

M12 Spring Washer Dimensions: 12.2–12.7 mm Inner, 21.1 mm Outer

M12 · Inner / outer diameter, S(b), free height · GB/T 93-2025 Table 1 sourcing · Weight from the catalogue coefficients

M12 normal-type spring lock washer (GB/T 93-2025 Table 1): inner diameter d 12.2–12.7 mm, S(b) nominal 3.1 mm, free height H 6.2–7.75 mm, m ≤ 1.55 mm; outer diameter D 21.1 mm and unit weight about 6 g are on our catalogue basis (carbon steel basis, bore taken at the nominal diameter).

M12 and the other 9 sizes: outer diameter, thickness coefficient and unit weight (catalogue basis)

Outer diameter D and thickness coefficient t come from the product catalogue weight coefficients (spec_json.weightCalc: method = washer_formula, version = v2, formula = ring_area*thickness); the unit weight is recomputed with the identical parameters and formula $\pi/4 \cdot (D^2 - d^2) \cdot t \cdot \rho$, with d at the nominal diameter and $\rho = 7.85 \text{ g/cm}^3$ for carbon steel (304 / 316L follow the density table below). The figures are the catalogue's rounded_g basis (1 decimal below 1 g, whole grams at 1 g and above) — the same numbers used on the product pages and in quotations.

Size	Inner d (Table 1 range, mm)	Outer D (mm)	Thickness coeff. t (mm)	Unit weight (g, carbon steel)	Bulk weight (kg / 1,000 pcs)
M12	12.2–12.7	21.1	3	6 g	6

GB/T 93-2025 Table 1: all 24 sizes (1.6–48 mm)

Every value is taken from GB/T 93-2025 Fasteners — Single coil spring lock washers — Normal type, Table 1 (PDF pages 8–9 = text pages 2–3), in millimetres. d = inner diameter; S(b) = the section dimension column of Table 1, quoted here exactly as the standard writes it, with no symbol conversion (GB/T 859-2025, the light series, splits S and b into separate columns — the two standards have different dimension tables and cannot be cited interchangeably); H = free height; m ≤ = the upper limit of m in Table 1. Sizes in parentheses ((14) / (18) / (22) / (27) / (33) / (39) / (45)) are the non-preferred sizes listed in the standard's table note.

Size (thread major dia.)	d min	d max	S(b) nom.	S(b) min	S(b) max	H min	H max	m ≤
1.6	1.7	1.95	0.5	0.42	0.58	1	1.25	0.25
2	2.1	2.35	0.5	0.42	0.58	1	1.25	0.25
2.5	2.6	2.85	0.65	0.57	0.73	1.3	1.63	0.33
3 ·	3.1	3.4	0.8	0.7	0.9	1.6	2	0.4
4 ·	4.1	4.4	1.1	1	1.2	2.2	2.75	0.55
5 ·	5.1	5.4	1.3	1.2	1.4	2.6	3.25	0.65
6 ·	6.1	6.5	1.6	1.5	1.7	3.2	4	0.8
8 ·	8.1	8.5	2.1	2	2.2	4.2	5.25	1.05
10 ·	10.2	10.7	2.6	2.45	2.75	5.2	6.5	1.3
12 ·	12.2	12.7	3.1	2.95	3.25	6.2	7.75	1.55
(14)	14.2	14.7	3.6	3.4	3.8	7.2	9	1.8
16 ·	16.2	16.8	4.1	3.9	4.3	8.2	10.25	2.05
(18)	18.2	18.9	4.5	4.3	4.7	9	11.25	2.25
20 ·	20.2	21	5	4.8	5.2	10	12.5	2.5
(22)	22.3	23.1	5.5	5.3	5.7	11	13.75	2.75
24 ·	24.3	25.3	6	5.8	6.2	12	15	3
(27)	27.3	28.3	6.8	6.5	7.1	13.6	17	3.4
30	30.3	31.3	7.5	7.2	7.8	15	18.75	3.75
(33)	33.3	34.5	8.5	8.2	8.8	17	21.25	4.25
36	36.3	37.5	9	8.7	9.3	18	22.5	4.5
(39)	39.3	40.5	10	9.7	10.3	20	25	5
42	42.3	43.5	10.5	10.2	10.8	21	26.25	5.25
(45)	45.3	46.5	11	10.7	11.3	22	27.5	5.5
48	48.3	49.5	12	11.7	12.3	24	30	6

