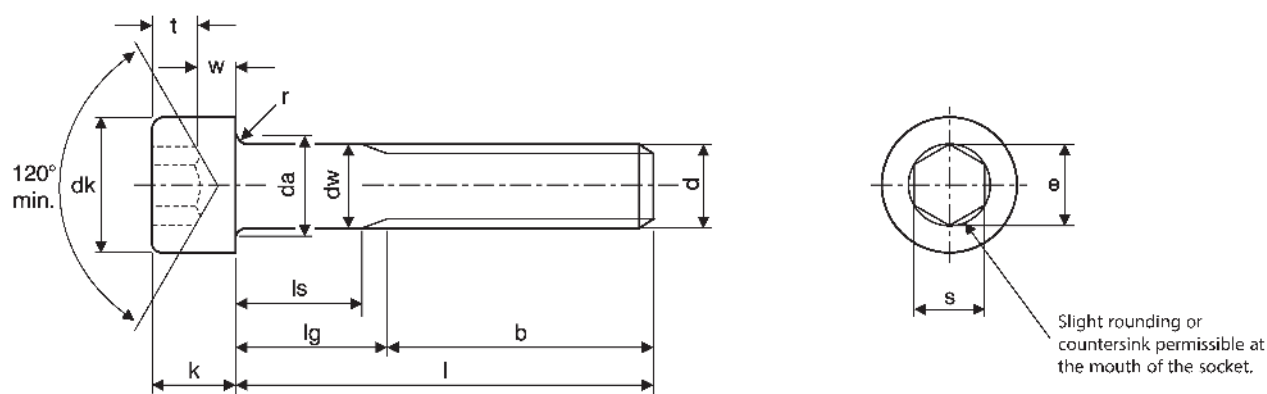


# Hexagon Socket Head Screws

EN ISO 4762 (DIN 912)

