

The American Society for Testing and Materials is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

ASTM A320 Alloy steel and stainless steel bolting materials for low temperature service.

Originally approved in 1948, the ASTM A320 specification covers alloy steel and stainless steel bolting materials for low temperature service. This standard covers rolled, forged, or strain hardened bars, bolts, screws, studs, and stud bolts used for pressure vessels, valves, flanges, and fittings. Like the ASTM A193 specification, unless otherwise specified, the 8UN thread series is specified on fastener larger than 1" in diameter.

Below is a basic summary of a few of the common grades within the ASTM A320 specification. A number of other less common grades of ASTM A320 exist, but not covered in the description below.

A320 Grades

L7 Alloy steel	AISI 4140/4142 Quenched and tempered
L43 Alloy steel	AISI 4340 Quenched and tempered
B8 Class 1 Stainless steel	AISI 304, carbide solution treated
B8M Class 1 Stainless steel	AISI 316, carbide solution treated
B8 Class 2 Stainless steel	AISI 304, carbide solution treated, strain hardened
B8M Class 2 Stainless steel	AISI 316, carbide solution treated, strain hardened

A320 Mechanical Properties

Grade	Diameter	Tensile, ksi, min	Yield, ksi, min	Charpy Impact 20-ft-lbf @ temp	Elong, %, min	RA, %, min
L7	UP to 2-1/2	125	105	-150° F	16	50
L43	Up to 4	125	105	-150° F	16	50
Class 1: BC, B8C, B8M, B8P, B8F, B8T, B8LN, B8MLN	All	75	30	N/A	30	50
Class 1A: B8A, B8CA, B8MA, B8PA, B8FA, B8TA, B8LNA, B8MLNA	All	75	30	N/A	30	50
Class 2: B8, B8C, B8P, B8F, B8T	Up to 3/4	125	100	N/A	12	35
	7/8 - 1	115	80	N/A	15	35
	11/8 - 11/4	105	65	N/A	20	35
	13/8 - 11/2	100	50	N/A	28	45
Class 2: B8M	Up to 3/4	110	95	N/A	15	45
	7/8 - 1	100	80	N/A	20	45
	11/8 - 11/4	95	65	N/A	25	45
	13/8 - 11/2	90	50	N/A	30	45

A320 Chemical Properties

Element	L7 (AISI 4140)	L43 (AISI 4340)	B8 (AISI 304)	B8M (AISI 316)
Carbon	0.38 - 0.48%	0.38 - 0.43%	0.08% max	0.08% max
Manganese	0.75 - 1.00%	0.75 - 1.00%	2.00% max	2.00% max

Phosphorus, max	0.035%	0.035%	0.045%	0.045%
Sulfur, max	0.040%	0.040%	0.030%	0.030%
Silicon	0.15 - 0.35%	0.15 - 0.35%	1.00% max	1.00% max
Chromium	0.80 - 1.10%	0.70 - 0.90%	18.0 - 20.0%	16.0 - 18.0%
Nickel		1.65 - 2.00%	8.0 - 11.0%	10.0 - 14.0%
Molybdenum	0.15 - 0.25%	0.20 - 0.30%		2.00 - 3.00%

A320 Recommended Hardware

Grade	Nuts	Washers
L7	A194 Grade 4 or 7	F436
L43	A194 Grade 4 or 7	F436
B8 Class 1	A194 Grade 8	SS304
B8M Class 1	A194 Grade 8M	SS316
B8 Class 2	A194 Grade 8	SS304
B8M Class 2	A194 Grade 8M	SS316

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