

# M16 Heavy Hex Socket Head Cap Screw Dimensions

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Fasteners/Screws Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046) M16 Heavy Hex Socket Head Cap Screw Dimensions  
Screws: GB/T 1228 / ASTM A325  
Controlling dimensions to GB/T 1228 / ASTM A325, with clearance hole and tapping drill, spanner or drive size and tightening torque.

M16 Heavy Hex Socket Head Cap Screw dimensions to GB/T 1228 / ASTM A325: head diameter 24 mm, head height 16 mm, coarse thread pitch 2 mm, clearance hole (ISO 273 medium) 17.5 mm. Tighten to approximately 210 Nm at property class 8.8 in a dry, as-supplied condition.

Head diameter

24 mm

Head height

16 mm

Coarse thread pitch

2 mm

Clearance hole (ISO 273 medium)

17.5 mm

Tightening torque (class 8.8)

210 Nm

Figures are nominal values from the governing standard. Confirm against the tolerance class for your application before machining or ordering.



This page covers M16 Heavy Hex Socket Head Cap Screw to GB/T 1228 / ASTM A325: the full dimensional row, hole and tool sizes, proof-load data and typical applications. All values are taken from the governing standards (GB/T 1228 / ASTM A325 together with ISO 273, ISO 724 and ISO 898-1 where applicable).

## M16 Dimensional Row (GB/T 1228 / ASTM A325)

| Size | Pitch<br>(mm) | Length L<br>(mm) | Head diameter dk<br>(mm) | Head height k<br>(mm) | Hex socket s<br>(mm) | Reference<br>standard |
|------|---------------|------------------|--------------------------|-----------------------|----------------------|-----------------------|
| M16  | 2.0           | 100              | 24.0                     | 16                    | 14.0                 | ISO 4762 / GB/T 70.1  |

## Spanner & Drive for M16 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046)

The hex socket for M16 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046) is shown in the spec table — use the matching Allen / hex key (an ISO 2936 hex key set covers the full range). A T-handle Allen key gives the best feel for setting preload by feel; for production work use a torque-controlled driver.

## Hole Sizes for M16

|                                           |         |
|-------------------------------------------|---------|
| Coarse-thread pitch (ISO 724)             | 2 mm    |
| Through-hole / clearance (ISO 273 medium) | 17.5 mm |
| Tapping drill, coarse thread              | 14 mm   |

## Tightening Torque for M16

|                                   |                  |
|-----------------------------------|------------------|
| Class 8.8 (dry, $\sim\mu$ 0.125)  | $\approx$ 210 Nm |
| Class 10.9 (dry, $\sim\mu$ 0.125) | $\approx$ 295 Nm |
| Class 12.9 (dry, $\sim\mu$ 0.125) | $\approx$ 355 Nm |

Indicative dry-joint values. Lubrication can lower the required torque by 15–25%. Always confirm against the joint design, especially when going up a strength class.

## Proof Load & Strength for M16

|                                       |                     |
|---------------------------------------|---------------------|
| Tensile stress area $A_s$ (ISO 898-1) | 157 mm <sup>2</sup> |
| Proof load, class 8.8                 | 91 kN               |
| Proof load, class 10.9                | 130 kN              |
| Proof load, class 12.9                | 152 kN              |
| Min. ultimate tensile, class 8.8      | 126 kN              |

Proof load = stress area  $\times$  proof stress per ISO 898-1. Design joints so the working preload stays below the proof load of the selected class.

## M16 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046) Weight

A steel M16 heavy hex socket head cap screw at the listed 100 mm length weighs approximately 355 g each — about 355 kg per 1,000 pieces. Stainless A2/A4 weighs roughly the same (density 7.9–8.0 g/cm<sup>3</sup>). Actual weight varies slightly with head form, thread and finish; use this figure for freight estimation only.

## Common Applications for M16 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046)

M16 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046) are commonly specified for heavier machine assembly and equipment mounting.

## Installation Tips for M16 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046)

- Use a quality Allen key fully seated in the socket — partial engagement is the most common cause of stripped sockets at this size.
- For countersunk and button-head variants, chamfer the through-hole to seat the head flush without preloading the head/shank fillet.

## Mating Parts for M16

For M16, pair with a M16 hex nut (ISO 4032 / DIN 934) and, where used, a M16 flat washer (ISO 7089 / DIN 125A) under the head and under the nut.

## Technical Drawing

Customize the parameters below — every spec field is editable, and the drawing redraws to match the values you choose. Changing the size will snap the other fields to that size's standard values; you can then override any individual value.

Sends the selected values to the quote form below.

## Request a Quote

The form below follows the current technical drawing configuration. Change the drawing values above and the request details update automatically.