Grade 12.9



DIN 912 Dimensions of Socket Head Screws

| Nominal size and thread diameter $d$ | Pitch of thread $P$ | Thread length $b$ | Head diameter $dk$ |        | Transition diameter $da$ | Diameter of unthreaded shank $ds$ |        | Hex socket width across corners $e$ | Thickness of head $k$ |        | Radius under head $r$ | Hex socket width across flats $s$ |       |       | Hex socket depth $t$ | $w$  |
|--------------------------------------|---------------------|-------------------|--------------------|--------|--------------------------|-----------------------------------|--------|-------------------------------------|-----------------------|--------|-----------------------|-----------------------------------|-------|-------|----------------------|------|
|                                      | coarse pitch        | max.              | min.               | max.   | max.                     | min.                              | max.   | min.                                | min.                  | max.   | nom.                  | min.                              | max.  | nom.  | min.                 | min. |
| M10                                  | 1.50                | 32                | 15.73              | 16.00  | 11.20                    | 9.78                              | 10.00  | 9.15                                | 9.64                  | 10.00  | 0.4                   | 8.03                              | 8.18  | 8.00  | 5.0                  | 4.0  |
| M12                                  | 1.75                | 36                | 17.73              | 18.00  | 13.70                    | 11.73                             | 12.00  | 11.43                               | 11.57                 | 12.00  | 0.6                   | 10.03                             | 10.18 | 10.00 | 6.0                  | 4.8  |
| M14                                  | 2.00                | 40                | 20.67              | 21.00  | 15.70                    | 13.73                             | 14.00  | 13.73                               | 13.57                 | 14.00  | 0.6                   | 12.03                             | 12.21 | 12.00 | 7.0                  | 5.8  |
| M16                                  | 2.00                | 44                | 23.67              | 24.00  | 17.70                    | 15.73                             | 16.00  | 15.73                               | 15.57                 | 16.00  | 0.6                   | 14.03                             | 14.21 | 14.00 | 8.0                  | 6.8  |
| M18                                  | 2.50                | 48                | 26.67              | 27.00  | 20.20                    | 17.73                             | 18.00  | 17.73                               | 17.57                 | 18.00  | 0.6                   | 14.03                             | 14.21 | 14.00 | 9.0                  | 7.8  |
| M20                                  | 2.50                | 52                | 29.67              | 30.00  | 22.40                    | 19.67                             | 20.00  | 19.44                               | 19.48                 | 20.00  | 0.8                   | 17.05                             | 17.23 | 17.00 | 10.0                 | 8.6  |
| M22                                  | 2.50                | 56                | 32.61              | 33.00  | 24.40                    | 21.67                             | 22.00  | 19.44                               | 21.48                 | 22.00  | 0.8                   | 17.05                             | 17.23 | 17.00 | 11.0                 | 9.4  |
| M24                                  | 3.00                | 60                | 35.61              | 36.00  | 26.40                    | 23.67                             | 24.00  | 21.73                               | 23.48                 | 24.00  | 0.8                   | 19.07                             | 19.28 | 19.00 | 12.0                 | 10.4 |
| M27                                  | 3.00                | 66                | 39.61              | 40.00  | 30.40                    | 26.67                             | 27.00  | 21.73                               | 26.48                 | 27.00  | 1.0                   | 19.07                             | 19.28 | 19.00 | 13.5                 | 11.9 |
| M30                                  | 3.50                | 72                | 44.61              | 45.00  | 33.40                    | 29.67                             | 30.00  | 25.15                               | 29.48                 | 30.00  | 1.0                   | 22.07                             | 22.28 | 22.00 | 15.5                 | 13.1 |
| M33                                  | 3.50                | 78                | 49.61              | 50.00  | 36.40                    | 32.61                             | 33.00  | 27.43                               | 32.38                 | 33.00  | 1.0                   | 24.07                             | 24.28 | 24.00 | 18.0                 | 13.5 |
| M36                                  | 4.00                | 84                | 53.54              | 54.00  | 39.40                    | 35.61                             | 36.00  | 30.85                               | 35.38                 | 36.00  | 1.0                   | 27.07                             | 27.28 | 27.00 | 19.0                 | 15.3 |
| M42                                  | 4.50                | 95                | 62.54              | 63.00  | 45.50                    | 41.61                             | 42.00  | 36.57                               | 41.38                 | 42.00  | 1.2                   | 32.08                             | 32.33 | 32.00 | 24.0                 | 16.3 |
| M48                                  | 5.00                | 108               | 71.54              | 72.00  | 52.60                    | 47.61                             | 48.00  | 41.13                               | 47.38                 | 48.00  | 1.6                   | 36.08                             | 36.33 | 36.00 | 28.0                 | 17.5 |
| M56                                  | 5.50                | 124               | 83.46              | 84.00  | 63.00                    | 55.54                             | 56.00  | 46.83                               | 56.26                 | 56.00  | 2.0                   | 41.08                             | 41.33 | 41.00 | 34.0                 | 19.0 |
| M64                                  | 6.00                | 140               | 95.46              | 96.00  | 71.00                    | 63.54                             | 64.00  | 52.53                               | 63.26                 | 64.00  | 2.0                   | 46.08                             | 46.33 | 46.00 | 38.0                 | 22.0 |
| M72                                  | 6.00                | 156               | 107.46             | 108.00 | 79.00                    | 71.54                             | 72.00  | 62.81                               | 71.26                 | 72.00  | 2.0                   | 55.10                             | 55.10 | 55.00 | 43.0                 | 25.0 |
| M80                                  | 6.00                | 172               | 119.46             | 120.00 | 87.00                    | 79.54                             | 80.00  | 74.21                               | 79.26                 | 80.00  | 2.0                   | 65.10                             | 65.40 | 65.00 | 48.0                 | 27.0 |
| M90                                  | 6.00                | 192               | 134.37             | 135.00 | 97.00                    | 89.46                             | 90.00  | 85.61                               | 89.13                 | 90.00  | 2.5                   | 75.10                             | 75.40 | 75.00 | 54.0                 | 32.0 |
| M100                                 | 6.00                | 212               | 149.37             | 150.63 | 107.00                   | 99.46                             | 100.00 | 97.04                               | 99.13                 | 100.00 | 2.5                   | 85.12                             | 85.47 | 85.00 | 60.0                 | 34.0 |

