                    | 3 * | -20  | -20  | -14  | -14  | -6  | -6   | -2  | 0   | 0   | 0    | 0    | 0    | 0    | 0    | + 4  |
|                      |     | -45  | -80  | -28  | -39  | -16 | -66  | -8  | -6  | -14 | -25  | -60  | -100 | -140 | -600 | -2   |
| 3                    | 6   | -30  | -30  | -20  | -20  | -10 | -10  | -4  | 0   | 0   | 0    | 0    | 0    | 0    | 0    | + 6  |
|                      |     | -60  | -105 | -38  | -50  | -22 | -85  | -12 | -8  | -18 | -30  | -75  | -120 | -180 | -750 | -2   |
| 6                    | 10  | -40  | -40  | -25  | -25  | -13 | -13  | -5  | 0   | 0   | 0    | 0    | 0    | 0    | 0    | + 7  |
|                      |     | -76  | -130 | -47  | -61  | -28 | -103 | -14 | -9  | -22 | -36  | -90  | -150 | -220 | -900 | -2   |
| 10                   | 18  | -50  | -50  | -32  | -32  | -16 | -16  | -6  | 0   | 0   | 0    | 0    | 0    | 0    | 0    | + 8  |
|                      |     | -93  | -160 | -59  | -75  | -34 | -126 | -17 | -11 | -27 | -43  | -110 | -180 | -270 |      | -3   |
| 18                   | 30  | -65  | -65  | -40  | -40  | -20 | -20  | -7  | 0   | 0   | 0    | 0    | 0    | 0    | 0    | + 9  |
|                      |     | -117   | -195 | -73  | -92  | -41 | -150 | -20 | -13 | -33 | -52  | -130 | -210 | -330 |      | -4   |
| 30                   | 50  | -80  | -80  | -50  | -50  | -25 | -25  | -9  | 0   | 0   | 0    | 0    | 0    | 0    | 0    | + 11 |
|                      |     | -142   | -240 | -89  | -112 | -50 | -185 | -25 | -16 | -39 | -62  | -160 | -250 | -390 |      | -5   |
| 50                   | 80  | -100   | -100 | -60  | -60  | -30 | -30  | -10 | 0   | 0   | 0    | 0    | 0    | 0    | 0    | + 12 |
|                      |     | -174   | -290 | -106 | -134 | -60 | -220 | -29 | -19 | -46 | -74  | -190 | -300 | -460 |      | -7   |
| 80                   | 120 | -120   | -120 | -72  | -72  | -36 | -36  | -12 | 0   | 0   | 0    | 0    | 0    | 0    | 0    | + 13 |
|                      |     | -207   | -340 | -126 | -159 | -71 | -256 | -34 | -22 | -54 | -87  | -220 | -350 | -540 |      | -9   |
| 120                  | 180 | -145   | -145 | -85  | -85  | -43 | -43  | -14 | 0   | 0   | 0    | 0    | 0    | 0    | 0    | + 14 |
|                      |     | -245   | -395 | -148 | -185 | -83 | -293 | -39 | -25 | -63 | -100 | -250 | -400 | -630 |      | -11  |
| 180                  | 250 | -170   | -170 | -100 | -100 | -50 | -50  | -15 | 0   | 0   | 0    | 0    | 0    | 0    | 0    | + 16 |
|                      |     | -285   | -460 | -172 | -215 | -96 | -340 | -44 | -29 | -72 | -115 | -290 | -460 | -720 |      | -13  |

\* Upto 1mm, the grade 16 is not given

## STANDARD TOLERANCES AND DEVIATIONS

Ref : IS 919

| Diameter Steps in mm |     | Values of deviations in microns ( 1 micron = 0.001mm ) |       |       |      |       |       |       |           |           |            |            |            |              |          |
|----------------------|-----|--|-------|-------|------|-------|-------|-------|-----------|-----------|------------|------------|------------|--------------|----------|
| Over                 | To  | js4  | js10  | js11  | js12 | js14* | js15* | js16* | k11       | k12       | k16*       | m5         | m6         | C11          | H6       |
| -                    | 3*  | ±1.5   | ±20   | ±30   | ±50  | ±125  | ±200  | ±300  | +60<br>0  | +100<br>0 | +600<br>0  | +6<br>+2   | +8<br>+2   | +120<br>+60  | +6<br>0  |
| 3                    | 6   | ±2   | ±24   | ±37.5 | ±60  | ±150  | ±240  | ±375  | +75<br>0  | +120<br>0 | +750<br>0  | +9<br>+4   | +12<br>+4  | +145<br>+70  | +8<br>0  |
| 6                    | 10  | ±2   | ±29   | ±45   | ±75  | ±180  | ±290  | ±450  | +90<br>0  | +150<br>0 | +900<br>0  | +12<br>+6  | +15<br>+6  | +170<br>+80  | +9<br>0  |
| 10                   | 18  | ±2.5   | ±35   | ±55   | ±90  | ±215  | ±350  | ±550  | +110<br>0 | +180<br>0 | +1100<br>0 | +15<br>+7  | +18<br>+7  | +205<br>+95  | +11<br>0 |
| 18                   | 30  | ±3   | ±42   | ±65   | ±105 | ±260  | ±420  | ±650  | +130<br>0 | +210<br>0 | +1300<br>0 | +17<br>+8  | +21<br>+8  | +240<br>+110 | +13<br>0 |
| 30                   | 50  | ±3.5   | ±50   | ±80   | ±125 | ±310  | ±500  | ±800  | +160<br>0 | +250<br>0 | +1600<br>0 | +20<br>+9  | +25<br>+9  | +170<br>+80  | +16<br>0 |
| 50                   | 80  | ±4   | ±60   | ±95   | ±150 | ±370  | ±600  | ±950  | +190<br>0 | +300<br>0 | +1900<br>0 | +24<br>+11 | +30<br>+11 | +170<br>+80  | +19<br>0 |
| 80                   | 120 | ±5   | ±70   | ±110  | ±175 | ±435  | ±700  | ±1100 | +220<br>0 | +350<br>0 | +2200<br>0 | +28<br>+13 | +35<br>+13 | +170<br>+80  | +22<br>0 |
| 120                  | 180 | ±6   | ±80   | ±125  | ±200 | ±500  | ±800  | ±1250 | +250<br>0 | +400<br>0 | +2500<br>0 | +33<br>+15 | +40<br>+15 | +170<br>+80  | +25<br>0 |
| 180                  | 250 | ±7   | ±92.5 | ±145  | ±230 | ±575  | ±925  | ±1450 | +290<br>0 | +460<br>0 | +2900<br>0 | +37<br>+17 | +46<br>+17 | +170<br>+80  | +29<br>0 |

