



# ASTM A320

Scope - This 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.

<b>Grades</b>	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

<b>Mechanical Properties</b>	Grade	Marking	Size	Tensile, ksi, min	Yield, ksi, min	Charpy Impact 20-ft-lbf @ temp	Elong, %, min	RA, %, min	Hardness max
	L7	L7	Up to 2 ½	125	105	-150° F	16	50	C35
	L43	L43	Up to 4	125	105	-150° F	16	50	C35
	B8 Cl 1	B8	All	75	30	N/A	30	50	B96
	B8M Cl 1	B8M	All	75	30	N/A	30	50	B90
	B8 Cl 2 B8	B8	Up to ¾	125	100	N/A	12	35	C35
			7/8 to 1	115	80	N/A	15	35	C35
			1 1/8 to 1 ¼	105	65	N/A	20	35	C35
			1 3/8 to 1 ½	100	50	N/A	28	45	C35
	B8M Cl 2 B8M	B8M	Up to ¾	110	95	N/A	15	45	C35
7/8 to 1			100	80	N/A	20	45	C35	
1 1/8 to 1 ¼			95	65	N/A	25	45	C35	
1 3/8 to 1 ½			90	50	N/A	30	45	C35	

<b>Chemical Properties</b>	Element	L7 (AISI 4140)	L43 (AISI 4340)	B8 (AISI 304)	B8M (AISI 316)
	Carbon	0.37 - 0.49	0.38 - 0.43	0.08 max	0.08 max
	Manganese	0.65 - 1.10	0.75 - 1.00	2.00 max	2.00 max
	Phosphorus, max	0.035	0.035	0.045	0.045
	Sulfur, max	0.04	0.04	0.03	0.03
	Silicon	0.15 - 0.35	0.15 - 0.35	1.00 max	1.00 max
	Chromium	0.75 - 1.20	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

<b>Recommended Mating Materials</b>	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