Hexagon Socket Head Screws

EN ISO 4762 (DIN 912)Grade 12.9

DIN 912 Dimensions of Socket Head Screws (concluded)

| d    | M10   |       | M12   |       | M14   |        | M16    |        | M18    |        | M20    |        | M22    |        | M24    |        | M27    |        | M30    |        |
|------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| l    | ls    | lg    | ls    | lg    | ls    | lg     | ls     | lg     | ls     | lg     | ls     | lg     | ls     | lg     | ls     | lg     | ls     | lg     | ls     | lg     |
| nom. | min.  | max.  | min.  | max.  | min.  | max.   | min.   | max.   | min.   | max.   | min.   | max.   | min.   | max.   | min.   | max.   | min.   | max.   | min.   | max.   |
| 25   | -     | 4.50  | -     | 5.25  | -     | 6.00   | -      | 6.00   |        |        |        |        |        |        |        |        |        |        |        |        |
| 30   | -     | 4.50  | -     | 5.25  | -     | 6.00   | -      | 6.00   | -      | 7.50   | -      | 7.50   |        |        |        |        |        |        |        |        |
| 35   | -     | 4.50  | -     | 5.25  | -     | 6.00   | -      | 6.00   | -      | 7.50   | -      | 7.50   | -      | 7.50   |        |        |        |        |        |        |
| 40   | -     | 4.50  | -     | 5.25  | -     | 6.00   | -      | 6.00   | -      | 7.50   | -      | 7.50   | -      | 7.50   |        | 9.00   |        |        |        |        |
| 45   | 5.50  | 13.00 | -     | 5.25  | -     | 6.00   | -      | 6.00   | -      | 7.50   | -      | 7.50   | -      | 7.50   |        | 9.00   | -      | 9.00   | -      | 10.50  |
| 50   | 10.50 | 18.00 | -     | 5.25  | -     | 6.00   | -      | 6.00   | -      | 7.50   | -      | 7.50   | -      | 7.50   |        | 9.00   | -      | 9.00   | -      | 10.50  |
| 55   | 15.50 | 23.00 | 10.25 | 19.00 | -     | 6.00   | -      | 6.00   | -      | 7.50   | -      | 7.50   | -      | 7.50   |        | 9.00   | -      | 9.00   | -      | 10.50  |
| 60   | 20.50 | 28.00 | 15.25 | 24.00 | 10.00 | 20.00  | -      | 6.00   | -      | 7.50   | -      | 7.50   | -      | 7.50   |        | 9.00   | -      | 9.00   | -      | 10.50  |
| 65   | 25.50 | 33.00 | 20.25 | 29.00 | 15.00 | 25.00  | 11.00  | 21.00  | -      | 7.50   | -      | 7.50   | -      | 7.50   |        | 9.00   | -      | 9.00   | -      | 10.50  |
| 70   | 30.50 | 38.00 | 25.25 | 34.00 | 20.00 | 30.00  | 16.00  | 26.00  | 9.50   | 22.00  | -      | 7.50   | -      | 7.50   |        | 9.00   | -      | 9.00   | -      | 10.50  |
| 80   | 40.50 | 48.00 | 35.25 | 44.00 | 30.00 | 40.00  | 26.00  | 36.00  | 19.50  | 32.00  | 15.50  | 28.00  | 11.50  | 24.00  |        | 9.00   | -      | 9.00   | -      | 10.50  |
| 90   | 50.50 | 58.00 | 45.25 | 54.00 | 40.00 | 50.00  | 36.00  | 46.00  | 29.50  | 42.00  | 25.50  | 38.00  | 21.50  | 34.00  | 15.00  | 30.00  | -      | 9.00   | -      | 10.50  |
| 100  | 60.50 | 68.00 | 55.25 | 64.00 | 50.00 | 60.00  | 46.00  | 56.00  | 39.50  | 52.00  | 35.50  | 48.00  | 31.50  | 44.00  | 25.00  | 40.00  | 19.00  | 34.00  | -      | 10.50  |
| 110  |       |       | 65.25 | 74.00 | 60.00 | 70.00  | 56.00  | 66.00  | 49.50  | 62.00  | 45.50  | 58.00  | 41.50  | 54.00  | 35.00  | 50.00  | 29.00  | 44.00  | 20.50  | 38.00  |
| 120  |       |       | 75.25 | 84.00 | 70.00 | 80.00  | 66.00  | 76.00  | 59.50  | 72.00  | 55.50  | 68.00  | 51.50  | 64.00  | 45.00  | 60.00  | 39.00  | 54.00  | 30.50  | 48.00  |
| 130  |       |       |       |       | 80.00 | 90.00  | 76.00  | 86.00  | 69.50  | 82.00  | 65.50  | 78.00  | 61.50  | 74.00  | 55.00  | 70.00  | 49.00  | 64.00  | 40.50  | 58.00  |
| 140  |       |       |       |       | 90.00 | 100.00 | 86.00  | 96.00  | 79.50  | 92.00  | 75.50  | 88.00  | 71.50  | 84.00  | 65.00  | 80.00  | 59.00  | 74.00  | 50.50  | 68.00  |
| 150  |       |       |       |       |       |        | 96.00  | 106.00 | 89.50  | 102.00 | 85.50  | 98.00  | 81.50  | 94.00  | 75.00  | 90.00  | 69.00  | 84.00  | 60.50  | 78.00  |
| 160  |       |       |       |       |       |        | 106.00 | 116.00 | 99.50  | 112.00 | 95.50  | 108.00 | 91.50  | 104.00 | 85.00  | 100.00 | 79.00  | 94.00  | 70.50  | 88.00  |
| 180  |       |       |       |       |       |        |        |        | 119.50 | 132.00 | 115.50 | 128.00 | 111.50 | 124.00 | 105.0  | 120.00 | 99.00  | 114.00 | 90.50  | 108.00 |
| 200  |       |       |       |       |       |        |        |        |        |        | 135.50 | 148.00 | 131.50 | 144.00 | 125.00 | 140.00 | 119.00 | 134.00 | 110.50 | 128.00 |

