

DESIGN STRESS VALUES (KSI) VS TEMPERATURE

SPEC	GRADE	TEMPERATURE deg F (deg C)									
		650	700	750	800	850	900	950	1000	1050	1100
		343	371	399	427	454	482	510	538	566	593
ASTM A193	B6	21.2	21.2	21.2	19.5	15.6	12				
ASTM A193	B7(*)										
ASTM A193	B7M	25	25	23.6	21	17	12.5	8.5	4.5		
ASTM A193	(*)	20	20	20	18.5	16.2	12.5	8.5	4.5		
ASTM A193	B8-CL1	11.2	11	10.8	10.5	10.3	10.1	9.9			
ASTM A193	B8-CL2	25									
ASTM A193	(* *)	25	25	25	25	23.5	20.5	16	11	6.3	2.8
ASTM A193	B16										
ASTM A320	L7	25	25								
BS	B17B	20	19.8	19.8	19.8	19.7	19.7	19.6	19.4	19.3	16.6
ASTM 453	660	20.2	20.1	20	19.9	19.9	19.9	19.8	19.8		

(*) FOR BOLT DIAMETERS < 2 1/2"

PLEASE NOTE THAT THE ABOVE VALUES ARE FOR REFERENCE PURPOSES ONLY. VALUES SHOULD BE EXTRACTED FROM ASME OR BS 5500.

(**) FOR BOLT DIAMETERS < 3/4"

MATERIAL	TEMPERATURE °C (°F)	
	MIN.	MAX.
CARBON STEEL	-29 (-20)	300 (572)
B7, L7	-73 (-100)	400 (752)
B6	0 (32)	500 (932)
B8	-200 (-325)	575 (1067)
B16	0 (32)	520 (968)
B17B	-29 (-20)	650 (1202)
INC 718	0 (32)	750 (1382)
660	-29 (20)	538 (1000)

ASTM A – 194 “Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service”

Identification	AISI Type	Outstanding Chemical
Ferritic		
L-7	4140-4142-4145	Chromium-Mooylbdenum
L-7M	4140-4142-4145	Chromium-Mooylbdenum
L-7A	4037	Carbon-Mooylbdenum
L-7B	4137	Chromium-Mooylbdenum
L-7C	8740	Nickel-Chromium-Mooylbdenum
L-43	4340	Nickel-Chromium-Mooylbdenum
Austenitic		
B8, B8A	304	Unstabilized 18 Chromium-8 Nickel
B8-C, B8CA	347	Stabilized 18 Chromium-8 Nickel
B-8M, BBMA	316	18 Chromium-10-Nickel-2 Molybdenum
B-8T, B8TA	321	Stabilized 18 Chromium-8 Nickel
B-8F, B8FA	303	Free Machining 18 Chromium-8 Nickel

The Ferritic Steel Grades L7 and L7M together with the Austenitic Grades B8 and B8M are normally stocked for immediate shipment, with the other Grades available on special order. Grade L7 is normally used to -50°F without a Charpy Test and to -150°F with a Charpy Test. Grade L7M is normally used in H2S service with a required Charpy Test at -100°F. All of the Austenitic steels listed above may be used to -325°F without a Charpy Impact Test and at lower temperatures with the requisite Impact Tests.

ASTM A – 320 “Standard Specification for Alloy-Steel and Stainless-Steel Bolting Materials for Low-Temperature Service”

Identification	AISI Type	Outstanding Chemical
Ferritic		
2-HM		Carbon
2-H		Carbon
4		Carbon-Moylbdenum
3	501	5% Chromium
6	410	12% Chromium
6-F	416	12% Chromium
7	4140-4142-4145	Chromium-Moylbdenum
Austenitic		
8	304	18 Chromium-8 Nickel
8-C	347	18 Chromium-8 Nickel
8-M	316	18 Chromium-10-Nickel-2 Molybdenum
8-T	321	18 Chromium-8 Nickel
8-F	303	18 Chromium-8 Nickel
8-P	305	18 Chromium-10 Nickel

Dan-Loc Group stocks the Ferritic steel nuts in Grades 2H, 2HM, 7, L7, and L7M which are normally used in conjunction with Grade B7, B7M, B16, L7 and L7M studs. The Austenitic steel nuts, Grade 8 and 8M are also available from stock for use on stainless steel studs and bolts. Dan-Loc Group stocks heavy pattern hex nuts in the grades listed above to the dimensional requirements of ANSI B18.22.1. Unless otherwise specified, these nuts are tapped UNC-2B in sizes 1" and under, and 8UN-2B over 1" diameter. All other grades of nuts listed may require special order.

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		11.2	11	10.8	10.5	10.3	10.1	9.9			
ASTM A193	B8-CL1(**)	11.2	11	10.8	10.5	10.3	10.1	9.9			
ASTM A193	B8-CL2(**)	25									
ASTM A193	B16	25	25	25	25	23.5	20.5	16	11	6.3	2.8

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(**) FOR BOLT DIAMETERS < 3/4"

Recommended Working Temperatures of Bolt Materials

MATERIAL	TEMPERATURE °C (°F)	
	MIN.	MAX.
CARBON STEEL	-29 (-20)	300 (572)
B7, L7	-73 (-100)	400 (752)
B6	0 (32)	500 (932)
B8	-200 (-325)	575 (1067)
B16	0 (32)	520 (968)
B17B	-29 (-20)	650 (1202)
INC 718	0 (32)	750 (1382)
660	-29 (20)	538 (1000)

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Ferritic		
B8, B8A	304	Unstabilized 18 Chromium-8 Nickel
B8-C, B8CA	347	Stabilized 18 Chromium-8 Nickel
B-8M, BBMA	316	18 Chromium-10-Nickel-2 Molybdenum
B-8T, B8TA	321	Stabilized 18 Chromium-8 Nickel
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Austenitic		
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