## Dimensions & Specifications (GB/T 1228 / ASTM A325)

| Size | Pitch (mm) | Length L (mm) | Head diameter dk (mm) | Head height k (mm) | Hex socket s (mm) | Reference standard   |
|------|------------|---------------|-----------------------|--------------------|-------------------|----------------------|
| M3   | 0.5        | 20            | 5.5                   | 3                  | 2.5               | ISO 4762 / GB/T 70.1 |
| M4   | 0.7        | 25            | 7.0                   | 4                  | 3.0               | ISO 4762 / GB/T 70.1 |
| M5   | 0.8        | 30            | 8.5                   | 5                  | 4.0               | ISO 4762 / GB/T 70.1 |
| M6   | 1.0        | 40            | 10.0                  | 6                  | 5.0               | ISO 4762 / GB/T 70.1 |
| M8   | 1.25       | 50            | 13.0                  | 8                  | 6.0               | ISO 4762 / GB/T 70.1 |
| M10  | 1.5        | 60            | 16.0                  | 10                 | 8.0               | ISO 4762 / GB/T 70.1 |
| M12  | 1.75       | 80            | 18.0                  | 12                 | 10.0              | ISO 4762 / GB/T 70.1 |
| M14  | 2.0        | 80            | 21.0                  | 14                 | 12.0              | ISO 4762 / GB/T 70.1 |
| M16  | 2.0        | 100           | 24.0                  | 16                 | 14.0              | ISO 4762 / GB/T 70.1 |
| M18  | 2.5        | 100           | 27.0                  | 18                 | 14.0              | ISO 4762 / GB/T 70.1 |
| M20  | 2.5        | 120           | 30.0                  | 20                 | 17.0              | ISO 4762 / GB/T 70.1 |
| M24  | 3.0        | 150           | 36.0                  | 24                 | 19.0              | ISO 4762 / GB/T 70.1 |
| M30  | 3.5        | 180           | 45.0                  | 30                 | 22.0              | ISO 4762 / GB/T 70.1 |
| M36  | 4.0        | 200           | 54.0                  | 36                 | 27.0              | ISO 4762 / GB/T 70.1 |

## Materials & Grades

Select a material class to see the grades we supply it in. Each designation is listed with its ISO/EN, AISI/SAE, JIS and GB equivalents.

[Stainless Steel](#)
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### Stainless Steel

#### Austenitic Stainless Steel

- A1 AISI 303 · SAE 303 · SUS303 · EN 1.4305 · X8CrNiS18-9
- A2 AISI 304 · SAE 304 · SUS304 · EN 1.4301 · X5CrNi18-10 · 06Cr19Ni10

- 304L AISI 304L · SUS304L · EN 1.4307 · X2CrNi18-9 · 022Cr19Ni10
- 302 AISI 302 · SUS302 · EN 1.4310
- 305 AISI 305 · SUS305 · EN 1.4303
- A4 AISI 316 · SAE 316 · SUS316 · EN 1.4401 · X5CrNiMo17-12-2 · 06Cr17Ni12Mo2
- 316L AISI 316L · SUS316L · EN 1.4404 · X2CrNiMo17-12-2 · 022Cr17Ni12Mo2
- 321 AISI 321 · SUS321 · EN 1.4541 · X6CrNiTi18-10
- 310 / 310S AISI 310 · AISI 310S · SUS310S · EN 1.4845
- 302HQ AISI 302HQ
- A3
- A5
- 347 AISI 347 · SUS347 · EN 1.4550 · X6CrNiNb18-10
- 309 / 309S AISI 309 · AISI 309S · SUS309S

### **Martensitic Stainless Steel**

- AISI 410 SUS410 · EN 1.4006 · X12Cr13 · 12Cr13
- AISI 420 SUS420J1 · SUS420J2 · EN 1.4021 · EN 1.4028 · 20Cr13 · 30Cr13
- AISI 431 SUS431 · EN 1.4057 · X17CrNi16-2
- C1
- C3
- C4
- AISI 440A
- AISI 440B
- AISI 440C SUS440C · EN 1.4125

### **Ferritic Stainless Steel**

- AISI 430 SUS430 · EN 1.4016 · X6Cr17 · 10Cr17
- F1
- AISI 434
- AISI 444

### **Precipitation-Hardening Stainless Steel**

- 17-4 PH AISI 630 · UNS S17400 · SUS630 · EN 1.4542 · X5CrNiCuNb16-4
- 15-5 PH UNS S15500
- 17-7 PH UNS S17700

## Duplex and Super Duplex Stainless Steel

- Duplex 2205 UNS S31803 · UNS S32205 · EN 1.4462
- Super Duplex 2507 UNS S32750 · EN 1.4410
- D2
- D4
- D6
- D8
- Lean Duplex 2101 UNS S32101
- Super Duplex S32760 UNS S32760 · EN 1.4501

