Property Class 8.8 Steel Hex Head Bolt

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Property Class 8.8 Steel Hex Head Bolt are supplied to ISO 898-1 property class 8.8. Corrosion behaviour is 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.

Property Class 8.8 Steel Hex Head Bolt combine the dimensional form of GB/T 5782 / ISO 4014 with the material properties of grade ISO 898-1 property class 8.8: requires plating (zinc) for corrosion protection, magnetic, service range commonly limited to approx. +300 °C; confirm against the coating and the load. This page summarizes the grade data, its corrosion behavior in service, the comparable grades, and the sizes supplied.

Why Choose Property Class 8.8 Steel for Hex Head Bolt — GB/T 5782 / ISO 4014 (Series 007)

The workhorse medium-carbon alloy class for structural joints. For hex head bolt — gb/t 5782 / iso 4014 (series 007), 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

Galvanic & Galling Considerations

For hex head bolt — gb/t 5782 / iso 4014 (series 007) in steel, the dominant compatibility issue is hydrogen embrittlement at high property classes (10.9 and above) when electroplated. Plating must be followed by an appropriate baking treatment, or a non-electroplated finish (mechanical zinc, zinc flake) should be substituted.

Comparable Grades

For Hex Head Bolt — GB/T 5782 / ISO 4014 (Series 007), 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 Hex Head Bolt — GB/T 5782 / ISO 4014 (Series 007) Available in Property Class 8.8 Steel

Size	Pitch (mm)	Nominal diameter d (mm)	Length L (mm)	Width across flats s (mm)
M3	0.5	3	20	5.5
M4	0.7	4	25	7.0
M5	0.8	5	30	8.0
M6	1.0	6	40	10.0
M8	1.25	8	50	13.0
M10	1.5	10	60	16.0
M12	1.75	12	80	18.0
M14	2.0	14	80	21.0
M16	2.0	16	100	24.0
M18	2.5	18	100	27.0
M20	2.5	20	120	30.0
M24	3.0	24	150	36.0
M30	3.5	30	180	46.0

Size	Pitch (mm)	Nominal diameter d (mm)	Length L (mm)	Width across flats s (mm)
M36	4.0	36	200	55.0

Dimensions are independent of the material: every size above is available in Property Class 8.8 Steel.

Custom manufacturing · Made to drawing

Need this bolt in a grade that is not listed?

Grade 8 8 Steel is one of the grades the catalog describes. Where the standard stops, the drawing takes over: fine pitches, left-hand threads, partial threading, and property classes above the catalogued grade where material and heat treatment allow. Made by cold heading or hot forging.

Minimum order from 2,000 pieces; samples within 7 days of drawing approval.

Custom bolt manufacturing
(https://engineeringhardware.com/custom/bolts/)

Send a drawing (https://engineeringhardware.com/custom/bolts/#rfq)

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.

Dimensioned line drawing of M3 Hex Head Bolt — GB/T 5782 / ISO 4014 (Series 007) to GB/T 5782 / ISO 4014. Side view and top view, drawn to the dimensions in the table below and redrawn for any size selected.

Opens a short step to confirm the exact specification before you enter contact details.

Request a Quote

Click “Request this configuration” under the drawing to confirm the exact specification, then add your contact details. You can also send the request without a specification — but only an accurate selection gets an accurate quote.

Dimensions & Specifications (GB/T 5782 / ISO 4014)

Size	Pitch (mm)	Nominal diameter d (mm)	Length L (mm)	Width across flats s (mm)
M3	0.5	3	20	5.5
M4	0.7	4	25	7.0
M5	0.8	5	30	8.0
M6	1.0	6	40	10.0
M8	1.25	8	50	13.0
M10	1.5	10	60	16.0
M12	1.75	12	80	18.0
M14	2.0	14	80	21.0
M16	2.0	16	100	24.0
M18	2.5	18	100	27.0
M20	2.5	20	120	30.0
M24	3.0	24	150	36.0
M30	3.5	30	180	46.0
M36	4.0	36	200	55.0

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

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

ML08Al
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

Applications & Industries

Where Hex Head Bolt are used, and what decides the specification in each case. Stocked from M3 to M36.

Industries that specify Hex Head Bolt

Steel fabrication **Bolted connections in frames, enclosures, walkways and weldments, on the bench and on site.**

Energy & infrastructure **Tower, pipework, switchgear and plant fixings specified for long service life and inspectable joints.**

Maintenance & MRO **Stocked replacements matched to an existing property class, thread and finish.**

Food, pharma & cleanroom **Stainless assemblies that are washed down, where the finish matters as much as the strength.**

Machine building & OEM **The default fastener on production equipment: covers, brackets, motor mounts and sub-assemblies tightened to a specified torque.**

Automotive & transport **Chassis, driveline and body fixings that see vibration and are assembled to a controlled preload.**

Typical applications

- **clamping two machined faces to a calculated preload**
- **bolting brackets, motors and gearboxes to a frame**
- **assemblies that are dismantled for service and re-torqued**
- **joints where the property class is stated on the drawing**

Service conditions to specify against

Marine and coastal

Available in A4 (316) stainless for chloride exposure — coastal structures, pool halls, water treatment and deck hardware, where A2 will eventually pit.

