

# M12 Hex Bolts Dimensions

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[Fasteners/Bolts Hex Bolts](#) M12 Hex Bolts Dimensions

Bolts · ISO 4014 / ISO 4017

Controlling dimensions to ISO 4014 / ISO 4017: with clearance hole and tapping drill, spanner or drive size and tightening torque

M12 Hex Bolts dimensions to ISO 4014 / ISO 4017: width across flats (spanner size) 18 mm, head height 7.5 mm, coarse thread pitch 1.75 mm, clearance hole (ISO 273 medium) 13.5 mm. Tighten to approximately 85 Nm at property class 8.8 in a dry, as-supplied condition.

Width across flats (spanner size)

18 mm

Head height

7.5 mm

Coarse thread pitch

1.75 mm

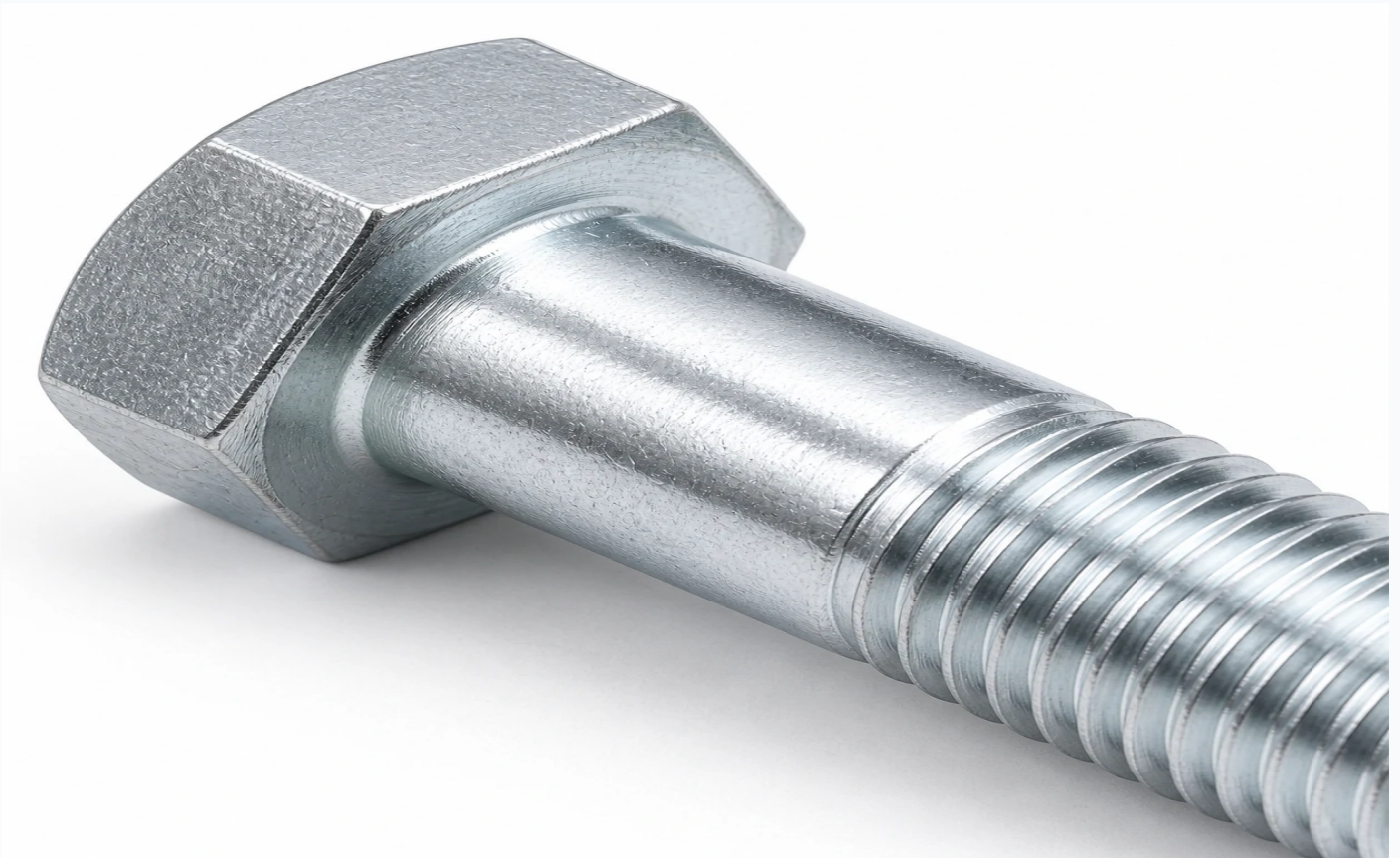
Clearance hole (ISO 273 medium)

13.5 mm

Tightening torque (class 8.8)

85 Nm

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



M12 is one of the standard coarse-thread sizes for hex bolts under ISO 4014 / ISO 4017. The sections below reproduce the dimensional row, list the matching tools and hole sizes, and summarize where this size is normally specified.