The bracketed sizes ((14) / (18) / (22) / (27) / (33) / (39) / (45)) are non-preferred; size 1.6 is new in this 2025 edition, and this edition also changed some d dimensions. Clickable sizes in the first column are the 10 sizes we quote (M3 / M4 / M5 / M6 / M8 / M10 / M12 / M16 / M20 / M24) — open one to see its outer diameter and unit weight. For every other size this page gives the standard dimensions only and no weight: without a weight coefficient we do not invent a figure.

Edition difference: our catalogue coefficients vs GB/T 93-2025 Table 1 (size by size)

GB/T 93-2025 has replaced GB/T 93—1987 (issued 2025-10-31, effective 2026-02-01) and its Table 1 does not include an outer diameter column. Below, the catalogue coefficients (outer diameter D × thickness coefficient t) sit next to the matching Table 1 columns: thickness difference = our t – Table 1 S(b) nominal; weight difference = our ring area uses the nominal bore (12 mm for M12) while Table 1 gives the inner diameter as a range (12.2–12.7 mm for M12) — a smaller bore makes the ring area larger, so our unit weight runs above a Table 1 inner-diameter basis; the spread is computed at both ends of the range (d min / d max). The table only describes the relation between the two bases: nothing is changed in the catalogue, and our coefficients are never presented as Table 1 values.

Size	Our D × t	Table 1 S(b) nom.	Thickness diff.	Table 1 d range	Our unit weight vs a Table 1 inner-diameter basis
M3	5.1 × 0.8	0.8	same	3.1–3.4	+3.7% – +17.7%
M4	6.8 × 0.9	1.1	-0.2 mm	4.1–4.4	+2.8% – +12.5%
M5	8.8 × 1.2	1.3	-0.1 mm	5.1–5.4	+2% – +8.6%
M6	11.8 × 1.6	1.6	same	6.1–6.5	+1.2% – +6.4%
M8	14.8 × 2	2.1	-0.1 mm	8.1–8.5	+1% – +5.6%
M10	18.1 × 2.5	2.6	-0.1 mm	10.2–10.7	+1.8% – +6.8%
M12	21.1 × 3	3.1	-0.1 mm	12.2–12.7	+1.6% – +6.1%
M16	27.4 × 4	4.1	-0.1 mm	16.2–16.8	+1.3% – +5.6%
M20	33.6 × 5	5	same	20.2–21	+1.1% – +6%
M24	40 × 6	6	same	24.3–25.3	+1.4% – +6.7%

How to use it: quotations, freight and packing go by the catalogue basis (estimate, not an inspection figure); dimensional verification against GB/T 93-2025 Table 1 goes by the first table above. The gap between the two is exactly what this table lists, size by size — no manual back-calculation needed.

Material density conversion

Three material options are quoted (carbon steel / 304 / 316L): the unit weights above are on the carbon steel basis, and other materials scale by the density ratio (weight × factor). GB/T 93-2025 groups materials in Table 2 as spring steel / stainless steel / phosphor bronze, and that table is identical in GB/T 859-2025 — it cannot tell the normal type from the light type; the only dividing lines are Table 1 dimensions and the range limit.

Material	Density (g/cm³)	Factor vs carbon steel
Carbon steel / spring steel	7.85	×1.000
Stainless 304	7.93	×1.010
Stainless 316L	7.98	×1.017

Anti-loosening limits: washer spread with 10.9 / 12.9 property classes

GB/T 93-2025 carries this note in its scope (PDF page 7 = text page 1): where the spring lock washers specified in this document are used with bolts and screws of property classes 10.9 and 12.9, attention should be paid to the washer spreading (opening-up) phenomenon.