High load

Supplied in ISO 898-1 property classes, so the joint can be designed to a stated proof load and tightened to a calculated torque rather than by feel.

Torque and preload

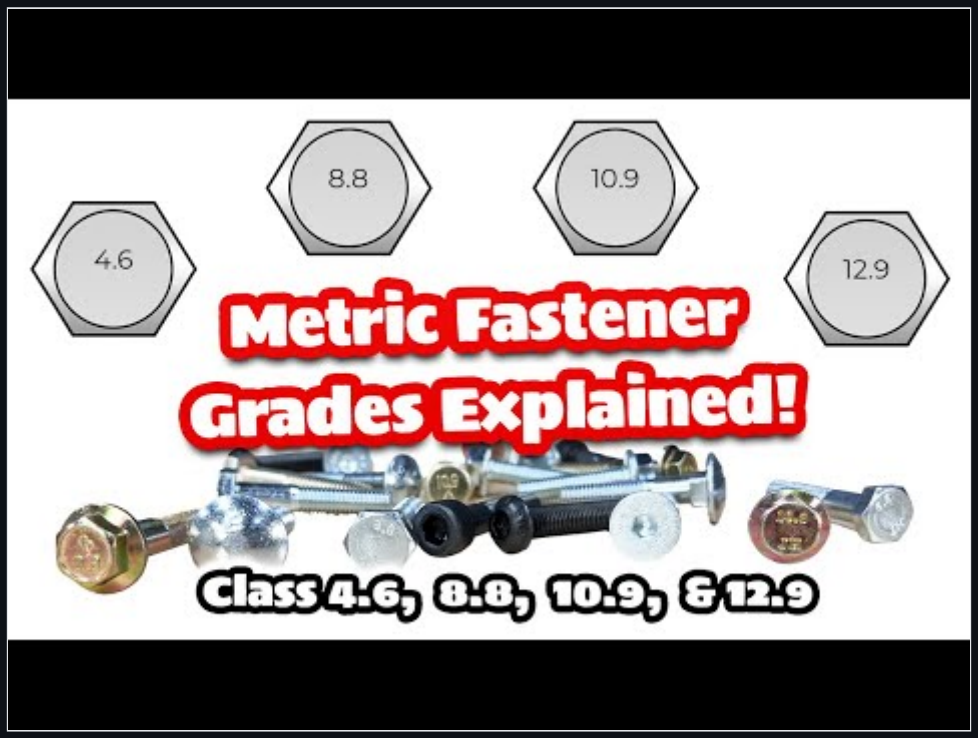
The joint is designed around bolt tension, so lubrication, coating and the friction coefficient all change the torque figure — state them together.

Where to use something else

- **Do not use a machine thread into unthreaded sheet or timber; use a tapping screw, rivet nut or insert made for that parent material.**

Need help matching Hex Head Bolt to your application? Send the assembly, the load and the environment with your enquiry and we will specify the size, material and finish against them.

Video: Property Class 8.8 Steel Hex Head Bolt



(https://www.youtube.com/watch?v=wTzwMC_sdp8)https://www.youtube.com/watch?v=wTzwMC_sdp8)

► Watch video: https://www.youtube.com/watch?v=wTzwMC_sdp8(https://www.youtube.com/watch?v=wTzwMC_sdp8)

Metric Fastener Grades & Strengths Explained!! (Class 4.6, 8.8, 10.9, & 12.9)

(https://www.youtube.com/watch?v=wTzwMC_sdp8)(https://www.youtube.com/watch?v=wTzwMC_sdp8)

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.

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.

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.

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.

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

Is Property Class 8.8 Steel prone to hydrogen embrittlement?

Class 10.9 and above can be susceptible to hydrogen embrittlement when electroplated. Specify post-plating baking, or use mechanical-zinc / zinc-flake finishes which avoid the cathodic plating step.

Which finish is best for outdoor Hex Head Bolt — GB/T 5782 / ISO 4014 (Series 007)?

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.

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 Hex Head Bolt — GB/T 5782 / ISO 4014 (Series 007) page (https://engineeringhardware.com/fastener/cad-svg-007-hexbolt/)

More Hex Head Bolt — GB/T 5782 / ISO 4014 (Series 007) Guides

- **A2 Stainless Steel Hex Head Bolt — GB/T 5782 / ISO 4014 (Series 007) (https://engineeringhardware.com/guide/material/a2-stainless-steel-cad-svg-007-hexbolt/)**
- **A4 Stainless Steel Hex Head Bolt — GB/T 5782 / ISO 4014 (Series 007) (https://engineeringhardware.com/guide/material/a4-stainless-steel-cad-svg-007-hexbolt/)**
- **Property Class 12.9 Steel Hex Head Bolt — GB/T 5782 / ISO 4014 (Series 007) (https://engineeringhardware.com/guide/material/grade-12-9-steel-cad-svg-007-hexbolt/)**