## Carbon Steel

### Low-Carbon Steel

- SAE 1006
- SAE 1008
- SAE 1010
- SAE 1018
- SAE 1020
- Q195
- Q235
- SAE 1012
- SAE 1015
- Q215
- ML08
- ML08AI
- ML10
- ML15
- ML20
- SWRCH6A
- SWRCH8A
- SWRCH10A
- SWRCH12A
- SWRCH15A
- SWRCH18A

## Medium-Carbon Steel

- SAE 1035
- SAE 1045
- S45C
- C45
- SAE 1030
- SAE 1040
- SAE 1050
- 30
- 35
- 40
- 45
- 50
- S35C
- S40C
- S50C
- C35
- C40

## High-Carbon Steel

- SAE 1060
- SAE 1070
- 65Mn
- SAE 1065
- SAE 1075
- SAE 1080
- SAE 1085
- SAE 1090
- SAE 1095
- 60
- 65
- 70
- 75
- 80
- 85

## Cold-Heading Steel

- SWRCH22A
- 10B21
- SWRCH22K
- SWRCH25K
- SWRCH30K
- SWRCH35K
- SWRCH40K
- ML20Mn
- ML25
- ML30
- ML35
- ML40
- 15B25

## Alloy Steel

### Chromium Steel

- 40Cr
- 45Cr
- AISI 5140
- SAE 5140
- AISI 5120
- SAE 5120
- SCr420
- SCr440

### Chromium-Molybdenum Steel

- 35CrMo
- 42CrMo
- AISI 4140
- SCM435
- SCM440
- 42CrMo4
- 30CrMo

- AISI 4130
- SAE 4130
- SAE 4140
- AISI 4142
- AISI 4145
- SCM415
- SCM420
- SCM445
- EN 1.7220
- EN 1.7225
- 25CrMo4
- 34CrMo4

### **Nickel-Chromium-Molybdenum Steel**

- AISI 4340
- SAE 4340
- 40CrNiMo
- SNCM439
- EN 1.6511
- 36CrNiMo4

### **Boron Alloy Steel**

- 10B22
- 10B21
- 15B21
- 15B25
- 20MnTiB
- 20Mn2B
- 35VB
- 40MnB

### **Bearing Steel**

#### **Bearing Steel**

- GCr15
- AISI 52100 SAE 52100 · UNS G52986

- SUJ2
- 100Cr6 EN 1.3505
- GCr15SiMn

## **Spring Steel**

### **Carbon Spring Steel**

- SAE 1065
- SAE 1070
- SAE 1075
- SAE 1080
- SAE 1095
- 65
- 70
- 75
- 80
- 65Mn

### **Silicon-Manganese Spring Steel**

- 60Si2Mn
- 60Si2MnA
- SUP6
- SUP7

### **Chromium-Vanadium Spring Steel**

- 50CrVA
- SAE 6150
- AISI 6150
- SUP10

### **Stainless Spring Steel**

- AISI 301
- SUS301
- EN 1.4310
- AISI 302
- AISI 304

- AISI 316
- 17-7 PH

## Aluminum and Aluminum Alloys

### Commercially Pure Aluminum

- 1050
- 1060
- 1070
- 1100

### 2xxx Series Aluminum

- 2024
- 2011
- 2014
- 2017

### 5xxx Series Aluminum

- 5052
- 5083
- 5754

### 6xxx Series Aluminum

- 6061
- 6061-T6
- 6063
- 6082
- 6082-T6

### 7xxx Series Aluminum

- 7075
- 7075-T6
- 7005
- 7050
- 7075-T73

## Brass

### Free-Cutting Brass

- C36000
- H62
- HPb59-1
- C3601
- C3602
- C3604
- CuZn36Pb3
- CuZn39Pb3
- EN CW614N
- EN CW617N
- H65

### Lead-Free Brass

- C69300
- C27450
- CW510L
- CW511L

### Naval Brass

- C46400
- CuZn39Sn1

## Bronze

### Silicon Bronze

- C65500
- C65100
- C65600

### Phosphor Bronze

- C51000
- C52100

- CuSn6
- CuSn8

### **Aluminum Bronze**

- C95400
- C95500
- C63000
- CuAl10Ni5Fe4

### **Copper**

#### **Copper**

- C11000
- T2
- C10100
- C10200
- C12200
- T1
- TU1
- TU2

### **Titanium and Titanium Alloys**

#### **Commercially Pure Titanium**

- Grade 2
- Grade 1
- Grade 3
- Grade 4
- TA1
- TA2
- TA3

#### **Alpha-Beta Titanium Alloys**

- Grade 5
- Ti-6Al-4V
- TC4

- UNS R56400

### **Low-Interstitial Grade**

- Grade 23
- Ti-6Al-4V ELI
- UNS R56407

### **Other Titanium Fastener Alloys**

- Ti-6Al-6V-2Sn
- Ti-6Al-2Sn-4Zr-2Mo
- Beta-C titanium
- Ti-10V-2Fe-3Al

## **Nickel and Nickel Alloys**

### **Commercially Pure Nickel**

- Nickel 200
- UNS N02200
- Nickel 201
- UNS N02201

### **Inconel Alloys**

- Inconel 625 UNS N06625
- Inconel 718 UNS N07718
- Inconel 600 UNS N06600
- Inconel 601 UNS N06601
- Inconel 686 UNS N06686
- Inconel X-750 UNS N07750

