

# Property Class 8.8 Steel Heavy Hex Socket Head Cap Screw

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Property Class 8.8 Steel Heavy Hex Socket Head Cap Screw are supplied to ISO 898-1 property class 8.8. Corrosion behaviour requires plating (zinc) for corrosion protection, the material is magnetic, and the usable service range is commonly limited to approx. +300 °C; confirm against the coating and the load. In practice this grade is the workhorse medium-carbon alloy class for structural joints.

## Grade

ISO 898-1 property class 8.8

## Corrosion resistance

Requires plating (zinc) for corrosion protection

## Magnetic response

Magnetic

## Service temperature

commonly limited to approx. +300 °C; confirm against the coating and the load

Property values are typical for the grade. Certified mechanical test data is available on request for production orders.



Heavy Hex Socket Head Cap Screw manufactured in Property Class 8.8 Steel (ISO 898-1 property class 8.8) are dimensioned to GB/T 1228 / ASTM A325. The sections below give the mechanical and physical properties of the grade, its behavior in corrosive and elevated-temperature service, and the full size table.

## Why Choose Property Class 8.8 Steel for Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046)

The workhorse medium-carbon alloy class for structural joints. For heavy hex socket head cap screw — gb/t 1228 / astm a325 (series 046), this matters when requires plating (zinc) for corrosion protection is the primary requirement.

### Mechanical & Physical Properties

|                          |                                                                               |
|--------------------------|-------------------------------------------------------------------------------|
| Grade designation        | ISO 898-1 property class 8.8                                                  |
| Magnetic response        | Magnetic                                                                      |
| Service temperature      | commonly limited to approx. +300 °C; confirm against the coating and the load |
| Corrosion characteristic | Requires plating (zinc) for corrosion protection                              |

## Corrosion Behavior in Service

Carbon and alloy steel heavy hex socket head cap screw — gb/t 1228 / astm a325 (series 046) require a coating for corrosion protection. Zinc plating (with or without passivation) is the most common; hot-dip galvanizing is used for outdoor structural service; black-oxide is mainly a tarnish-prevention finish for tool-room use.

## Comparable Grades

For Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046), class 10.9 or 12.9 is the comparable strength step. Move up when the joint preload approaches the proof load of the current class; move down when the joint is over-specified. For corrosion-critical service, switch to stainless A2 or A4.

## Sizes of Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046) Available in Property Class 8.8 Steel

| 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 |
|------|---------------|------------------|--------------------------|-----------------------|----------------------|-----------------------|
| 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  |

## 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<br>(mm) | Length L<br>(mm) | Head diameter dk<br>(mm) | Head height k<br>(mm) | Hex socket s<br>(mm) | Reference<br>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](#)[38 Carbon Steel](#)[66 Alloy Steel](#)[41 Bearing Steel](#)[5 Spring Steel](#)[25 Aluminum and Aluminum Alloys](#)[21 Brass](#)[17 Bronze](#)[11 Copper](#)[8 Titanium and Titanium Alloys](#)[18 Nickel and Nickel Alloys](#)[22 Iron-Nickel and High-Temperature Alloys](#)[10 Tool Steel and Specialty Hardened Steel](#)[9 Structural and Construction Steel](#)[9](#)

### 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: Property Class 8.8 Steel Heavy Hex Socket Head Cap Screw



► Watch video: [https://www.youtube.com/watch?v=k\\_a3MAMepe8](https://www.youtube.com/watch?v=k_a3MAMepe8)

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

Which finish is best for outdoor Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046)?

For outdoor service in steel, hot-dip galvanizing gives the longest life; zinc-flake (Geomet/Delta-Tone family) gives a thinner film with excellent salt-spray performance; standard zinc plating is the lowest-cost option for general indoor / shielded outdoor use.

What's the service temperature limit for Property Class 8.8 Steel?

The practical service range is commonly limited to approx. +300 °C; confirm against the coating and the load.

Can Property Class 8.8 Steel replace stainless steel structurally?

No — stainless A2/A4 cannot match class 10.9 / 12.9 strength. Stainless is selected for corrosion, not raw strength.

Are Property Class 8.8 Steel Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046) magnetic?

Property Class 8.8 Steel Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 (Series 046) are magnetic.

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

- [A2 Stainless Steel Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\)](#)
- [A4 Stainless Steel Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\)](#)
- [Property Class 12.9 Steel Heavy Hex Socket Head Cap Screw — GB/T 1228 / ASTM A325 \(Series 046\)](#)