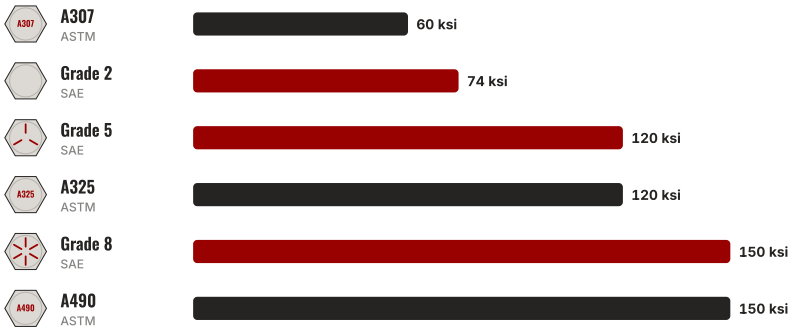
Bolt Grade Markings & Strength

jandesupply.com/reference-bolt-grades.php

J & E Supply & FASTENER CO.

What the lines and letters on a bolt head mean — and how much load each grade is built to take. Read the head, know the bolt.

The marks stamped on top of a bolt head are its **grade** — a shorthand for how strong it is and what it's made of. A higher grade means a stronger bolt, not a bigger one: a Grade 8 and a Grade 2 of the same size look alike until you read the head. The numbers below are the three that matter — **proof**, **yield**, and **tensile** — given in ksi (1 ksi = 1,000 pounds per square inch). When in doubt, match the grade you're replacing; stepping down can let a joint fail, and stepping up isn't always free of trade-offs.

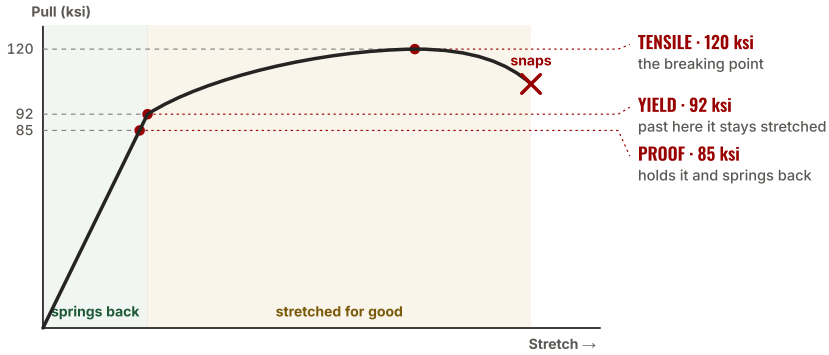


Minimum tensile strength, smallest size range of each grade (from the tables below). Same size bolt — the grade is the difference.

Proof load
The stress a bolt can hold and still spring back — the everyday "don't exceed" working number.

Yield strength
Push past this and the bolt stretches for good. The line between "reusable" and "permanently deformed."

Tensile strength
The breaking point — where the bolt finally snaps. Always the highest of the three.



What a pull test on a ½″ Grade 5 bolt looks like. Every grade follows the same shape — only the three numbers move.

SAE grades — general & automotive

The grades you meet most often on shelves, in trucks, and around the shop. Marks are radial lines on the head.

HEAD MARK	GRADE	MATERIAL	SIZE RANGE	PROOF (KSI)	YIELD (KSI)	TENSILE (KSI)
NO MARKS	Grade 2	Low / medium carbon steel	¼″ – ¾″	55	57	74
	Grade 2	Low / medium carbon steel	>¾″ – 1½″	33	36	60
	Grade 5	Medium carbon steel, quenched & tempered	¼″ – 1″	85	92	120
	Grade 5	Medium carbon steel, quenched & tempered	>1″ – 1½″	74	81	105

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HEAD MARK	GRADE	MATERIAL	SIZE RANGE	PROOF (KSI)	YIELD (KSI)	TENSILE (KSI)
	**Grade 8**	Medium carbon alloy steel, quenched & tempered	¼″ – 1½″	120	130	150

Values per SAE J429. Where a grade spans two size ranges, the larger sizes carry lower numbers — bigger bolts can't be hardened all the way through as evenly.

ASTM structural bolts

Steel-construction bolts — usually heavy hex — stamped with their spec right on the head.

HEAD MARK	SPEC	MATERIAL / USE	SIZE RANGE	PROOF (KSI)	YIELD (KSI)	TENSILE (KSI)
	**A307 Gr. A**	Low carbon — general structural & anchor bolts	¼″ – 4″	—	—	60
	**A325**	Medium carbon, heat treated — structural steel connections	½″ – 1½″	85	92	120
	**A490**	Alloy steel, heat treated — high-strength structural	½″ – 1½″	120	130	150

Values per ASTM A307 / A325 / A490. A325 and A490 are now published under ASTM F3125 as grades, but the original callouts are still in everyday use. Under F3125, A325 over 1″ carries the same 85 / 92 / 120 as the smaller sizes (the old A325 rated 1-1/8″–1-1/2″ at 74 / 81 / 105). A307 is a low-strength general bolt — no proof or yield is specified, only a minimum tensile.

Metric lookalikes

Metric bolts carry a **number** on the head instead of lines. Two of them sit close to the inch grades:



Grade 5
120 ksi

≈



Class 8.8
800 MPa ≈ 116 ksi



Grade 8
150 ksi

≈



Class 10.9
1,040 MPa ≈ 151 ksi

Close in strength, **not** interchangeable — the threads are different. A metric bolt takes a metric nut. See metric vs. inch.

Other things people ask at the counter

Stainless isn't graded this way. Common 18-8 stainless (304-series) is rated by its alloy and how much it's been work-hardened, not by a Grade number — typical tensile runs roughly 70–100 ksi. Stainless is chosen for corrosion resistance first; if you need both high strength and corrosion resistance, ask us about the right alloy.

Socket head cap screws run higher. Standard alloy-steel socket cap screws (ASTM A574) are heat treated to about 170–180 ksi tensile — stronger than Grade 8 — which is why they show up in machinery and tooling.

Match what you're replacing. The safest rule on an existing assembly is to put back the same grade. If you're not sure what came out, bring the old bolt to either counter and we'll read the head with you.

Reference values drawn from the governing standards. For critical applications, confirm against the standard and the manufacturer's published data. Technical information disclaimer →