### **Monel Alloys**

- Monel 400 UNS N04400
- Monel K-500 UNS N05500

### **Hastelloy Alloys**

- Hastelloy C-276 UNS N10276
- Hastelloy C-22 UNS N06022

- Hastelloy B-2 UNS N10665
- Hastelloy B-3 UNS N10675
- Hastelloy X UNS N06002

### **Other Nickel Alloys**

- Alloy 20 UNS N08020
- Alloy 625
- Alloy 718
- Alloy 825 UNS N08825
- Alloy 925 UNS N09925

## **Iron-Nickel and High-Temperature Alloys**

### **A286**

- A-286
- UNS S66286
- EN 1.4980

### **Invar**

- Invar 36
- Alloy 36
- UNS K93600
- FeNi36

### **Alloy 42**

- Alloy 42
- UNS K94100
- FeNi42

## **Tool Steel and Specialty Hardened Steel**

### **Tool Steel and Specialty Hardened Steel**

- AISI D2
- AISI H13
- SKD11
- Cr12MoV

- AISI O1
- AISI A2
- AISI S7
- SKD61
- 9CrSi

## **Structural and Construction Steel**

### **Structural and Construction Steel**

- ASTM A36
- Q235B
- Q355B
- S355JR
- Q235C
- Q355C
- S235JR
- S275JR
- S355J2

## Video: M16 Heavy Hex Socket Head Cap Screw Dimensions



► Watch video: <https://www.youtube.com/watch?v=BDSqKrlagxo>

Third-party video, selected automatically for this topic. It is not produced by Engineering Hardware and is not a specification source — use the tables on this page for dimensional data.

Inside the plant

## Manufactured in our own plant

This part is cold-formed, threaded, heat-treated and finished in-house. The stages below are where its class and finish are actually decided.

1.



01

### **Cold heading**

Wire rod is drawn to size and cold-formed into blanks. Forming rather than cutting keeps the grain flow continuous around the head, which is where a bolt is most likely to fail.

Head dimensions and under-head radius checked at set-up and per shift.



2.

02

## Thread rolling

Threads are rolled between hardened dies rather than cut. Rolled threads are stronger in fatigue than cut threads and hold pitch and flank angle far more consistently across a batch.

Go / no-go ring gauges to ISO 965 tolerance class 6g.

3.



03

### Heat treatment

Quench-and-temper brings carbon and alloy steel to the property class ordered — 8.8, 10.9 or 12.9 — with the furnace charge tracked so a finished lot can be traced back to it.

Core hardness and tensile tested per lot to ISO 898-1.

4.



04

## Surface treatment

Zinc, zinc-nickel, hot-dip galvanizing, black oxide, phosphate and Dacromet, selected against the service environment rather than against the price list.

Coating thickness and neutral salt spray hours to ISO 9227.

## Frequently Asked Questions

What torque do M16 class 8.8 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046) take?

A dry M16 class 8.8 joint takes about 210 Nm ( $\approx 295$  Nm for 10.9,  $\approx 355$  Nm for 12.9). Confirm against your joint design; lubrication reduces these values.

What clearance and tapping drill suit M16?

Use a 17.5 mm clearance hole (ISO 273 medium) for through-fixing, or a 14 mm tapping drill for a coarse M16 thread.

Which Allen key fits M16 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046)?

The hex-socket size for each row of Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046) is shown in the spec table — use the matching Allen / hex key. An ISO 2936 set covers every size on this page.

How do I avoid stripping the socket on M16 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046)?

Fully seat the key in the socket, choose ball-end keys only for low-torque finishing work, and prefer a T-handle key when feel matters. For production use a torque-controlled driver.

How do I request a quotation?

Use the technical drawing on this page to pick the exact configuration, then submit it with the quote form. We respond within one business day.

## Related Pages

[View the full Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\) page](#)

### More Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046) Guides

- [M3 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\)](#)
- [M4 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\)](#)
- [M5 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\)](#)
- [M6 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\)](#)
- [M8 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\)](#)
- [M10 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\)](#)
- [M12 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\)](#)
- [M14 Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\)](#)