Property Class 12.9 Steel Equal-End Stud Bolt

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Property Class 12.9 Steel Equal-End Stud Bolt are supplied to ISO 898-1 property class 12.9. Corrosion behaviour is requires plating or black-oxide 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 highest common strength class, for high-load machine assembly.

Grade
: ISO 898-1 property class 12.9

Corrosion resistance
: Requires plating or black-oxide 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 12.9 Steel Equal-End Stud Bolt are supplied to GB/T 901 / DIN 939. The grade provides requires plating or black-oxide protection and is magnetic; the practical service range is commonly limited to approx. +300 °C; confirm against the coating and the load. Property data, grade comparison and the full size table follow.

Why Choose Property Class 12.9 Steel for Equal-End Stud Bolt — GB/T 901 / DIN 939 (Series 093)

The highest common strength class, for high-load machine assembly. For equal-end stud bolt — gb/t 901 / din 939 (series 093), this matters when requires plating or black-oxide protection is the primary requirement.

Mechanical & Physical Properties

Grade designation	ISO 898-1 property class 12.9
Magnetic response	Magnetic
Service temperature	commonly limited to approx. +300 °C; confirm against the coating and the load
Corrosion characteristic	Requires plating or black-oxide protection

Corrosion Behavior in Service

Carbon and alloy steel equal-end stud bolt — gb/t 901 / din 939 (series 093) 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.

Galvanic & Galling Considerations

For equal-end stud bolt — gb/t 901 / din 939 (series 093) 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.

Sizes of Equal-End Stud Bolt — GB/T 901 / DIN 939 (Series 093) Available in Property Class 12.9 Steel

Thread size	Pitch (mm)	Length L (mm)	Engagement depth bm (mm)	Material	Reference standard
M6	1.0	50	8	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M8	1.25	60	10	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M10	1.5	80	15	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M12	1.75	100	18	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M14	2.0	120	21	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M16	2.0	150	24	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M20	2.5	180	30	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M24	3.0	200	36	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M30	3.5	240	45	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M36	4.0	280	54	Cl. 8.8 alloy steel	DIN 939 / GB/T 901

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 901 / DIN 939)

Thread size	Pitch (mm)	Length L (mm)	Engagement depth bm (mm)	Material	Reference standard
M6	1.0	50	8	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M8	1.25	60	10	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M10	1.5	80	15	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M12	1.75	100	18	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M14	2.0	120	21	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M16	2.0	150	24	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M20	2.5	180	30	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M24	3.0	200	36	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M30	3.5	240	45	Cl. 8.8 alloy steel	DIN 939 / GB/T 901
M36	4.0	280	54	Cl. 8.8 alloy steel	DIN 939 / GB/T 901

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 Steel38 Carbon Steel66 Alloy Steel41 Bearing Steel5 Spring Steel25 Aluminum and Aluminum Alloys21 Brass17 Bronze11 Copper8 Titanium and Titanium Alloys18 Nickel and Nickel Alloys22 Iron-Nickel and High-Temperature Alloys10 Tool Steel and Specialty Hardened Steel9 Structural and Construction Steel9

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

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

When should I move from ISO 898-1 property class 12.9 to class 8.8 for Equal-End Stud Bolt — GB/T 901 / DIN 939 (Series 093)?
Step up to class 8.8 when the joint preload approaches the proof load of the current class. The higher class adds preload at the same diameter, often saving size and weight.

Is Property Class 12.9 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 Equal-End Stud Bolt — GB/T 901 / DIN 939 (Series 093)?
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 12.9 Steel?

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

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 Equal-End Stud Bolt — GB/T 901 / DIN 939 (Series 093) page

More Equal-End Stud Bolt — GB/T 901 / DIN 939 (Series 093) Guides

- A2 Stainless Steel Equal-End Stud Bolt — GB/T 901 / DIN 939 (Series 093)
- A4 Stainless Steel Equal-End Stud Bolt — GB/T 901 / DIN 939 (Series 093)
- Property Class 8.8 Steel Equal-End Stud Bolt — GB/T 901 / DIN 939 (Series 093)