

ASTM A194





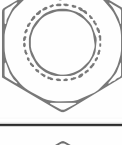
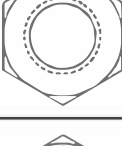
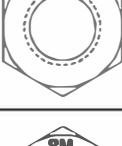



Grades

Grade	Description
2	Carbon steel heavy hex nuts
2H	Quenched & tempered carbon steel heavy hex nuts
2HM	Quenched & tempered carbon steel heavy hex nuts
4	Quenched & tempered carbon-molybdenum heavy hex nuts
7	Quenched & tempered alloy steel heavy hex nuts
7M	Quenched & tempered alloy steel heavy hex nuts
8	Stainless AISI 304 heavy hex nuts
8M	Stainless AISI 316 heavy hex nuts

Scope

The ASTM A194 specification covers carbon, alloy and stainless steel nuts intended for use in high-pressure and/or high-temperature service. Unless otherwise specified, the American National Standard Heavy Hex Series (ANSI B 18.2.2) shall be used. Nuts up to and including 1 inch nominal size shall be UNC Series Class 2B fit. Nuts over 1 inch nominal size shall be either UNC Series Class 2B fit or 8 UN Series Class 2B fit. High strength ASTM A194 grade 2H nuts are common in the marketplace and are often substituted for ASTM A563 grade DH nuts due to the limited availability of DH nuts in certain diameters and finishes.

Mechanical Properties, Grade Identification Markings								
Grade Identification Marking ⁵	Specification	Material	Nominal Size, In.	Tempering Temp. °F	Proof Load Stress, ksi	Hardness Rockwell		See Note
						Min	Max	
	ASTM A194 Grade 2	Medium Carbon Steel	1/4-4	0	150	159	352	1,2,3
	ASTM A194 Grade 2H	Medium Carbon Steel, Quenched and Tempered	1/4-5	850	175	C24	C38	1,2
	ASTM A194 Grade 2HM	Medium Carbon Steel, Quenched and Tempered	1/4-6	1150	150	159	237	1,2,3
	ASTM A194 Grade 4	Medium Carbon Alloy Steel, Quenched and Tempered	1/4-7	1100	175	C24	C38	1,2
	ASTM A194 Grade 7	Medium Carbon Alloy Steel, Quenched and Tempered	1/4-8	1100	175	C24	C38	1,2
	ASTM A194 Grade 7M	Medium Carbon Alloy Steel, Quenched and Tempered	1/4-9	1150	150	159	237	1,2,3
	ASTM A194 Grade 8	Stainless AISI 304	1/4-10	-	80	126	300	4
	ASTM A194 Grade 8M	Stainless AISI 316	1/4-11	-	80	126	300	4

NOTES:

- The markings shown for all grades of A194 nuts are for cold formed and hot forged nuts. When nuts are machined from bar stock, the nut must additionally be marked with the letter 'B'. The letters H and M indicate heat treated nuts.
 - Properties shown are those of coarse and 8-pitch thread heavy hex nuts.
 - Hardness numbers are Brinell Hardness.
 - Nuts that are carbide-solution treated require additional letter A - 8A or 8MA.
 - All nuts shall bear the manufacturer's identification mark. Nuts shall be legibly marked on one face to indicate the grade and process of the manufacturer. Marking of wrench flats or bearing surfaces is not permitted unless agreed upon between manufacturer and purchaser. Nuts coated with zinc have an asterisk (*) marked after the grade symbol. Nuts coated with cadmium shall have a plus sign (+) marked after the grade symbol.
 - Other less common grades exist, but are not listed here.
- Inch Fastener Standards. 7th ed. Cleveland: Industrial Fasteners Institute, 2003. N-80 - N-81.

Chemical Properties

Element	2, 2H, and 2HM	4	7 and 7M (AISI 4140)	8 (AISI 304)	8M (AISI 316)
Carbon	0.40% min	0.40 - 0.50%	0.37 - 0.49%	0.08% max	0.08% max
Manganese	1.00% max	0.70 - 0.90%	0.65 - 1.10%	2.00% max	2.00% max
Phosphorus, max	0.04%	0.04%	0.04%	0.05%	0.05%
Sulfur, max	0.05%	0.04%	0.04%	0.03%	0.03%
Silicon	0.40% max	0.15 - 0.35%	0.15 - 0.35%	1.00% max	1.00% max
Chromium			0.75 - 1.20%	18.0 - 20.0%	16.0 - 18.0%
Nickel				8.0 - 11.0%	10.0 - 14.0%
Molybdenum		0.20 - 0.30%	0.15 - 0.25%		2.00 - 3.00%