



# ASTM A320



## Scope

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.*

## Grades

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

## Recommended Nuts and Washers

Grade	Nuts	Washers
L7	A194 Grade 4	F436
L43	A194 Grade 4	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	Grade 8M	SS316

*Strain hardened nuts available as a supplementary requirement*

## Mechanical Properties

Grade	Size	Tensile, ksi, min	Yield, ksi, min	Charpy Impact 20-ft-lbf @temp	Elong, %, min	RA, %, min
L7	Up to 2 <sup>1</sup> / <sub>2</sub>	125	105	-150° F	16	50
L43	Up to 4	125	105	-150° F	16	50
B8 Class 1	All	75	30	N/A	30	50
B8M Class 1	All	75	30	N/A	30	50
B8 Class 2	Up to 3 <sup>3</sup> / <sub>4</sub>	125	100	N/A	12	35
	7/8-1	115	80	N/A	15	35
	1 <sup>1</sup> / <sub>8</sub> - 1 <sup>1</sup> / <sub>4</sub>	105	65	N/A	20	35
	1 <sup>3</sup> / <sub>8</sub> - 1 <sup>1</sup> / <sub>2</sub>	100	50	N/A	28	45
B8M Class 2	Up to 3 <sup>3</sup> / <sub>4</sub>	110	95	N/A	15	45
	7/8-1	100	80	N/A	20	45
	1 <sup>1</sup> / <sub>8</sub> - 1 <sup>1</sup> / <sub>4</sub>	95	65	N/A	25	45
	1 <sup>3</sup> / <sub>8</sub> - 1 <sup>1</sup> / <sub>2</sub>	90	50	N/A	30	45

## Chemical Properties

Element	L7 (AISI 4140)	L43 (AISI 4340)	B8 (AISI 304)	B8M (AISI 316)
Carbon	0.37 - 0.49%	0.38 - 0.43%	0.08%	0.08% max
Manganese	0.65 - 1.10%	0.75 - 1.00%	2.00%	2.00% max
Phosphorus, max	0.04%	0.04%	0.05%	0.05%
Sulfur, max	0.04%	0.04%	0.03%	0.03%
Silicon	0.15 - 0.35%	0.15 - 0.35%	1.00%	1.00% max
Chromium	0.75 - 1.20%	0.70 - 0.90%	18.0 -	16.0 - 18.0%
Nickel		1.65 - 2.00%	8.0 -	10.0 - 14.0%
Molybdenum	0.15 - 0.25%	0.20 - 0.30%		2.00 - 3.00%

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