# ISO 7045 Pan Head Screws Specification

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ISO 7045 specifies the dimensions and tolerances for pan head screws. The full dimensional table is reproduced below, followed by the DIN, ISO and ASME parts that match or supersede it.

**Standard**

### ISO 7045

**Product**

### Pan Head Screws

**Governing standards**

### ISO 7045 / DIN 7985

Equivalence between national standards is dimensional, not always metallurgical. Check the property class separately when substituting.

Specification summary of ISO 7045 as applied to pan head screws: the dimensions the standard controls, the full specified size range, and the equivalent DIN/ISO/ASME designations.

## ISO 7045 — Scope

ISO 7045 is "Pan head screws with type H or type Z cross recess — Product grade A".

> *Material, property class, surface finish and packaging are governed by separate documents — ISO 898-1 and ISO 898-2 for mechanical property classes, ISO 4042 for electroplated finishes.*

# Tolerance & Product Grades

ISO 7045 is written to product grade A; a different grade of the same part is a different document in the family, not a variant of this one.

# Dimensions Specified by ISO 7045

| Size | Pitch (mm) | Head diameter dk (mm) | Head height k (mm) | Cross recess | Refere |
|---|---|---|---|---|---|
| M1 | 0.25 | 2.0 | 0.8 | PH0 | ISO 704 |
| M1.2 | 0.25 | 2.3 | 0.9 | PH0 | ISO 704 |
| M1.4 | 0.3 | 2.6 | 1.0 | PH0 | ISO 704 |
| M1.6 | 0.35 | 3.0 | 1.0 | PH0 | ISO 704 |
| M2 | 0.4 | 3.8 | 1.3 | PH1 | ISO 704 |
| M2.5 | 0.45 | 4.7 | 1.5 | PH1 | ISO 704 |
| M3 | 0.5 | 5.6 | 1.8 | PH1 | ISO 704 |
| M3.5 | 0.6 | 6.5 | 2.1 | PH2 | ISO 704 |
| M4 | 0.7 | 8.0 | 2.4 | PH2 | ISO 704 |
| M5 | 0.8 | 9.5 | 3.0 | PH2 | ISO 704 |
| M6 | 1.0 | 12.0 | 3.6 | PH3 | ISO 704 |
| M8 | 1.25 | 16.0 | 4.8 | PH3 | ISO 704 |
| M10 | 1.5 | 20.0 | 6.0 | PH4 | ISO 704 |

## Equivalent Standards

Where direct equivalents exist (ISO ↔ DIN, ISO ↔ ASME), they are listed on the parent Pan Head Screws page.

> *Always confirm against the dimensions on this page, since some "equivalent" standards differ in tolerances and head geometry.*

## When to Specify ISO 7045

Choose ISO 7045 for international engineering work and OEM supply where ISO standards are the contractual reference. It is the default modern specification for pan head screws.

Custom manufacturing · Made to drawing

### Need a screw to this standard in a non-standard size?

Parts built to ISO 7045 are already in the catalog, so a special is usually a variation on existing tooling rather than a new design — which is what keeps the cost down. Made by cold heading or warm forging.

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

**Custom screw manufacturing**

**(https://engineeringhardware.com/custom/screws/)**

**(https://engineeringhardware.com/custom/screws/)**

**Send a drawing (https://engineeringhardware.com/custom/screws/#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 M1 Pan Head Screws to ISO 7045 / DIN 7985. 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 (ISO 7045 / DIN 7985)

| Size | Pitch (mm) | Head diameter dk (mm) | Head height k (mm) | Cross recess | Refere |
|---|---|---|---|---|---|
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| M2 | 0.4 | 3.8 | 1.3 | PH1 | ISO 704 |
| M2.5 | 0.45 | 4.7 | 1.5 | PH1 | ISO 704 |
| M3 | 0.5 | 5.6 | 1.8 | PH1 | ISO 704 |
| M3.5 | 0.6 | 6.5 | 2.1 | PH2 | ISO 704 |
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## 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 Pan Head Screws are used, and what decides the specification in each case. Stocked from M1 to M10.**

### Industries that specify Pan Head Screws

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.**

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.**

### 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.**

**Full application guide: where Pan Head Screws are used, how to specify them, and the cases they are wrong for (https://engineeringhardware.com/applications/pan-head-screws/)**

## Video: ISO 7045 Pan Head Screws Specification

(https://www.youtube.com/watch?v=aNOgKJBE9X4)https://www.youtube.com/watch?v=aNOgKJBE9X4)

► Watch video: https://www.youtube.com/watch?v=aNOgKJBE9X4(https://www.youtube.com/watch?v=aNOgKJBE9X4)

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

### What does ISO 7045 specify for Pan Head Screws?

ISO 7045 specifies the dimensions and tolerances of pan head screws. Material and property class are governed by separate documents.

### What product grades does ISO 7045 define?

ISO 7045 is written to product grade A; a different grade of the same part is a different document in the family, not a variant of this one.

### Does ISO 7045 specify the mechanical strength?

No. ISO 7045 controls only the geometry of pan head screws. The mechanical strength is set by ISO 898-1 (bolts, screws and studs) or ISO 898-2 (nuts), and the finish by separate documents.

### Can I substitute ISO 7045 for the corresponding DIN standard on a drawing?

On modern drawings the ISO standard is the master reference; the older DIN equivalent is a cross-reference. For most dimensional purposes the parts are interchangeable, but check tolerance grades and the head height — these are the most common points of divergence.

### 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 Pan Head Screws page (https://engineeringhardware.com/fastener/pan-head-screws/)**

## More Pan Head Screws Guides

- **DIN 7985 Pan Head Screws (https://engineeringhardware.com/guide/standard/din-7985-pan-head-screws/)**