\* Upto 1mm, the grades 14,15 & 16 are not given

## STANDARD TOLERANCES AND DEVIATIONS

Ref : IS 919

| Diameter Steps in mm |     | Values of deviations in microns ( 1 micron = 0.001mm ) |          |           |           |           |           |            |            | Diameter Steps in mm |             |       |      |    |              |
|----------------------|-----|--|----------|-----------|-----------|-----------|-----------|------------|------------|----------------------|-------------|-------|------|----|--------------|
| Over                 | To  | H7   | H8       | H9        | H11       | H12       | H13       | H14*       | H15*       | N9*                  | N11*        | IT16* | Over | To | z9           |
| -                    | 3*  | +10<br>0   | +14<br>0 | +25<br>0  | +60<br>0  | +100<br>0 | +140<br>0 | +250<br>0  | +400<br>0  | - 4<br>- 29          | - 4<br>- 64 | 600   | -    | 3  | +51<br>+26   |
| 3                    | 6   | +12<br>0   | +18<br>0 | +30<br>0  | +75<br>0  | +120<br>0 | +180<br>0 | +300<br>0  | +480<br>0  | 0<br>- 30            | 0<br>- 75   | 750   | 3    | 6  | +65<br>+35   |
| 6                    | 10  | +15<br>0   | +22<br>0 | +36<br>0  | +90<br>0  | +150<br>0 | +220<br>0 | +360<br>0  | +580<br>0  | 0<br>- 36            | 0<br>- 90   | 900   | 6    | 10 | +78<br>+42   |
| 10                   | 18  | +18<br>0   | +27<br>0 | +43<br>0  | +110<br>0 | +180<br>0 | +270<br>0 | +430<br>0  | +700<br>0  | 0<br>- 43            | 0<br>- 110  | 1100  | 10   | 14 | +93<br>+50   |
| 18                   | 30  | +21<br>0   | +33<br>0 | +52<br>0  | +130<br>0 | +210<br>0 | +330<br>0 | +520<br>0  | +840<br>0  | 0<br>- 52            | 0<br>- 130  | 1300  | 14   | 18 | +103<br>+60  |
| 30                   | 50  | +25<br>0   | +39<br>0 | +62<br>0  | +160<br>0 | +250<br>0 | +390<br>0 | +620<br>0  | +1000<br>0 | 0<br>- 62            | 0<br>- 160  | 1600  | 18   | 24 | +125<br>+73  |
| 50                   | 80  | +30<br>0   | +46<br>0 | +74<br>0  | +190<br>0 | +300<br>0 | +460<br>0 | +740<br>0  | +1200<br>0 | 0<br>- 74            | 0<br>- 190  | 1900  | 24   | 30 | +140<br>+88  |
| 80                   | 120 | +35<br>0   | +54<br>0 | +87<br>0  | +220<br>0 | +350<br>0 | +540<br>0 | +870<br>0  | +1400<br>0 | 0<br>- 87            | 0<br>- 220  | 2200  | 30   | 40 | +174<br>+112 |
| 120                  | 180 | +40<br>0   | +63<br>0 | +100<br>0 | +250<br>0 | +400<br>0 | +630<br>0 | +1000<br>0 | +1600<br>0 | 0<br>- 100           | 0<br>- 250  | 2500  | 40   | 50 | +198<br>+136 |
| 180                  | 250 | +46<br>0   | +72<br>0 | +115<br>0 | +290<br>0 | +460<br>0 | +720<br>0 | +1150<br>0 | +1850<br>0 | 0<br>- 115           | 0<br>- 290  | 2900  | 50   | 65 | +246<br>+172 |

\* Upto 1mm, the grades 14,15, 16, N9 and N11 are not given