## M12 Dimensional Row (ISO 4014 / ISO 4017)

| Size | Pitch<br>coarse<br>(mm) | Width across<br>flats s (mm) | Width across<br>corners e min<br>(mm) | Head height<br>k nom (mm) | Nominal<br>diameter d<br>(mm) | Reference<br>standard | Notes                    |
|------|-------------------------|------------------------------|---------------------------------------|---------------------------|-------------------------------|-----------------------|--------------------------|
| M12  | 1.75                    | 18.0                         | 20.03                                 | 7.5                       | 12.0                          | ISO 4014/4017         | Partial / fully threaded |

## Spanner & Drive for M12 Hex Bolts

M12 Hex Bolts have a width across flats of 18.0 mm — fit a 18.0 mm open-ended spanner or socket. Use a 6-point socket for tight clearances and to reduce rounding; for repeated assembly choose a torque wrench so the joint preload is repeatable.

## Hole Sizes for M12

|                                           |         |
|-------------------------------------------|---------|
| Coarse-thread pitch (ISO 724)             | 1.75 mm |
| Through-hole / clearance (ISO 273 medium) | 13.5 mm |
| Tapping drill, coarse thread              | 10.2 mm |

## Tightening Torque for M12

|                                   |                  |
|-----------------------------------|------------------|
| Class 8.8 (dry, $\sim\mu$ 0.125)  | $\approx$ 85 Nm  |
| Class 10.9 (dry, $\sim\mu$ 0.125) | $\approx$ 120 Nm |
| Class 12.9 (dry, $\sim\mu$ 0.125) | $\approx$ 145 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 M12

|                                       |                      |
|---------------------------------------|----------------------|
| Tensile stress area $A_s$ (ISO 898-1) | 84.3 mm <sup>2</sup> |
| Proof load, class 8.8                 | 49 kN                |
| Proof load, class 10.9                | 70 kN                |
| Proof load, class 12.9                | 82 kN                |
| Min. ultimate tensile, class 8.8      | 67 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.

## Common Applications for M12 Hex Bolts

M12 Hex Bolts are commonly specified for medium-duty structural connections, automotive sub-frames and equipment chassis.

## Installation Tips for M12 Hex Bolts

- Use a 6-point socket where access allows — 12-point sockets are more prone to rounding the corners on smaller sizes.
- On flanged or serrated variants, do NOT add a separate flat washer — the flange already spreads the load and the washer can defeat the locking serrations.

## Mating Parts for M12

For M12, pair with a M12 hex nut (ISO 4032 / DIN 934) and, where used, a M12 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 (ISO 4014 / ISO 4017)

| Size | Pitch coarse (mm) | Width across flats s (mm) | Width across corners e min (mm) | Head height k nom (mm) | Nominal diameter d (mm) | Reference standard | Notes                    |
|------|-------------------|---------------------------|---------------------------------|------------------------|-------------------------|--------------------|--------------------------|
| M1   | 0.25              | 2.5                       | 2.71                            | 0.7                    | 1.0                     | ISO 4017           | Fully threaded           |
| M1.2 | 0.25              | 3.0                       | 3.28                            | 0.8                    | 1.2                     | ISO 4017           | Fully threaded           |
| M1.4 | 0.3               | 3.0                       | 3.28                            | 0.9                    | 1.4                     | ISO 4017           | Fully threaded           |
| M1.6 | 0.35              | 3.2                       | 3.48                            | 1.1                    | 1.6                     | ISO 4014/4017      | Fully threaded           |
| M2   | 0.4               | 4.0                       | 4.32                            | 1.4                    | 2.0                     | ISO 4014/4017      | Fully threaded           |
| M2.5 | 0.45              | 5.0                       | 5.45                            | 1.7                    | 2.5                     | ISO 4014/4017      | Fully threaded           |
| M3   | 0.5               | 5.5                       | 6.01                            | 2.0                    | 3.0                     | ISO 4014/4017      | Fully threaded           |
| M4   | 0.7               | 7.0                       | 7.66                            | 2.8                    | 4.0                     | ISO 4014/4017      | Fully threaded           |
| M5   | 0.8               | 8.0                       | 8.79                            | 3.5                    | 5.0                     | ISO 4014/4017      | Fully threaded           |
| M6   | 1.0               | 10.0                      | 11.05                           | 4.0                    | 6.0                     | ISO 4014/4017      | Fully threaded           |
| M8   | 1.25              | 13.0                      | 14.38                           | 5.3                    | 8.0                     | ISO 4014/4017      | Fully threaded           |
| M10  | 1.5               | 16.0                      | 17.77                           | 6.4                    | 10.0                    | ISO 4014/4017      | Fully threaded           |
| M12  | 1.75              | 18.0                      | 20.03                           | 7.5                    | 12.0                    | ISO 4014/4017      | Partial / fully threaded |
| M14  | 2.0               | 21.0                      | 23.36                           | 8.8                    | 14.0                    | ISO 4014/4017      | Partial / fully threaded |