That is a caution stated by the standard, not a prohibition for classes 10.9 / 12.9 — spring washers can still be used, but a high-strength joint carries high preload and the washer may open up radially, changing the fit and the clamping state. In practice: (1) check bolt torque against the target preload (our torque chart for the same size gives ranges by the K-factor method); (2) where the spreading risk is high, use or add another locking method (all-metal prevailing torque nuts, threadlocker, double nuts, other elastic washers), chosen by the designer from the joint load and vibration duty; (3) surface defects follow Table 2 — cracks, rust and harmful dents, scratches and burrs are not permitted. We publish no spring or clamping force figures: GB/T 93-2025 gives none, so any force derived from dimensions or grade would not be a standard value.

Data basis and assumptions

Two kinds of figures, two sources, marked column by column. (1) The standard dimension columns (d / S(b) / H / m) are taken value by value from GB/T 93-2025 Table 1 (PDF pages 8–9) and carried in utils/springWasherCalc.ts; the check script ops/tools/gen-spring-washer-chart-data.mjs --check re-parses the distilled fact layer and compares every cell (9 columns × 24 sizes, all equal). (2) The weight column and the 10 outer diameter / thickness coefficients come from the product catalogue, MySQL prd_sku.spec_json.weightCalc (method = washer_formula, version = v2, formula = ring_area*thickness, confidence = estimate): the recomputed raw_g and rounded_g match all 53 SW- SKUs in the catalogue exactly. This page copies nothing beyond those standard table values and does not use the dimension table of GB/T 859 (light type).

Limits: (1) the dimensions here are standard table values, not a measurement of the parts in your hands — cite them as "per GB/T 93-2025 Table 1, size N has d ..., S(b) nominal ..., H ..., m ≤ ..." and never as our measured product data; (2) the weights are quotation estimates (quoting, freight, packing), while real unit weight varies with chamfers, the split shape and coating (hot-dip galvanising about +4.5%) — settle on actual weighing; (3) our weights use the nominal bore, and the gap versus the Table 1 inner-diameter range is listed in the edition-difference table, so no manual correction is needed; (4) sizes we do not quote (1.6 / 2 / 2.5 / 14 / 18 / 22 / 27 / 30 / 33 / 36 / 39 / 42 / 45 / 48) carry standard dimensions only and no weight — no coefficient, no figure; ask for a quote by standard and size; (5) this page publishes no spring force, clamping force or test load figures — GB/T 93-2025 gives none, and elasticity, torsion and hydrogen embrittlement resistance are referenced to GB/T 94.1.

References

- GB/T 93-2025 Fasteners — Single coil spring lock washers — Normal type (issued 2025-10-31, effective 2026-02-01, replacing GB/T 93—1987) — source of the standard dimension columns and the scope note on this page, transcribed value by value with page references (Table 1 = PDF pages 8–9, scope note = PDF page 7); the licensed copy is held offline and is not re-hosted on this site
- GB/T 94.1-2008 Specification for spring washers — Single coil spring lock washers (National Standards Information Public Service Platform) — elasticity, torsion, hydrogen embrittlement resistance and test methods are referenced to it; GB/T 93-2025 gives no test method detail — https://openstd.samr.gov.cn/bzgk/gb/std?std_no=GB%2FT%2094.1-2008

- GB/T 859-2025 Fasteners — Single coil spring lock washers — Light type (National Standards Information Public Service Platform) — the companion light series; its table splits S and b, so its values are not used here and it serves only as a system cross-reference — https://openstd.samr.gov.cn/bzgk/gb/std?std_no=GB%2FT%20859-2025
- Product catalogue weight coefficients (MySQL prd_sku.spec_json.weightCalc, method = washer_formula, version = v2) — source of the weight column and of the 10 outer diameter / thickness coefficients, identical to the product pages and the weight calculator

Disclaimer: this page is engineering reference material combining standard table values with quotation estimates, for selection, quoting and fit checks; it is not a design basis or an inspection standard — dimensional acceptance follows the standard edition named in your drawing or contract.

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