| d    | M33    |        | M36    |        | M42    |        | M48    |        | M56    |        | M64    |        | M72    |        | M80   |        | M90   |        | M100  |       |
|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|--------|-------|--------|-------|-------|
| l    | ls     | lg     | ls     | lg     | ls     | lg     | ls     | lg     | ls     | lg     | ls     | lg     | ls     | lg     | ls    | lg     | ls    | lg     | ls    | lg    |
| nom. | min.   | max.   | min.   | max.   | min.   | max.   | min.   | max.   | min.   | max.   | min.   | max.   | min.   | max.   | min.  | max.   | min.  | max.   | min.  | max.  |
| 50   | -      | 10.50  |        |        |        |        |        |        |        |        |        |        |        |        |       |        |       |        |       |       |
| 55   | -      | 10.50  | -      | 12.00  |        |        |        |        |        |        |        |        |        |        |       |        |       |        |       |       |
| 60   | -      | 10.50  | -      | 12.00  | -      | 13.50  |        |        |        |        |        |        |        |        |       |        |       |        |       |       |
| 65   | -      | 10.50  | -      | 12.00  | -      | 13.50  |        |        |        |        |        |        |        |        |       |        |       |        |       |       |
| 70   | -      | 10.50  | -      | 12.00  | -      | 13.50  | -      | 15.00  |        |        |        |        |        |        |       |        |       |        |       |       |
| 80   | -      | 10.50  | -      | 12.00  | -      | 13.50  | -      | 15.00  | -      | 16.50  |        |        |        |        |       |        |       |        |       |       |
| 90   | -      | 10.50  | -      | 12.00  | -      | 13.50  | -      | 15.00  | -      | 16.50  | -      | 18.00  |        |        |       |        |       |        |       |       |
| 100  | -      | 10.50  | -      | 12.00  | -      | 13.50  | -      | 15.00  | -      | 16.50  | -      | 18.00  | -      | 18.00  |       |        |       |        |       |       |
| 110  | 14.50  | 32.00  | -      | 12.00  | -      | 13.50  | -      | 15.00  | -      | 16.50  | -      | 18.00  | -      | 18.00  |       |        |       |        |       |       |
| 120  | 24.50  | 42.00  | 16.00  | 36.00  | -      | 13.50  | -      | 15.00  | -      | 16.50  | -      | 18.00  | -      | 18.00  | -     | 18.00  |       |        |       |       |
| 130  | 34.50  | 52.00  | 26.00  | 46.00  | -      | 13.50  | -      | 15.00  | -      | 16.50  | -      | 18.00  | -      | 18.00  | -     | 18.00  |       |        |       |       |
| 140  | 44.50  | 62.00  | 36.00  | 56.00  | 21.50  | 44.00  | -      | 15.00  | -      | 16.50  | -      | 18.00  | -      | 18.00  | -     | 18.00  | -     | 18.00  |       |       |
| 150  | 54.50  | 72.00  | 46.00  | 66.00  | 31.50  | 54.00  | -      | 15.00  | -      | 16.50  | -      | 18.00  | -      | 18.00  | -     | 18.00  | -     | 18.00  | -     | 18.00 |
| 160  | 64.50  | 82.00  | 56.00  | 76.00  | 41.50  | 64.00  | 27.00  | 52.00  | -      | 16.50  | -      | 18.00  | -      | 18.00  | -     | 18.00  | -     | 18.00  | -     | 18.00 |
| 180  | 84.50  | 102.00 | 76.00  | 96.00  | 61.50  | 84.00  | 47.00  | 72.00  | 56.00  | 56.00  | -      | 18.00  | -      | 18.00  | -     | 18.00  | -     | 18.00  | -     | 18.00 |
| 200  | 104.50 | 122.00 | 96.00  | 116.00 | 81.50  | 104.00 | 67.00  | 92.00  | 48.50  | 76.00  | 30.00  | 60.00  | -      | 18.00  | -     | 18.00  | -     | 18.00  | -     | 18.00 |
| 220  | 124.50 | 142.00 | 116.00 | 136.00 | 101.50 | 124.00 | 87.00  | 112.00 | 68.50  | 96.00  | 50.00  | 80.00  | 34.00  | 64.00  | -     | 18.00  | -     | 18.00  | -     | 18.00 |
| 240  | 144.50 | 162.00 | 136.00 | 156.00 | 121.50 | 144.00 | 107.00 | 132.00 | 88.50  | 116.00 | 70.00  | 100.00 | 54.00  | 84.00  | 38.00 | 68.00  | -     | 18.00  | -     | 18.00 |
| 260  | 164.50 | 182.00 | 156.00 | 176.00 | 141.50 | 164.00 | 127.00 | 152.00 | 108.50 | 136.00 | 90.00  | 120.00 | 74.00  | 104.00 | 58.00 | 88.00  | 38.00 | 68.00  | -     | 18.00 |
| 280  | 184.50 | 202.00 | 176.00 | 196.00 | 161.50 | 184.00 | 147.00 | 172.00 | 128.50 | 156.00 | 110.00 | 140.00 | 94.00  | 124.00 | 78.00 | 108.00 | 58.00 | 88.00  | 38.00 | 68.00 |
| 300  | 204.50 | 222.00 | 196.00 | 216.00 | 181.50 | 204.00 | 167.00 | 192.00 | 148.50 | 176.00 | 130.00 | 160.00 | 114.00 | 144.00 | 98.00 | 128.00 | 78.00 | 108.00 | 58.00 | 88.00 |