| Size | Pitch<br>coarse<br>(mm) | Width across<br>flats s (mm) | Width across<br>corners e min<br>(mm) | Head height<br>k nom (mm) | Nominal<br>diameter d<br>(mm) | Reference<br>standard | Notes                    |
|------|-------------------------|------------------------------|---------------------------------------|---------------------------|-------------------------------|-----------------------|--------------------------|
| M16  | 2.0                     | 24.0                         | 26.75                                 | 10.0                      | 16.0                          | ISO 4014/4017         | Partial / fully threaded |
| M18  | 2.5                     | 27.0                         | 30.14                                 | 11.5                      | 18.0                          | ISO 4014/4017         | Partial / fully threaded |
| M20  | 2.5                     | 30.0                         | 33.53                                 | 12.5                      | 20.0                          | ISO 4014/4017         | Partial / fully threaded |
| M22  | 2.5                     | 32.0                         | 35.72                                 | 14.0                      | 22.0                          | ISO 4014/4017         | Partial / fully threaded |
| M24  | 3.0                     | 36.0                         | 39.98                                 | 15.0                      | 24.0                          | ISO 4014/4017         | Partial / fully threaded |
| M27  | 3.0                     | 41.0                         | 45.2                                  | 17.0                      | 27.0                          | ISO 4014/4017         | Partial / fully threaded |
| M30  | 3.5                     | 46.0                         | 50.85                                 | 18.7                      | 30.0                          | ISO 4014/4017         | Partial / fully threaded |
| M33  | 3.5                     | 50.0                         | 55.37                                 | 21.0                      | 33.0                          | ISO 4014/4017         | Partial / fully threaded |
| M36  | 4.0                     | 55.0                         | 60.79                                 | 22.5                      | 36.0                          | ISO 4014/4017         | Partial / fully threaded |
| M39  | 4.0                     | 60.0                         | 66.44                                 | 25.0                      | 39.0                          | ISO 4014/4017         | Partial / fully threaded |
| M42  | 4.5                     | 65.0                         | 71.3                                  | 26.0                      | 42.0                          | ISO 4014/4017         | Partial / fully threaded |
| M45  | 4.5                     | 70.0                         | 76.95                                 | 28.0                      | 45.0                          | ISO 4014/4017         | Partial / fully threaded |
| M48  | 5.0                     | 75.0                         | 82.6                                  | 30.0                      | 48.0                          | ISO 4014/4017         | Partial / fully threaded |
| M52  | 5.0                     | 80.0                         | 88.25                                 | 33.0                      | 52.0                          | ISO 4014/4017         | Partial / fully threaded |
| M56  | 5.5                     | 85.0                         | 93.56                                 | 35.0                      | 56.0                          | ISO 4014              | Partial / fully threaded |

| Size | Pitch<br>coarse<br>(mm) | Width across<br>flats s (mm) | Width across<br>corners e min<br>(mm) | Head height<br>k nom (mm) | Nominal<br>diameter d<br>(mm) | Reference<br>standard | Notes                    |
|------|-------------------------|------------------------------|---------------------------------------|---------------------------|-------------------------------|-----------------------|--------------------------|
| M60  | 5.5                     | 90.0                         | 99.21                                 | 38.0                      | 60.0                          | ISO 4014              | Partial / fully threaded |
| M64  | 6.0                     | 95.0                         | 104.86                                | 40.0                      | 64.0                          | ISO 4014              | Partial / fully threaded |

## 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

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.



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 spanner size fits M12 Hex Bolts?

The width across flats for M12 Hex Bolts is 18.0 mm, so a 18.0 mm spanner or 6-point socket fits.

What is the coarse-thread pitch of M12 for Hex Bolts?

For M12 the standard coarse pitch is 1.75 mm — this is the value used for Hex Bolts.

What torque do M12 class 8.8 Hex Bolts take?

A dry M12 class 8.8 joint takes about 85 Nm ( $\approx$  120 Nm for 10.9,  $\approx$  145 Nm for 12.9). Confirm against your joint design; lubrication reduces these values.

What clearance and tapping drill suit M12?

Use a 13.5 mm clearance hole (ISO 273 medium) for through-fixing, or a 10.2 mm tapping drill for a coarse M12 thread.

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 Bolts page](#)

### More Hex Bolts Guides

- [M1.6 Hex Bolts](#)
- [M2 Hex Bolts](#)
- [M2.5 Hex Bolts](#)
- [M3 Hex Bolts](#)
- [M4 Hex Bolts](#)
- [M5 Hex Bolts](#)
- [M6 Hex Bolts](#)
- [M8 Hex Bolts](#)