

M45 Bolt Size Chart: Hex Head Dimensions s, e and k

M45	Both standards (GB/T 5783 / 5782) × both grades (A / B)	Nominal (= max) values	Row-level standards
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M45 hex bolt: socket size s = 70 mm; head diagonal e min = — mm (grade A) / 76.95 mm (grade B); head height k = 28 mm nominal, 28.42 mm max in grade B; pitch P = 4.5 mm; fine pitch options (3). Head values are the standard's nominal (= max) or minimum figures, not measured guarantees.

M45 in both standards and both product grades

One row per thread form and product grade. The head columns repeat because GB/T 5783 and GB/T 5782 share the same head; b is tabulated in GB/T 5782 only, and a dash means the standard does not tabulate that value for the combination.

Thread form	Product grade	Coarse pitch P (mm)	Width across flats s (mm, nominal = max)	s min (mm)	Width across corners e min (mm)	Head height k (mm, nominal)	k max (mm)	b at l ≤ 125 mm	b at 125 < l ≤ 200 mm	b at l > 200 mm
Partially threaded (GB/T 5782)	A	—	—	—	—	—	—	—	—	—
Partially threaded (GB/T 5782)	B	4.5	70	68.1	76.95	28	28.42	—	102	115
Fully threaded (GB/T 5783)	A	—	—	—	—	—	—	—	—	—
Fully threaded (GB/T 5783)	B	4.5	70	68.1	76.95	28	28.42	—	—	—

Thread length b on partially threaded bolts (GB/T 5782)

b = 2d + 6 at l ≤ 125 mm, b ≈ 2d + 12 at 125 < l ≤ 200 mm, b ≈ 2d + 25 at l > 200 mm; the tabulated figure is that value rounded to a whole millimetre. Grade A tables carry the shorter bands only; grade B carries the band that applies to each size.

Thread length b by length band, grade B (mm)

Size	b at l ≤ 125 mm	b at 125 < l ≤ 200 mm	b at l > 200 mm
M45	—	102	115

Thread length b by length band, grade A (mm)

Size	b at l ≤ 125 mm	b at 125 < l ≤ 200 mm	b at l > 200 mm
M45	—	—	—

Quote the diameter and the length together: b follows l, so only "M12×100" pins the thread length down.

Fine pitch hex bolts (GB/T 5785): fine thread against coarse thread

One diameter, one head: every fine pitch of the same d shares the same s, e, k and r, so the socket size does not change with the pitch.

Nominal diameter d (mm)	Fine pitch P (mm)	Coarse pitch P (mm)
M45	(3)	4.5

A pitch in brackets is the non-preferred fine pitch of that diameter in GB/T 5785-2025; diameters not listed have no fine thread series in that standard.

M45 beside the next sizes

The sizes either side of M45. Measure the thread diameter d with a caliper and compare the head against the rows below before ordering; the nominal diameter steps by 0.5 mm or 1 mm in this range.

Size	Coarse pitch P (mm)	Width across flats s (mm, nominal = max)	Width across corners e min (mm)	Head height k (mm, nominal)
M42 (d = 42)	4.5	65	71.3	26
M45 (d = 45)	4.5	70	76.95	28
M48 (d = 48)	5	75	82.6	30

Which number do you need: s, e or k?

"Bolt size" means three different numbers depending on the job, and order codes use a fourth. Buying a tool uses s, checking a head that will not go into a socket uses e, and a counterbore or a flush-head check uses k.

- s — width across flats (nominal = max) — M45 is s = 70 mm. This is the socket, spanner or ring size, and the number stamped on the tool. It is the same in grade A and grade B and the same in GB/T 5783 and GB/T 5782, because the two standards share the hex head.

- **e — width across corners (min)** — M45 is $e_{min} = \text{--- mm}$ in grade A and 76.95 mm in grade B. This is the diagonal between two opposite corners of the head, the dimension that decides whether a 12-point socket or a ring spanner passes over the head. Most published bolt size charts leave this column out; it is also what you can still measure with a caliper once the flats have been rounded off.
- **k — head height (nominal, with a max)** — M45 is $k = 28 \text{ mm}$ nominal and 28.42 mm max in grade B. It sets how deep a counterbore or recess has to be and how far the head stands above the part. When the head must not protrude, k is the number to check, not s.
- **d — nominal thread diameter** — The number in the callout: M45 is a 45 mm thread, not a 45 mm head. The head is always wider, 70 mm across the flats here, which is where ordering by "size" alone goes wrong.
- **r — fillet radius under the head (min)** — $r_{min} = 1.2 \text{ mm}$ at M45. The washer face has to clear this radius, so it matters when the bolt sits in a corner, against a shoulder or in a slotted hole rather than on a flat face.

References

- GB/T 5783-2025 Hexagon head bolts, fully threaded - width across flats s, s_{min} , width across corners e min, head height k and fillet radius r min, product grades A and B; thread length rule $b = l - a$ — https://openstd.samr.gov.cn/bzgk/gb/std?std_no=GB%2FT%205783-2025
- GB/T 5782-2025 Hexagon head bolts, partially threaded - the same head dimensions, plus the thread length b in three nominal-length bands ($l \leq 125 \text{ mm}$, $125 < l \leq 200 \text{ mm}$, $l > 200 \text{ mm}$) — https://openstd.samr.gov.cn/bzgk/gb/std?std_no=GB%2FT%205782-2025
- GB/T 5785-2025 Hexagon head bolts with fine pitch thread - fine pitch options per nominal diameter and the same hex head (s, e, k unchanged) — https://openstd.samr.gov.cn/bzgk/gb/std?std_no=GB%2FT%205785-2025
- Table values are the nominal (= max) or minimum figures of the standard editions above, checked row by row against the official text. No table values are reproduced from third-party dimension tables, and every row is labelled with the standard it comes from.

Disclaimer: this table is a selection and quotation reference built from the standard editions named on this page, not a design basis or an acceptance standard.

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