# Hexagon Socket Head Screws

EN ISO 4762 (DIN 912)

Grade 12.9

## Specification for bolts and reference standards

| Characteristic                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           | Standard                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Material                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                           | Steel                                                                                                                 |
| General Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                           | As specified in DIN 267 Part 1.                                                                                       |
| Thread                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Tolerance                 | 5g6g for property class 12.9;<br>6g <sup>a</sup> for other property classes.                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Standard                  | ISO 261, ISO 965.                                                                                                     |
| Mechanical Properties                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Property Class (material) | d ≤ M39 <sup>b</sup> : 8.8; 10.9; 12.9<br>d > M39: as agreed                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Standard                  | DIN ISO 898 Part 1                                                                                                    |
| Tolerances on dimensions and form                                                                                                                                                                                                                                                                                                                                                                                                                                          | Product Grade             | A                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Standard                  | ISO 4759/1/DIN ISO 4759 Part 1                                                                                        |
| Surface finish                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           | Black oxide (thermal or chemical)                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           | DIN 267 Part 2 shall apply with regard to surface roughness.                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           | DIN 267 Part 19 shall apply with regard to the permissible surface defects.                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           | DIN 267 Part 9 shall apply with regard to electroplating.                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           | If different electroplating or other surface protection is desired, this shall be agreed upon at the time of ordering |
| Acceptable inspection                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                           | DIN 267 Part 5 shall apply with regard to acceptance testing.                                                         |
| <p>a Only for screws without surface protection, 6g makes it possible for normal coating thicknesses to be applied in accordance with DIN 267 Part 9 but the reference line shall not be exceeded. Depending on the coating thickness required, a larger fundamental deviation shall be selected than for the g position. A larger fundamental deviation may impair the stripping strength of the screw/nut connection.</p> <p>b In ISO 4762, only up to M36 or below.</p> |                           |                                                                                                                       |